DELTA

MD-88

Quick Reference Handbook

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Crash Landing or Ditching

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

Note: Refer to FCTM for 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 SMOK/SEAT BELTS Switches . . . . . ON

2 Center Instrument Panel
EGPWS TERRAIN OVRD . . . . . OVRD

Note: EGPWS warnings will be inhibited.

3 Plan a flaps 28 landing.

Note: A 28/LAND position 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 40/LAND approach.

4 AIR CONDITIONING SUPPLY 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).

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▼Crash Landing or Ditching continued▼

5 Cabin Pressurization . . . . . Depressurize manually

Note: Manual control wheel forces will be high unless airspeed is low.

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

6 RADIO RACK Switch . . . . . FAN

7 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

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▼Crash Landing or Ditching continued▼

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
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

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▼Crash Landing or Ditching continued▼

Additional Deferred Items

Choose one:

◆**Ditching** is required:

Gear Handle . . . . . UP

CAWS, SSRS-1, LDG GEAR, T/O, A/P, SP BK, CAB ALT CB P38 (lower EPC). . Pull

Note: This action silences landing gear warning.

When depressurized,

CABIN ALT
Control Wheel . . . . . (Full forward)
VALVE CLOSED

Note: This action closes pressurization nozzle and outflow valve in order to present a smoother fuselage surface during ditching, and to close openings to improve flotation. Outflow valve and nozzle will be below water line following ditching.

►►**Go to Landing Checklist - Ditching below**

◆**Crash landing** is required:

Gear Handle . . . . . DOWN

Note: Extended landing gear will absorb impact forces.

►►**Go to Landing Checklist - Crash Landing below**

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▼Crash Landing or Ditching continued▼

Landing Checklist - Crash Landing

Landing gear	down, 3 green	C&F
Flaps & slats	**28, 28, LAND**	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes.	as reqd	PM
Annunciator panel	ckd	PM

Landing Checklist - Ditching

Landing gear	**UP**	C&F
Flaps & slats	**28, 28, LAND**	C&F
Spoilers	**disarmed**	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

At 1000 feet AFE

Announce "BRACE FOR LANDING" via the PA.

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▼Crash Landing or Ditching continued▼

Prior to Touchdown

EMER LTS Switch. . . . . .ON

Note: EMER LTS switch on will assure 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.

■ ■ ■ ■

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Driftdown

Condition: Engine failure or shutdown during cruise.

1 TRP . . . . . MCT

2 CRZ key . . . . . .Push

3 ENG OUT prompt . . . . . .Select

Note: The engine out cruise driftdown page will display only if the current altitude is above the FMS computed engine out cruise altitude.

4 EXEC key. . . . . .Push

Warning! The MCP altitude must be reset to a lower altitude in order for the FMS to start a driftdown. A stall may result if the MCP altitude is not reset.

5 Altitude . . . . . .Set

6 Monitor deceleration to FMS computed driftdown speed.

7 Monitor VNAV descent.

8 At level off, ensure acceleration to FMS computed engine out long range cruise speed.

■ ■ ■ ■

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Emergency Descent

Condition: A rapid descent is needed.

1 Throttles . . . . . IDLE

Note: Autothrottles must be engaged in clamp mode or disengaged before moving throttles to idle.

2 Speed Brakes . . . . . EXTEND

3 Descent Speed . . . . . ESTABLISHED
(320 TO 340 KIAS/.80 TO .82M)

Caution! Speed profile is based on no loss in structural integrity and assumes smooth air conditions. Known failures affecting structural integrity and/or turbulence may dictate more conservative speed profiles or entry maneuvers. Recommended speed with structural damage is 275 to 285 KIAS/.75 to .79M.

Note: Descent not to exceed 10° pitch or 30° bank.

4 Altitude Preselect . . . . . SET and ARM

Set and arm assigned level-off altitude.

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

■ ■ ■ ■

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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 ▼

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▼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 ▼

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▼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, frequency, identifier, and approach course.

From the LEGS 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 ▼

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▼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
- Navaids
- 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

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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 ▼

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▼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 ▼

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▼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**

■ ■ ■ ■

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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 ▼

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▼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 ▼

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▼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.

■ ■ ■ ■

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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:

AIR CONDITIONING SUPPLY 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 Pressurization . . . Depressurize manually

Note: Manual control wheel forces will be high unless airspeed is low.

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

RADIO RACK Switch . . . . . FAN

- When at 1,000 feet:

Announce "BRACE FOR LANDING" over the PA.

▼ Continued on next page ▼

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▼Emergency Landing Considerations continued▼

- 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."

■ ■ ■ ■

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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.

■ ■ ■ ■

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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 always less than the takeoff distance at all gross weights when landing with flaps 28 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 (normal or reduced landing flap configuration).
- If landing distance is a concern, consider holding to reduce weight.
- If landing distance is not an issue, holding to reduce weight is not necessary.
- 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.

▼ Continued on next page ▼

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▼Overweight Landing Considerations continued▼

- 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.

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.

■ ■ ■ ■

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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.

- 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.

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▼Rejected Takeoff - Post RTO Considerations continued▼

Accomplish the appropriate normal checklists (e.g., After Landing checklist, Taxi checklist, Before Takeoff checklist).

- 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.

■ ■ ■ ■

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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.

Objective: To exit the ash cloud and restart engines if needed.

Caution! Exit volcanic ash as quickly as possible. Consider a 180 degree turn. Attempting to climb above the volcanic cloud is not recommended.

1 Don oxygen masks and smoke goggles, as needed.

2 Establish crew communications, as needed.

3 Do not deploy passenger oxygen if cabin pressure is normal.

4 ENG IGN selector . . . . . .ON

5 Autothrottles . . . . . OFF

6 Throttles . . . . . Retard to idle or as low as practical

This reduces possible engine damage or flameout, or both, by decreasing EGT.

7 EMER PWR Switch. . . . . .ON

8 Engine/Airfoil Anti-Ice . . . . . .ON

▼ Continued on next page ▼

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▼Volcanic Ash continued▼

9 APU (if available) . . . . . Start

This may be used as a backup source of electrical power.

Note: Volcanic ash can cause non-normal system indications such as:

- Engine stalls, increasing EGT, decreasing N1 and N2, and engine flameout.
- Volcanic dust may block the pitot static system and result in unreliable airspeed indications.
- Communication difficulties may be experienced due to electrostatic conditions.

10 Engine parameters . . . . . .Monitor

11 Airspeed indication . . . . . .Monitor

Caution! If airspeed indications are abnormal, refer to Airspeed Unreliable.

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

Engines are slow to accelerate at high altitudes. This should not be interpreted as failure to start.

▼ Continued on next page ▼

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▼Volcanic Ash continued▼

12 Choose one:

- Engines run **normally**:

  ►►**Go to step 13**

- Engines are **flamed out** or **stalled**, or EGT is rapidly **approaching** or **exceeding limit**:

  ►►**Go to Two Engine Flameout checklist on page 7.10**

■ ■ ■ ■

13 **When** clear of the volcanic ash cloud, and if engines have been restarted, avoid rapid throttle movement, if possible.

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

14 Avoid use of windshield wipers.

15 Avoid reverse thrust to prevent engine damage, visibility restriction and bleed air re-ingestion.

16 Land at nearest suitable airport.

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

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

■ ■ ■ ■

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Non-Normal Checklists — Chapter NNC

Airplane Gen., Emer. Equip., Doors, Windows — Section 1

ACCESS COMPT DOOR 1.1
AFT CABIN DOOR 1.2
AFT CARGO DOOR 1.3
AFT GALLEY DOOR 1.4
AFT STAIRWAY DOOR 1.4
ELECT COMPT DOOR 1.5
FWD CABIN DOOR 1.6
FWD CARGO DOOR 1.7
FWD GALLEY DOOR 1.8
FWD STAIRWAY DOOR 1.9
LOCK FAIL 1.10
MID CARGO DOOR 1.11
Oxygen Low Pressure - Crew 1.12
TAILCONE UNSAFE 1.13

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ACCESS COMPT DOOR

Messages:	ACCESS COMPT DOOR
Condition:	Indicates access door in nose wheel well may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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AFT CABIN DOOR

Messages:	AFT CABIN DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

- Pressurization is **normal**:

  Continue normal operation.

  ■ ■ ■ ■

- Pressurization is **not** normal:

  Plan to land at the nearest suitable airport.

  ■ ■ ■ ■

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AFT CARGO DOOR

Messages:	AFT CARGO DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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AFT GALLEY DOOR

Messages: AFT GALLEY DOOR

Condition: Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position switch.

1 Choose one:

- Pressurization is **normal**:

  Continue normal operation.

  ■ ■ ■ ■

- Pressurization is **not** normal:

  Plan to land at the nearest suitable airport.

  ■ ■ ■ ■

AFT STAIRWAY DOOR

Messages: AFT STAIRWAY DOOR

Condition: Indicates door may not be closed and latched. If the right hydraulic system pressure is normal, indication may be due to a faulty door latch position sensor(s).

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ELECT COMPT DOOR

Messages:	ELECT COMPT DOOR
Condition:	Indicates electrical/electronic compartment door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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FWD CABIN DOOR

Messages:	FWD CABIN DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

- Pressurization is **normal**:

  Continue normal operation.

  ■ ■ ■ ■

- Pressurization is **not** normal:

  Plan to land at the nearest suitable airport.

  ■ ■ ■ ■

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FWD CARGO DOOR

Messages:	FWD CARGO DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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FWD GALLEY DOOR

Messages:	FWD GALLEY DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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FWD STAIRWAY DOOR

Messages: FWD STAIRWAY DOOR

Condition: Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**.

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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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 (P24) and
RAS Control circuit breaker (R34). . . . . 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.

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MID CARGO DOOR

Messages:	MID CARGO DOOR
Condition:	Indicates door may not be closed and latched. If pressurization is normal, indication may be due to a faulty door position sensor.

1 Choose one:

◆Pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆Pressurization is **not** normal:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

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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 and smoke/fire/fumes procedures.

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.

■ ■ ■ ■

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DOOR

TAILCONE UNSAFE

Messages: TAILCONE UNSAFE

Condition: Indicates the latching mechanism for the tailcone has been compromised.

1 Choose one:

◆On the **ground**:

Ground Control . . . . . Notify

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

Maintenance action required.

■ ■ ■ ■

◆In **flight**:

Tower or ATC. . . . . Notify

Air loads at speeds greater than 90 KIAS will keep tailcone on aircraft. If latches are compromised, tailcone may detach on landing roll.

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

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CABIN ALT
or
Rapid Decompression

Condition: A cabin altitude exceedance occurs.

1 Oxygen masks ON/100%

2 Crew Communications . . . . . Establish

Note: If unable to establish immediate communications with ATC and descent is begun without clearance, squawk 7700.

3 CABIN ALT
Control Lever/Wheel . . . MANUAL/FULL FORWARD

Note: Manual control wheel forces may be high. Apply force as required.

4 PNEU X-FEED VALVE Levers . . . . . CLOSE

5 AIR CONDITIONING SUPPLY switches . . . . . AUTO

6 If cabin altitude exceeds 14,000 feet:
PASS OXY MASK switch . . . . . EJECT

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▼ CABIN ALT or Rapid Decompression continued ▼

7 Choose one:

◆Cabin pressure is **controllable**:

CABIN ALT Control Wheel . . . . As required

■ ■ ■ ■

◆Cabin pressure is **uncontrollable**:

►►**Go to step 8**

8 Begin emergency descent.

9 Throttles . . . . . IDLE

Note: Autothrottles must be engaged in clamp mode or disengaged before moving throttles to idle.

10 Speed Brakes . . . . . EXTEND

11 Descent Speed . . . . . Established (320 TO 340 KIAS/.80 TO .82M)

Caution! Speed profile is based on loss of pressurization with no loss of structural integrity and assumes smooth air conditions. Known failures affecting structural integrity and/or turbulence may dictate more conservative speed profiles or entry maneuvers. Recommended speed with structural damage is 275 to 285 KIAS/ .75 to .79M.

Note: Descent not to exceed 10° pitch or 30° bank.

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▼CABIN ALT or Rapid Decompression continued▼

12 Altitude Preselect . . . . . SET and ARM

Set and arm assigned level-off altitude.

13 Cabin . . . . . Advise

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

■ ■ ■ ■

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MISC

AIR COND TEMP HIGH

Messages:	L AIR COND TEMP HIGH	R AIR COND TEMP HIGH

Condition: Indicates air conditioning pneumatic supply exceeds normal operating temperature. Indicates possible malfunction of augmentation valve.

1 **If** airfoil anti-ice is in use, it is not necessary to turn it off.

2 PNEU X-FEED VALVE lever (Affected Side) . . . . . CLOSE

Note: With airfoil anti-ice in use and CL selected on TRP, NO MODE light will come on and EPR limit will be replaced with dashes. Selecting MCT or CR will cause NO MODE light to go off and EPR limit to be displayed.

3 AIR CONDITIONING SUPPLY switch (Affected Side) . . . . . HP BLD OFF

4 **After** 1 minute,

5 Choose one:

◆AIR COND TEMP HIGH message stays displayed:

Continue flight in established configuration.

►►**Go to step 6**

◆AIR COND TEMP HIGH message **blanks**:

►►**Go to step 7**

▼ Continued on next page ▼

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▼AIR COND TEMP HIGH continued▼

6 Choose one:

◆AIR CONDITIONING PRESS gauge is **normal**:

■ ■ ■ ■

◆AIR CONDITIONING PRESS gauge goes to **zero** (confirms pack overheat and automatic shutdown):

Radio Rack switch . . . . . FAN

AIR CONDITIONING SUPPLY switch (Affected Side) . . . . . OFF

If this is the only functioning pack, an immediate descent to below 10,000 feet should be considered.

■ ■ ■ ■

▼ Continued on next page ▼

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▼AIR COND TEMP HIGH continued▼

7 Continue flight in established configuration.

Note: L, R AIR COND TEMP HIGH annunciation may come on, when no problem exists, at altitudes above 35,000 feet or at other altitudes when selecting engine anti-ice without simultaneously selecting airfoil anti-ice.

When below 30,000 feet, attempt to restore automatic operation.

If automatic operation can be restored, system operation is normal.

If automatic operation cannot be restored to at least one pack, it may be necessary to advance throttle(s) to maintain normal cabin pressure.

■ ■ ■ ■

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Air Conditioning/Pack - Dual System Failure During or Immediately After Takeoff

Condition: Failure of both air conditioning systems during or immediately after takeoff with cabin differential pressure less than 1.3 psi where a thermal shut-down is not suspected indicates failure of the automatic shutoff system.

1 **After** takeoff and above 400 feet AFE or obstacle clearance altitude, whichever is higher,

2 Air conditioning shutoff switch . . . . . OVRD

3 Choose one:

◆Air conditioning packs **are** restored:

Continue flight with switch in OVRD.

■ ■ ■ ■

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

►►Go to the Air Conditioning/Pack - Single System Failure checklist on page 2.12

or

►►Go to the Unpressurized Flight checklist on page 2.28

■ ■ ■ ■

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

Condition: AUTO INOP light illuminates when both automatic systems fail. Auto pressurization does not function normally.

1 Choose one:

◆AUTO INOP light is **extinguished**:

CABIN PRESSURE System
Selector switch . . . . . Opposite position

►►**Go to step 2**

◆AUTO INOP light is **illuminated**:

►►**Go to step 3**

2 Choose one:

◆Pressurization is **normal**:

Continue flight.

■ ■ ■ ■

◆Pressurization is **uncontrollable**:

►►**Go to step 3**

▼ Continued on next page ▼

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

3 CABIN ALT Control Lever . . . . . Manual

Note: Be prepared to hold CABIN ALT control wheel firmly. Control wheel and indicator will move forward toward VALVE CLOSE position with varying force depending on cabin differential pressure. This force is high when differential pressure is at maximum.

4 CABIN ALT Control Wheel . . . . . Push in and attempt to move

5 Choose one:

◆CABIN ALT control wheel and indicator **moves**:

►►Go to the Manual Pressurization Control checklist on page 2.15

■ ■ ■ ■

◆CABIN ALT control wheel and indicator **jammed**:

►►Go to step 6

6 Terrain and conditions permitting,

7 Descent (to below 10,000 ft) . . . . . Initiate

8 AIR CONDITIONING SUPPLY switch (one) . . . OFF

Maintain a comfortable cabin rate of descent by varying throttle position on side of operating air conditioning system.

▼ Continued on next page ▼

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

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

AIR CONDITIONING SUPPLY
switches (both) . . . . . OFF

Selecting both switches OFF allows cabin and aircraft altitude to equalize.

Note: Cabin altitude may be below sea level. When cabin altitude indicates 2000 feet above destination altitude, continue descent, approach and landing.

10 **When** cabin altitude and aircraft altitude are equal:

RAM AIR switch . . . . . .ON

Note: Cabin altitude and airplane altitude will descend at same rate.

11 **After** landing:

Clearview window(s). . . . . OPEN

Note: Air conditioning may be resumed for passenger comfort.

Do not close clearview windows after restarting air conditioning systems.

■ ■ ■ ■

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FLOW Light Illuminated

Condition: Illuminates with a closed outflow valve and a cabin climb rate is detected.

Note: Cabin depressurization may be imminent.

If an emergency descent is required,

►►Go to the Emergency Descent checklist on page 0.8

1 Check Air Conditioning Supply switches in AUTO.

2 Radio Rack switch. . . . . FAN

3 Throttles (if at low power) . . . . . ADJUST

If throttles are at low power (conditions permitting) advance throttles until air conditioning supply pressure ceases to rise (approximately 21 psi).

4 Choose one:

◆FLOW light **illuminates** and cabin continues to climb:

Descend to an altitude where normal pressurization can be maintained.

If supply pressure is zero,

►►Go to the Supply Pressure Drops to Zero checklist on page 2.12

■ ■ ■ ■

◆FLOW light **extinguishes**.

■ ■ ■ ■

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Air Conditioning/Pack - Single System Failure or Supply Pressure Drops to Zero

Condition: Loss of air conditioning pack or supply pressure drops to zero.

1 Associated AIR CONDITIONING SUPPLY switch . . . . . OFF

Note: Selecting OFF will allow pack temperatures to decrease to normal values to allow system reinstatement. Allow sufficient time for cooling.

2 Choose one:

◆Associated TEMP CONTROL VALVE indicator is in **HOT** range:

Rotate TEMP selector toward COLD.

►►**Go to step 3**

◆Associated TEMP CONTROL VALVE indicator is in **COLD** range:

Rotate TEMP selector toward HOT.

►►**Go to step 3**

3 Associated AIR CONDITIONING SUPPLY switch . . . . . AUTO

▼ Continued on next page ▼

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▼Air Conditioning/Pack - Single System Failure or Supply Pressure Drops to Zero continued▼

4 Choose one:

◆Supply pressure remains at **zero**:

Pack is inoperative.

Note: Aircraft may maintain flight altitude provided cabin altitude can be maintained below 10,000 feet.

■ ■ ■ ■

◆Supply pressure **increases**:

Associated TEMP Selector . . . . . As desired

Rotate TEMP selector to desired position. Monitor VALVE position indicator and if no response, attempt manual operation of system.

■ ■ ■ ■

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Maintaining Cabin Differential Pressure During Idle Descent with One High Pressure Bleed

Condition: Insufficient bleed air during descent.

1 Choose one:

◆**Both** AIR CONDITIONING systems are operational:

PNEU X-FEED VALVE levers . . . . . OPEN

■ ■ ■ ■

◆**One** AIR CONDITIONING system is operational:

►►**Go to step 2**

2 Throttle (engine supplying bleed air). . . . . Slowly advance

Slowly advance throttle until AIR CONDITIONING SUPPLY PRESS gauge indicator ceases to rise (approximately 21 psi). Adjust as required.

3 Speed Brakes. . . . . As required

■ ■ ■ ■

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Manual Pressurization Control

Condition: Pressurization must be manually controlled and monitored.

1 CABIN ALT Control Lever . . . . . MANUAL

Move CABIN ALT control lever to manual (down) position.

Note: Manual control wheel forces may be high. Apply force as required.

Note: Throughout flight, before engine power changes, CABIN ALT control wheel and outflow valve position indicator should be coordinated with throttle movement.

Hold CABIN ALT control wheel firmly when adjusting as it will tend to move toward VALVE CLOSE at varying force depending on cabin differential pressure.

2 Altitude SCHED Placard (overhead panel) . . . . . CHECK

Determine desired cabin altitude based on aircraft altitude.

Note: Cabin pressure must be manually controlled to maintain desired cabin altitude. Lower altitude values will result in excessive differential pressure which will activate relief valves.

▼ Continued on next page ▼

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▼Manual Pressurization Control continued▼

3 Choose one:

◆On the **ground**:

Outflow Valve
Position Indicator . . . . . VALVE OPEN

Push in and rotate CABIN ALT control wheel until outflow valve position indicator moves to VALVE OPEN.

Note: Before moving AIR CONDITIONING SUPPLY switches to AUTO, check manual operation of CABIN ALT control wheel and outflow valve position indicator by pushing in and rotating wheel to move outflow valve position indicator to VALVE CLOSE then returning to VALVE OPEN.

Air Conditioning . . . . . AS REQUIRED

Use normal air conditioning procedures.

►►Go to step 4

◆In **flight**:

►►Go to step 4

▼ Continued on next page ▼

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▼Manual Pressurization Control continued▼

4 Choose one:

◆In after takeoff phase:

Accomplish as soon as practical.

Outflow Valve
Position Indicator. . . . . 1/3 VALVE CLOSE

Push in and rotate CABIN ALT control wheel to move outflow valve position indicator 1/3 of quadrant toward VALVE CLOSE, then release.

►►Go to step 5

◆In another phase of flight:

►►Go to step 5

5 Choose one:

◆In after clean-up during climb phase:

Outflow Valve
Position Indicator. . . . . ADJUST 500 FPM CLIMB

►►Go to step 6

◆In another phase of flight:

►►Go to step 6

▼ Continued on next page ▼

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▼Manual Pressurization Control continued▼

6 Choose one:

◆At cruise cabin altitude:

Outflow Valve
Position Indicator . . . . . ADJUST TO ZERO RATE

►►Go to step 7

◆In another phase of flight:

►►Go to step 7

7 At the start of descent,

8 Outflow Valve
Position Indicator . . . . . ADJUST TO 300 FPM DESCENT

Hold CABIN ALT control wheel firmly and be prepared to control rate of change to zero. Reduce engine power slowly and move CABIN ALT control wheel toward VALVE CLOSE to compensate for bleed air reduction.

When engine power is reduced to desired level, adjust CABIN ALT control wheel to obtain 300 FPM rate of descent. Monitor cabin rate of descent closely and be prepared to make adjustments during engine power changes.

9 **When** cabin altitude is 2000 feet above destination field elevation, maintain cabin rate at zero until cabin altitude equals aircraft altitude.

▼ Continued on next page ▼

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▼Manual Pressurization Control continued▼

10 **When** cabin altitude and aircraft altitude are equal,

Outflow Valve
Position Indicator . . . . . VALVE OPEN

Wheel and indicator should remain in this position for remainder of flight.

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

■ ■ ■ ■

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Passenger Masks Doors Fail to Open

Condition: One or more masks doors fail to deploy automatically.

1 Activate oxygen masks switch behind the FO to eject.

2 Choose one:

◆Doors **open**:

■ ■ ■ ■

◆Doors **fail to** open:

Actuate manual door release.

■ ■ ■ ■

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MISC

RADIO FAN OFF

Messages: RADIO FAN OFF

Condition: Illuminates in flight to indicate RADIO RACK switch is in FAN position and primary and standby fans are inoperative. On ground, message illuminates if primary fan is inoperative.

1 In flight,

RADIO RACK switch . . . . . .VENTURI

Note: If only one engine system is supplying cabin pressure, it may not be possible to hold desired differential pressure. If so, move RADIO RACK switch to FAN.

2 **After** parking,

Electrical Power . . . . . As required

Note: After landing, RADIO FAN OFF message will be shown.

Prolonged use of aircraft systems for ground operations will cause overheating of radio and electronic equipment.

Ground operation of electrical equipment is limited to a maximum of 45 minutes. Switch to ground service power at the gate.

■ ■ ■ ■

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TAIL COMP TEMP HIGH

Condition: Tail compartment temperature exceeds normal.

Note: The right pack should be operated during hot ramp conditions. The right pack heat exchanger draws air from the tail compartment. This reduces the likelihood of TAIL COMP TEMP HIGH light.

1 PNEU X-FEED VALVE Levers . . . . . CLOSED

2 AIR FOIL Anti-Ice switch . . . . . OFF

3 AIR CONDITIONING SUPPLY switches . . . . . HP BLEED OFF

4 **Wait** two minutes,

5 Choose one:

◆Light **extinguishes**:

Avoid icing conditions.

If icing is unavoidable:

►►**Go to the Air Foil Ice Protection Inoperative checklist on page 3.1**

■ ■ ■ ■

◆Light **remains illuminated**:

►►**Go to step 6**

▼ Continued on next page ▼

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▼TAIL COMP TEMP HIGH continued▼

6 Choose one:

◆On **final approach** (5 minutes from touchdown):

Continue approach using minimum power settings and consider a flaps 28 landing, if conditions permit.

■ ■ ■ ■

◆On **takeoff, climb, cruise, descent or initial approach**:

Autothrottles . . . . . OFF

Left Throttle . . . . Confirm . . . . . Idle

►►**Go to step 7**

7 **After** two minutes,

8 Choose one:

◆TAIL COMP TEMP HIGH light **extinguishes**:

L AIR CONDITIONING SUPPLY switch . . . . . OFF

Left Throttle . . . . . Restore power

►►**Go to step 9**

◆TAIL COMP TEMP HIGH light **stays illuminated**:

Left Throttle . . . . . Restore power

Right Throttle . . . Confirm . . . . . Idle

►►**Go to step 11**

▼ Continued on next page ▼

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▼TAIL COMP TEMP HIGH continued▼

9 Choose one:

◆TAIL COMP TEMP HIGH light **extinguishes**:

R AIR CONDITIONING
SUPPLY switch . . . . . AUTO

►►Go to step 10

◆TAIL COMP TEMP HIGH light **stays illuminated**:

Left Throttle . . . . Confirm . . . . . Idle

Continue at reduced thrust setting necessary to keep light off.

R AIR CONDITIONING
SUPPLY switch . . . . . AUTO

Restore airfoil ice protection from right engine if desired. If TAIL COMP TEMP HIGH light comes on again, move AIR FOIL anti-ice switch to OFF and minimize time in icing conditions.

If unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

▼ Continued on next page ▼

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▼TAIL COMP TEMP HIGH continued▼

10 Choose one:

◆TAIL COMP TEMP HIGH light **extinguishes**:

Restore airfoil ice protection from right engine if desired. If TAIL COMP TEMP HIGH light comes on again, move AIR FOIL anti-ice switch to OFF and minimize time in icing conditions.

If unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

■ ■ ■ ■

◆TAIL COMP TEMP HIGH light **stays illuminated**:

R AIR CONDITIONING
SUPPLY switch . . . . . HP BLD OFF

L AIR CONDITIONING
SUPPLY switch . . . . . AUTO

Restore airfoil ice protection from left engine if desired.

■ ■ ■ ■

▼ Continued on next page ▼

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▼TAIL COMP TEMP HIGH continued▼

11 **After** two minutes,

12 Choose one:

◆TAIL COMP TEMP HIGH light **extinguishes**:

R AIR CONDITIONING
SUPPLY switch . . . . . OFF

Right Throttle . . . . . Restore power

►►Go to step 13

◆TAIL COMP TEMP HIGH light **stays illuminated**:

Right Throttle . . . . . Restore power

Land at nearest suitable airport.

Note: In order to maintain cabin pressurization during descent, it may be necessary to carry higher than normal power settings.

■ ■ ■ ■

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▼TAIL COMP TEMP HIGH continued▼

13 Choose one:

◆TAIL COMP TEMP HIGH light **extinguishes**:

Continue operation with right system off and isolated.

L AIR CONDITIONING
SUPPLY switch . . . . . AUTO

Restore airfoil ice protection from left engine if desired.

■ ■ ■ ■

◆TAIL COMP TEMP HIGH light **stays illuminated**:

Right Throttle . . . Confirm . . . . . Idle

Continue at reduced thrust setting necessary to keep light off.

L AIR CONDITIONING
SUPPLY switch . . . . . AUTO

Restore airfoil ice protection from left engine if desired.

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

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Unpressurized Flight

Condition: Pressurization must be manually controlled and monitored.

1 Choose one:

◆On the **ground**:

CABIN PRESSURE CONTROL CBs (4) (J2, H2, U22, W22) . . . . . PULL

►►**Go to step 2**

◆In **flight**:

►►**Go to step 2**

2 CABIN ALT Control Lever . . . . . MANUAL

Move CABIN ALT control lever to manual (down) position.

3 Outflow Valve Position Indicator . . . . VALVE OPEN

Push in and rotate CABIN ALT control wheel aft until valve position indicator moves to VALVE OPEN.

Note: Valve position indicator should remain in this position throughout flight.

Flight altitude must be limited to 10,000 feet. At altitudes above 9500 feet, expect vocal warning and horn to sound and CABIN ALT and MASTER WARNING lights to illuminate.

▼ Continued on next page ▼

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▼Unpressurized Flight continued▼

4 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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Air Foil Ice Protection Inoperative

Condition: The air foil ice protection system is inoperative.

1 **Prior** to final approach,

Add 5 knots to all minimum maneuvering speeds.

Do not extend flaps beyond 28/EXT as a decrease in airplane controllability may result.

2 **For** final approach,

Flaps/slats. 28/EXT

Speed . . . . . VREF for 28/EXT + 5 knots

3 **If** go-around is initiated,

Flaps/slats. . . . . Retract to 15/EXT

Speed . . . . . Maintain

Note: Do not use 0/EXT through 13/EXT for maneuvering or go-around when wing icing is present or suspected due to possible adverse characteristics.

■ ■ ■ ■

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ICE

AIRFL ICE PRES ABNML

Messages: AIRFL ICE PRES ABNML

Condition: Low or unscheduled pressure in wing and/or duct to horizontal stabilizer. Malfunction of ice protection pressure regulator and shutoff valve if AIR FOIL switch selected OFF after tail cycle complete.

1 Choose one:

◆On the **ground**:

PNEU X-FEED VALVE Levers . . . . . CLOSE

APU AIR switch . . . . . OFF

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Choose one:

◆AIR FOIL anti-ice switch is **OFF**:

Note: With switch OFF, AIRFL ICE PRES ABNML message displayed indicates failure of ice protection pressure regulator to shut off.

PNEU X-FEED VALVE Levers . . . . . CLOSE

■ ■ ■ ■

◆AIR FOIL anti-ice switch is **ON**:

►►**Go to step 3**

▼ Continued on next page ▼

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▼AIRFL ICE PRES ABNML continued▼

3 PNEU X-FEED VALVE
Lever(s) . . . . . Verify OPEN

4 PNEU PRESS Gauge . . . . . Above 22 PSI

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

5 SUPPLY AIR PRESS REGULATOR VALVE CB (N21) . . . . . Check/Reset

6 WING/TAIL DE-ICE VALVES CB (M24). . . . . Check/Reset

7 Choose one:

◆AIRFL ICE PRES ABNML message **blanks**:

Continue normal operation.

■ ■ ■ ■

◆AIRFL ICE PRES ABNML message **stays displayed**:

►►Go to step 8

▼ Continued on next page ▼

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▼AIRFL ICE PRES ABNML continued▼

8 Choose one:

◆AIRFL ICE PRES ABNML message stays displayed with **WING ANTI-ICE ON** light illuminated:

AIR FOIL Anti-Ice switch . . . . . OFF

PNEU X-FEED VALVE Lever(s) . . . . CLOSE

Avoid icing areas.

If unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

■ ■ ■ ■

◆AIRFL ICE PRES ABNML message stays displayed with **TAIL DE-ICE ON** light illuminated:

Note: Tail ice protection shutoff valve will be closed.

Wait 2.5 minutes for tail anti-ice timer completion.

If WING ANTI-ICE ON light is illuminated and AIRFL ICE PRES ABNML message blanks,

►►Go to the TAIL DE-ICE Inoperative checklist on page 3.20

AIRFOIL ICE PROTECTION - AUTO
CB (N29) . . . . . PULL

■ ■ ■ ■

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ICE

ANTI-ICE SUPPLY HIGH

Messages: ANTI-ICE SUPPLY HIGH

Condition: Malfunction of the ice protection pressure regulator and shutoff valve causing excessive duct pressure.

1 PNEU X-FEED VALVE Levers . . . . . Move toward CLOSE

2 PNEU PRESS Gauge . . . . . Observe

3 **When** PNEU PRESS gauge reads approximately 22 psi,

4 Stop moving PNEU X-FEED VALVE Levers.

5 Readjust when power, speed or altitude is changed.

■ ■ ■ ■

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ICE

ENG VALVE

Messages: L ENG VALVE R ENG VALVE

Condition: Indicates one or more anti-ice valves is not in agreement with the ENGINE ANTI-ICE switch.

1 Affected ENGINE ANTI-ICE CBs
L: K30,K31,K32 and R: L30, L31,L32
(Lower EPC) (If Tripped) . . . . . Reset

2 Choose one:

◆L, R ENG VALVE message **blanks**:

Continue normal engine operation.

■ ■ ■ ■

◆L, R ENG VALVE message **stays displayed**:

Note: Engine valve has malfunctioned.

Depart icing area as soon as possible.

Minimize throttle movement until clear of icing area.

■ ■ ■ ■

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ICE

ICE PROT TEMP HIGH

Messages: L ICE PROT TEMP HIGH R ICE PROT TEMP HIGH

Condition: Malfunction of augmentation valve, resulting in high duct temperature.

Note: If both messages illuminate, close the crossfeed associated with the first message annunciated. Wait approximately one minute before switching crossfeed valve positions, if necessary.

1 Associated PNEU X-FEED VALVE Lever . . . . . CLOSED

Note: Closing affected system PNEU X-FEED VALVE lever deactivates temperature control of associated augmentation valve. Augmentation valve is now controlled by associated air conditioning system pressure demands.

■ ■ ■ ■

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ICE

ICE PROT TEMP LOW

Messages: L ICE PROT TEMP LOW R ICE PROT TEMP LOW

Condition: Low engine power or malfunction of augmentation valve resulting in low duct temperature.

1 Associated PNEU X-FEED VALVE Lever. . . . . OPEN

Note: If at low engine power, advance power.

2 Associated ICE PROTECT AUGMENT VALVE CB (Left M23, Right N23) (If Tripped) . . . . . Reset

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

3 **If** ICE PROT TEMP LOW message stays displayed,

Associated PNEU X-FEED VALVE Lever . . . . . CLOSED

■ ■ ■ ■

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Overwing Heater System Fail

Condition: The L or R overwing heater system is failed.

1 Overwing Heater switch . . . . . OFF

2 Use alternate fuel burn schedule.

■ ■ ■ ■

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ICE

PITOT/STALL HEAT OFF

Messages: PITOT/STALL HEAT OFF

Condition: Electrical power loss to one or more pitot probes or stall/AOA vanes.

1 Verify PITOT METER SEL & HEAT selector is not in the OFF position.

Note: Airspeed and Mach indications may be invalid if the captain's, first officer's or AUX pitot probe is affected by icing.

If both airspeed indicators are inoperative, refer to **Airspeed Unreliable** checklist in Section 10.

2 Failed Unit(s) . . . . . Determine

Rotate PITOT METER SEL & HEAT selector and check for heater current. If any unit indicates no heater current, cross-check appropriate instruments for valid indications.

3 Applicable Circuit Breakers (If Tripped) . . . Reset

CAPTAIN'S PITOT HEATER CB C12*

AUX and F/O PITOT HEATER CBs M28, N28 (lower EPC)

L/R ANGLE OF ATTACK VANE HTR CBs X22, Z22 and L/R STATIC PORT HEATER CBs X21, Z21 (lower EPC)

RUDDER Q LIMITER HTR Z30 (lower EPC)

▼ Continued on next page ▼

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▼PITOT/STALL HEAT OFF continued▼

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

4 Choose one:

◆PITOT/STALL HEAT OFF message **stays displayed**:

Depart icing area.

►►Go to step 5

◆PITOT/STALL HEAT OFF message **blanks**:

No further crew action required.

■ ■ ■ ■

5 Choose one:

◆CAPT position - HEATER/CUR meter **indicates** "0":

CADC selector . . . . . Both on 2

►►Go to step 6

◆CAPT position - HEATER/CUR meter **does not** indicate "0":

►►Go to step 6

▼ Continued on next page ▼

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▼PITOT/STALL HEAT OFF continued▼

6 Choose one:

◆AUX position - HEATER/CUR meter **indicates** "0":

Standby airspeed indicator may be inaccurate.

►►**Go to step 7**

◆AUX position - HEATER/CUR meter **does not** indicate "0":

►►**Go to step 7**

7 Choose one:

◆F/O position - HEATER/CUR meter **indicates** "0":

CADC selector . . . . . Both on 1

►►**Go to step 8**

◆F/O position - HEATER/CUR meter **does not** indicate "0":

►►**Go to step 8**

▼ Continued on next page ▼

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▼PITOT/STALL HEAT OFF continued▼

8 Choose one:

◆RUD LIM position - HEATER/CUR meter **indicates** "0":

Rudder limiter may be off schedule.

Note: If icing conditions are encountered, rudder limiter may become inoperative. RUDDER TRAVEL UNRESTRICTED light may not come on if rudder pitot tube is obstructed.

►►**Go to step 9**

◆RUD LIM position - HEATER/CUR meter **does not** indicate "0":

►►**Go to step 9**

9 Choose one:

◆L/R STALL PROBE position - HEATER/CUR meter **indicates** "0":

Stick shaker actuation may be off schedule.

■ ■ ■ ■

◆L/R STALL PROBE position - HEATER/CUR meter **does not** indicate "0":

■ ■ ■ ■

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Pressurization Surge Occurs When Air Foil Ice Protection System is switched ON

Condition: Indicates a leak from wing anti-ice duct into pressurized area.

Note: Difficulty may be encountered in maintaining cabin differential pressure due to pressurization loss through ruptured airfoil anti-ice duct.

1 AIR FOIL Anti-Ice switch . . . . . OFF

2 PNEU X-FEED VALVE Levers . . . . . CLOSE

3 Avoid icing areas.

4 **If** unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

■ ■ ■ ■

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Severe Rain/Ice/Turbulence

Condition: Severe rain/ice/turbulence is suspected.

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

1 ENG IGN selector . . . . . BOTH

2 PNEU X-FEED VALVE Levers . . . . . OPEN

3 ENG and AIR FOIL Anti-Ice switches . . . . . As required

Note: Engine and air foil anti-ice systems should be off if RAT is above 10°C or icing will not be encountered or is not anticipated. Reduced engine bleeds will increase engine flameout margin during periods of heavy water ingestion.

4 APU . . . . . START

5 TURB Mode Button . . . . . If desired

Push TURB mode button and observe autothrottle system disengages. Push autothrottle system disconnect button (on throttle) to extinguish flashing red lights. If system does not disengage, move AUTO THROT switch to OFF and push TURB mode button again. Verify YAW DAMP switch is ON.

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▼Severe Rain/Ice/Turbulence continued▼

During extreme turbulence, fly attitude indicator as primary pitch reference. Sacrifice altitude to maintain attitude. Descend if necessary to improve buffet margin. Do not chase airspeed.

6 ENG SYNC Selector . . . . . OFF

7 Airspeed . . . . . Monitor

Note: Recommended turbulence airspeed is 275 to 285 KIAS or .75M to .79M (whichever is lower). At 10,000 feet and below, minimum recommended speed is 250 KIAS or minimum maneuvering (whichever is greater). Do not fly less than minimum maneuvering speed for existing configuration.

▼ Continued on next page ▼

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▼Severe Rain/Ice/Turbulence continued▼

8 Throttles . . . . . SET

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

If throttles are at idle when extreme precipitation is encountered, N2 should be monitored for spool-down below idle rpm (L, R GEN OFF message may come on). 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.

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▼Severe Rain/Ice/Turbulence continued▼

Note: During the unavoidable encounter of exceptionally severe icing conditions (those that occur on an infrequent basis), it is desirable to maintain a minimum of 70% N1. Necessary thrust reductions below this level should be limited in duration with a maximum of one minute but to not less than 55% N1. A minimum of 70% N1 should be maintained following re-acceleration for at least one minute and preferably longer before reducing thrust again.

The left and right windshields consist of primary and secondary de-ice areas. Under severe icing conditions, the secondary de-ice areas may not completely de-ice. Due to the geometry of these windshields, the heat flow to the secondary de-ice area is not adequate to remove the ice.

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▼Severe Rain/Ice/Turbulence continued▼

Note: Increased engine vibration during low thrust operation in severe icing conditions, with or without engine anti-ice, may be due to fan blade icing. This is especially suspect if more than one engine experiences higher than normal vibration levels. If fan blade icing is suspected, verify ENG IGN selector is in SYS A or SYS B. If engine anti-ice is off, reduce thrust (one engine at a time) to idle and turn on engine anti-ice. Accelerate affected engine to 70% N1 while closely monitoring engine instruments (especially EGT) for any abnormalities. If vibration decreases (indicating ice removal), resume normal operation for existing conditions. If vibration does not decrease after one minute, consider engine shutdown

■ ■ ■ ■

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TAIL DE-ICE Inoperative or TAIL DE-ICE ON Light Extinguishes Immediately After Tail De-Ice Is Activated

Condition: TAIL DE-ICE ON light does not come on when TAIL DE-ICE is selected.

1 TAIL DE-ICE Timer CB (N31) (If Tripped) . . . Reset

2 TAIL De-Ice Button . . . . . Push and hold

3 Choose one:

◆TAIL DE-ICE ON light **illuminates**:

Tail de-ice timer is inoperative.

When tail de-ice is required and immediately prior to system shutdown:

TAIL De-Ice Button . . Push and hold for 2.5 minutes

■ ■ ■ ■

◆TAIL DE-ICE ON light **does not** illuminate:

Tail de-ice is inoperative.

Avoid icing conditions.

If unable to avoid icing conditions:

Increase all minimum maneuvering, approach, and flare speeds by 5 KIAS.

Do not extend flaps beyond 28.

■ ■ ■ ■

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TAIL DE-ICE ON
Light Illuminated Continuously

Condition: Illumination of this light indicates a stuck timer.

1 WING & TAIL VALVES CB (M24) . . . . . Pull

Note: Opening WING & TAIL VALVES CB will cause wing anti-ice valve to open and tail anti-ice valve to close.

2 Choose one:

◆AIRFL ICE PRES ABNML message **stays displayed**:

When tail de-ice is required,

WING & TAIL VALVES
CB (M24) . . . . . .Reset for 2.5 minutes

Observe AIRFL ICE PRES ABNML message blanks.

After 2.5 minutes,

WING & TAIL VALVES
CB (M24) . . . . . Pull
(Repeat as required)

■ ■ ■ ■

◆AIRFL ICE PRES ABNML message **blanks**:

►►Go to step 3

3 AIR FOIL Anti-Ice . . . . . OFF

4 PNEU X-FEED VALVE Levers . . . . . CLOSE

▼ Continued on next page ▼

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▼TAIL DE-ICE ON Light Illuminated Continuously continued▼

5 Avoid icing areas.

6 **If** unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

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Windshield Arcing

Condition: The windshield is arcing.

1 WINDSHIELD ANTI-ICE and ANTI-FOG switches. . . . . OFF

2 Locate and pull the affected WINDSHIELD ANTI-ICE CB:

LEFT WINDSHIELD ANTI-ICE (X24)

CENTER WINDSHIELD ANTI-ICE (X25)

RIGHT WINDSHIELD ANTI-ICE (Z24)

3 If anti-fog was in use when arcing occurred, locate and pull affected WINDSHIELD ANTI-FOG CBs:

WINDOW ANTI-FOG CAPT, F/O & CENTER (X26)

FLIGHT DECK WINDOW ANTI-FOG CLEARVIEW & EYEBROW (Z26)

4 WINDSHIELD ANTI-ICE and ANTI-FOG switches. . . . . As required

5 Do **not** exceed 315 KIAS below 10,000 feet. [AFM]

■ ■ ■ ■

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ICE

WINDSHIELD OVERTEMP or Windshield Cracked or Windshield Heat Inoperative

Messages: WINDSHIELD OVERTEMP

Condition: One or more windshield panes is overheated, resulting in the removal of anti-ice power from the overheated windshield(s).

Caution! With windshield heat inoperative, below 10,000 feet do not exceed 315 KIAS. If inner windshield is cracked below 10,000 feet, do not exceed 235 KIAS. [AFM]

1 Choose one:

◆Windshield **is** cracked:

►►**Go to step 2**

◆Windshield **is not** cracked:

►►**Go to step 7**

2 WINDSHIELD ANTI-ICE and ANTI-FOG switches . . . . . OFF

▼ Continued on next page ▼

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▼WINDSHIELD OVERTEMP or Windshield Cracked or Windshield Heat Inoperative continued▼

3 Choose one:

◆Inner glass ply **is** cracked:

Pull affected WINDSHIELD ANTI-FOG CBs:

WINDOW ANTI-FOG CAPT, F/O & CENTER (X26)

FLIGHT DECK WINDOW ANTI-FOG CLEARVIEW & EYEBROW (Z26)

►►Go to step 4

◆Inner glass ply **is not** cracked:

►►Go to step 4

4 Locate and pull the affected WINDSHIELD ANTI-ICE CB:

LEFT WINDSHIELD ANTI-ICE (X24)

CENTER WINDSHIELD ANTI-ICE (X25)

RIGHT WINDSHIELD ANTI-ICE (Z24)

5 WINDSHIELD ANTI-ICE and ANTI-FOG switches. . . . . As required

▼ Continued on next page ▼

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▼WINDSHIELD OVERTEMP or Windshield Cracked or Windshield Heat Inoperative continued▼

6 Choose one:

◆Inner glass ply **is** cracked:

Do not exceed 235 KIAS below 10,000 feet MSL. [AFM]

■ ■ ■ ■

◆Inner glass ply **is not** cracked:

Do not exceed 315 KIAS below 10,000 feet MSL. [AFM]

■ ■ ■ ■

7 WINDSHIELD ANTI-FOG switch . . . . . OFF

8 Locate and pull the affected WINDSHIELD ANTI-ICE CBs one at a time while pausing to observe overheat message:

LEFT WINDSHIELD ANTI-ICE (X24)

CENTER WINDSHIELD ANTI-ICE (X25)

RIGHT WINDSHIELD ANTI-ICE (Z24)

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▼WINDSHIELD OVERTEMP or Windshield Cracked or Windshield Heat Inoperative continued▼

9 Choose one:

◆WINDSHIELD OVERTEMP message **blanks**:

Leave respective CB pulled.

Windshield anti-ice and anti-fog may be used for remaining windows.

►►Go to step 10

◆WINDSHIELD OVERTEMP message **stays displayed**:

WINDSHIELD ANTI-ICE switch . . . . . OFF

►►Go to step 10

10 Do not exceed 315 KIAS below 10,000 feet MSL. [AFM]

■ ■ ■ ■

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WING ANTI-ICE ON Light Extinguished With Air Foil Anti-Ice On

Condition: Wing leading edge and ram air scoop anti-ice heat selected.

1 AIRFOIL ADVISORY & PRESSURE ABNORMAL CAUTION CB (M21) (If Tripped) . . . . . RESET

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

2 PNEU X-FEED VALVE Levers . . . . . CLOSE

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▼WING ANTI-ICE ON Light Extinguished With Air Foil Anti-Ice On continued▼

3 Choose one:

◆AIRFL ICE PRES ABNML message **blanks**:

Note: AIRFL ICE PRES ABNML message blank confirms inoperative anti-ice system.

AIR FOIL Anti-Ice . . . . . OFF

Avoid icing areas.

If unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

■ ■ ■ ■

◆AIRFL ICE PRES ABNML message **stays displayed**:

►►Go to step 4

4 PNEU X-FEED VALVE Levers . . . . . OPEN

5 **After** 1 minute,

▼ Continued on next page ▼

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▼WING ANTI-ICE ON Light Extinguished With Air Foil Anti-Ice On continued▼

6 Choose one:

◆AIRFL ICE PRES ABNML message **blanks**:

Note: AIRFL ICE PRES ABNML message blank will confirm WING ANTI-ICE ON light malfunction.

Continue normal operation.

■ ■ ■ ■

◆AIRFL ICE PRES ABNML message **stays displayed**:

►►Go to step 7

7 AIR FOIL Anti-Ice System . . . . . OFF

8 PNEU X-FEED VALVE Levers . . . . . CLOSE

9 Avoid icing areas.

10 **If** unable to avoid icing areas,

►►Go to the Air Foil Ice Protection Inoperative checklist on page 3.1

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Autopilot Fails to Disconnect

Condition: Autopilot does not disconnect after pressing the AUTOPILOT REL button on either control wheel.

Note: The autopilot may be used as desired.

1 Autopilot Release button . . . . . .Press and hold

Press and hold either yoke (yellow) autopilot RELEASE button while continuing to fly the aircraft manually. The AP will remain disengaged while depressing the button.

When the autopilot RELEASE button is released, the AP will engage and all AP functions should work normally.

2 To silence the aural warning:

CAWS CB (P38) . . . . . Pull

Circuit breaker is located behind the Captain's seat.

Pulling circuit breaker will disable the stall warning SSRS-1, landing gear, takeoff, cabin altitude, speedbrake aural warnings, in addition to the autopilot aural warning.

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▼ Autopilot Fails to Disconnect continued ▼

Caution! Do not attempt to overpower the autopilot. When the autopilot is engaged, applying force to the column may allow the alternate trim to reposition the stabilizer. If the force is applied long enough, it will result in an out-of-trim condition.

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Autothrottle Fails to Disconnect

Condition: Autothrottles do not disconnect after pressing either or both autothrottle disconnect buttons on the throttles.

Note: If the autothrottle (AT) disconnects when either throttle disconnect button is depressed, AND re-engages when throttle disconnect button is released, the autothrottle may be used as desired.

1 Autothrottle Release button . . . . . Press and hold

Press and hold either button until flashing red A/T annunciation is illuminated. Flashing red light indicates autothrottle is disconnected.

Autothrottle RELEASE button may then be released.

The FMA AT window will annunciate as though the AT is engaged.

The flashing red AT annunciation of the FMA cannot be extinguished with repeated depression of the autothrottle release button.

If the throttle levers are retarded to the idle stop, the flashing red A/T annunciation will extinguish, and the AT system will reengage.

If the DFGC is selected to the IAS mode and the AT SPEED mode is selected, the AT system will re-engage.

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ACARS - NO COMM (Touchscreen)

Condition: No data link is available.

1 Frequency changes are automatically controlled by the ACARS unit as long as the aircraft is in range of a datalink ground station. However, within oceanic airspace or isolated areas out of VHF range, a NO COMM condition may occur. In NO COMM, all messages are stored in memory and will be downlinked when comm is automatically re-established at the next landfall.

2 **If** NO COMM exists when in range of a ground station:

From the MAIN MENU page,

REPORTS MAINTENANCE . . . . . .Select

From the REPORTS page,

DIAGNOSTICS. . . . . .Select

From the DIAGNOSTICS page,

TECHNICAL MENU . . . . . .Select

From the TECHNICAL MENU page,

LINK STATUS. . . . . .Select

From the LINK STATUS page,

LINK TEST . . . . . .Select

This action should establish a good link if one is available. If successful, the VHF frequency of the ground station will appear below the FREQ label. The frequency is also continually displayed on all menu page.

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▼ ACARS NO COMM (Touchscreen) continued ▼

3 **If** NO COMM message remains:

From the LINK STATUS page,

VHF CNTRL . . . . . .Select

To force the datalink box on to that network:

Manually select the frequency of the area service provider.

If in the USA, select 136.85.

If in other areas, select 131.72.

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ACARS System Inoperative

Condition: ACARS is inoperative.

1 The following items must be manually completed:

Required company radio reports

Written Engine Performance Reports as follows:

2 **When** the aircraft is stabilized in cruise:

Autothrottles . . . . . OFF

ENG SYNC . . . . . OFF

Allow engines to stabilize.

Record data on Engine Performance Report Form.

3 **When** Engine Performance Report is complete:

Autothrottles/VNAV . . . . . As required

ENG SYNC N1

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ACARS Touchscreen/Printer Inop or Reset

Condition: Touchscreen is inoperative or a reset of the system is required.

1 ACARS CBs . . . . . Open

DATALINK PRINTER - F18

ACARS AUX - F22

DATA LINK MU - F25

DATA LINK IDU - F26

DATA LINK MU - B18*

Note: Circuit breakers should remain open simultaneously. All uplinked memory data and all downlinked data present is lost.

2 **After** one minute,

3 Circuit breakers . . . . . Reset

This allows all system capacitors to discharge.

4 ACARS . . . . . Reinitialize manually

Update ACARS clock by using the UTC UPDATE page.

Add update date manually.

Note: Inoperative functions cannot be corrected by accessing the MAINT MENU page.

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ATTENDANT CALL Button Inoperative

Condition: The ATTENDANT CALL button may become inoperative due to electrical transients.

1 ALL CALL button. . . . . Push and release

Located on the forward Flight Attendant's intercom panel.

2 Test the ATTENDANT CALL button to determine that the problem has cleared.

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Cabin Interphone System Inoperative

Condition: The cabin interphone system is inoperative.

1 Ensure all cabin headsets 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.

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▼ 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.

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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.

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▼ Public Address 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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Radar Malfunctions

Condition: A malfunction has occurred in the radar system.

1 **If** one or more of the following major fault codes appear on the radar scope:

R/T FAULT, ANT FAULT, CON FAULT, IND FAULT, ATT FAULT, COOL FAULT

Mode selector . . . . . OFF

If the system is left ON, further damage will occur.

2 **When** the system is in WX, TURB or MAP mode, partial failures will appear as yellow caution annunciations in the corner of the display unit. Radar data will still be displayed but the flight crew should be aware that the display may not be accurate.

Annunciation	Effect/Crew Action
CAL	Weak targets, use caution.
STAB	System stabilized with respect to aircraft, no pitch or roll stabilization.
COOL	System may fail if operation is continued. Use only long enough to analyze weather, then turn off to allow cooling of the transceiver.

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Voice Communication with VHF-3

Condition: VHF #1 and VHF #2 have failed and voice communications are desired.

1 If voice communication is desired via ACARS:

From the ACARS main menu:

MAINTENANCE . . . . . .Select

From the MAINTENANCE menu:

DIAGNOSTICS. . . . . .Select

From the DIAGNOSTICS menu:

LINK STATUS. . . . . .Select

From the LINK STATUS menu:

VHF CNTRL . . . . . .Select

From the VHF CNTRL menu:

Voice frequency . . . . . Enter

CHANGE MODE . . . . . .Select

Note that the VHF MODE changes from DATA to FREQ. Return to DATA by selecting CHANGE MODE again. The unit will scan for an available frequency automatically to establish a link.

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If a data message is attempted with the unit in the VOICE mode, the DATA MODE advisory will appear. Select the advisory, and the IDU will shift to the VHF CNTRL page for mode change.

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Complete Loss Of AC Power

Condition: The AC buses are not powered.

1 EMER PWR switch . . . . . ON

Note: AC and DC EMER BUS OFF lights should extinguish.

2 BATT switch . . . . . Check ON

Note: Buses powered with BATT switch and EMER PWR switch on are: BATT DIR BUS, BATTERY BUS, DC TRANSFER BUS, EMERGENCY AC BUS, and EMERGENCY DC BUS.

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

3 **If** buses not powered, reset BAT DIRECT BUS FEED CB.

Pull mechanical remote handle, lower left rear of center pedestal.

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▼Complete Loss of AC Power continued▼

Note: Only the captain's radios (except ADF) and flight deck speaker are operative.

Flight instruments may take up to 3 minutes to erect before warning flags disappear. During this time, airplane should be flown straight and level.

ARC or ROSE should be selected for heading to be displayed on the captain's ND.

Battery will power all aircraft equipment listed on overhead emergency circuit breaker panel and DC Transfer bus for approximately 30 minutes.

Use only equipment essential to flight.

Captain's and First Officer's instrument panel white incandescent floodlights come on automatically. At Captain's discretion and/or when time permits, intensity of illumination can be controlled by adjusting the WHITE floodlight controls (small knobs). Flood lights cannot be turned off with WHITE floodlight controls.

4 Flight Deck Door Deadbolt . . . . . .Lock

5 GALLEY Power switch . . . . . OFF

6 CABIN ALT Control Lever . . . . . MANUAL (Down)

7 CKPT/CABIN TEMP selectors . . . . . MANUAL

8 AC BUS X TIE switch . . . . . OPEN

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▼Complete Loss of AC Power continued▼

9 L GEN (or APU), then R GEN (or APU) switches . . . .Reset/Check/ON (Normal)

Move indicator selector to L AC VOLT/FREQ. If voltage and frequency are within normal range, move L GEN switch to ON. Attempt to reset R GEN or APU GEN in same manner.

Note: If a generator will not reset or is out of limits, leave the associated generator control switch in the OFF position. A generator must be reset only once for a given fault. If fault trips generator after reset, fault should be located and corrected before attempting to place generator on its bus again.

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▼Complete Loss of AC Power continued▼

10 Choose one:

◆**One or both** generator buses restored:

If APU available and not already in use,

APU . . . . . Start

Note: If FMAs are blank, push either autopilot release button to reset the digital flight guidance computer.

AC BUS X TIE switch . . . . . AUTO

CABIN ALT Control Lever . . . . AUTO (Up)

CKPT/CABIN TEMP selectors . . . . . AUTO

EMER PWR switch . . . . . OFF

GALLEY switch
(if electrical load permits) . . . . . ON

Note: With only one generator operative, GALLEY switch and one air conditioning SUPPLY switch should be OFF for landing.

■ ■ ■ ■

◆**No** generator bus restored:

►►**Go to step 11**

▼ Continued on next page ▼

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▼Complete Loss of AC Power continued▼

11 Choose one:

◆APU is **not** available:

►►**Go to step 12**

◆APU **is** available:

L and R GEN switches. . . . . OFF

APU L and R BUS switches . . . . . OFF

APU . . . . . START/RUN

APU PWR AVAIL light . . . . . ON

Note: It may be necessary to move APU GEN switch to RESET then to NORM.

APU L and R BUS switches
(One At a Time) . . . . . ON

Note: With only one generator operative, the GALLEY power switch and one air conditioning SUPPLY switch should be OFF for landing.

Land at nearest suitable airport.

■ ■ ■ ■

▼ Continued on next page ▼

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▼Complete Loss of AC Power continued▼

12 Avoid IMC flight.

13 Land at the nearest suitable airport.

Caution! Depressurize cabin prior to landing. Manual pressurization control forces may be high. Apply force as required.

Inoperative Items

All stall warning systems inop

Auto slats inop
Slats cannot be extended beyond midposition.

Flap, slat, and landing gear position indicating systems inop

Stabilizer inop

Auto brakes/anti-skid inop

Auto spoilers inop

Automatic flight deck/cabin temperature control inop

Flight director/autopilot/autothrottle inop

Ground proximity warning system inop

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▼Complete Loss of AC Power continued▼

14 Choose one:

◆Aircraft is **trimmed** and flaps **are** 28 or 40:

Landing flaps . . . . . Existing flap setting

Landing speed. . . . . As appropriate for flap setting

■ ■ ■ ■

◆Aircraft is **out of trim** or flaps are **less than** 28:

Landing flaps 15/EXT

Note: Do not reduce power until flare has been initiated and sink has been reduced.

►►Go to step 15

▼ Continued on next page ▼

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▼Complete Loss of AC Power continued▼

15 Compute landing threshold speeds.

VREF is flaps 15 speedbook minimum maneuver speed, plus,

Add knot value for adjusted takeoff weight C.G. Interpolate as necessary from takeoff C.G. below.

Stab Angle	MD-88 Takeoff C.G.				
	0	5	10	15	20
-2	40	32	24	17	8
0	29	22	15	8	0
2	20	14	7	1	0
4	13	7	1	0	0
6	6	1	0	0	0

■ ■ ■ ■

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ELEC

AC CROSSTIE LOCKOUT and AC BUS OFF, GEN OFF, DC BUS OFF

Messages: AC CROSSTIE LOCKOUT

L AC BUS OFF — R AC BUS OFF

L GEN OFF — R GEN OFF

APU GEN OFF — DC BUS OFF

Condition: AC CROSSTIE LOCKOUT message indicates AC crosstie relay automatically locked open. AC BUS OFF indicates the respective AC bus is not powered. GEN OFF indicates the respective generator relay is open, disconnecting generator from its bus.

Note: AC crosstie lockout may have been caused by a temporary fault in electrical system.

Electrical trips associated with AC CROSSTIE LOCKOUT will cause ON BATT on IRS MODE SELECT panel and IRS 1/2 NO AIR and IRS 1/2 ON BATTERY on EOAP to illuminate.

1 Fuel Boost Pump switches (All) . . . . . As required

Note: With an AC bus failure, only one fuel boost pump per tank will be operating. In order to use center tank fuel, the appropriate main tank fuel pump(s) must be turned off.

2 DC BUS X TIE switch. . . . . CLOSE

DC BUS OFF annunciation should go off and DC buses should be restored. Monitor DC LOAD meters.

▼ Continued on next page ▼

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▼AC CROSSTIE LOCKOUT and AC BUS OFF, GEN OFF, DC BUS OFF continued▼

3 Indicator Selector switch . . . . . Affected generator

4 Affected Engine (or APU) GEN switch . . . . . Reset/OFF (or NORM)

5 Choose one:

◆AC Volts/Frequency **is** within allowable limits:

GEN (or APU BUS) switch . . . . . ON

►►Go to step 6

◆AC Volts/Frequency is **not** within allowable limits:

►►Go to step 7

6 Choose one:

◆If AC BUS is **powered** and AC LOAD is within allowable limits:

DC BUS X TIE switch . . . . . OPEN

Monitor system. All buses restored.

Note: AC crosstie relay will remain locked open until reset on ground. APU generator, if available, may be selected as backup.

■ ■ ■ ■

◆If AC BUS is **not powered** or AC LOAD is **not** within allowable limits:

►►Go to step 7

▼ Continued on next page ▼

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▼AC CROSSTIE LOCKOUT and AC BUS OFF, GEN OFF, DC BUS OFF continued▼

7 GEN switch . . . . . OFF

Generator cannot be used. Do not attempt additional resets.

Note: If right generator bus is not powered, battery charger will be inoperative. More than one APU start attempt will reduce battery power and result in less than 30 minutes of emergency power if all AC power is lost.

8 **If** APU start is desired,

9 APU L and R BUS switches . . . . . OFF

10 APU . . . . . START

▼ Continued on next page ▼

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**▼AC CROSSTIE LOCKOUT and
AC BUS OFF, GEN OFF, DC BUS OFF continued▼**

11 Choose one:

◆APU **starts** and AC Volts/Frequency are within allowable limits:

Note: Move APU generator switch to RESET if required.

APU L or R BUS switch
(switch with inoperative generator) . . .ON

Note: APU electrical load can be reduced by turning off the galley power or one AIR CONDITIONING SUPPLY switch.

►►Go to step 12

◆APU **does not** start or AC Volts/Frequency are not within allowable limits:

►►Go to step 13

▼ Continued on next page ▼

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▼AC CROSSTIE LOCKOUT and AC BUS OFF, GEN OFF, DC BUS OFF continued▼

12 Choose one:

◆If AC BUS is **powered** and AC LOAD is within allowable limits:

DC BUS X TIE switch . . . . . OPEN

Monitor system. All buses restored.

Note: AC crosstie relay will remain locked open until reset on ground.

■ ■ ■ ■

◆If AC BUS is **not powered** or AC LOAD is **not** within allowable limits:

Generator bus cannot be restored. Reset APU generator if required. Select APU BUS switch to provide backup for operating system.

►►Go to step 13

13 Land at the nearest suitable airport.

14 Multiple systems and circuits will be inoperative. Refer to Vol. 2, Chapter 6, Electrical to determine affected circuits.

15 F/D, AP, AUTO THROT switches . . . . . .OFF/ Verify Disconnected

▼ Continued on next page ▼

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**▼AC CROSSTIE LOCKOUT and
AC BUS OFF, GEN OFF, DC BUS OFF continued▼**

16 Choose one:

◆**Left** AC bus powered:

DFGC 1-2 switch . . . . . Verify number 1 position selected

FD CMD selector . . . . . Both on 1

F/D, AP,
AUTO THROT switches . . . . . As required

►►Go to step 17

◆**Right** AC bus powered:

DFGC 1-2 switch . . . . . Verify number 2 position selected

FD CMD selector . . . . . Both on 2

F/D, AP,
AUTO THROT switches . . . . . As required

►►Go to step 17

17 Choose one:

◆Center tank has **zero fuel** remaining:

CTR tank pump switches. . . . . OFF

■ ■ ■ ■

◆Center tank has **fuel** remaining:

►►Go to step 18

▼ Continued on next page ▼

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▼AC CROSSTIE LOCKOUT and AC BUS OFF, GEN OFF, DC BUS OFF continued▼

18 CTR tank pump switches . . . . . ON

19 Main tank pump switches (one at a time). . . . . OFF

20 Prior to landing,

Inoperative Items

Affected AC bus unpowered

Affected INST bus (28 VAC) unpowered

Affected radio AC bus unpowered

Affected radio bus (28 VAC) unpowered

Circuit breakers by panel are listed in Vol. 2, Chapter 6, Electrical.

21 **When** CTR FUEL QTY indicator indicates 500 pounds,

Main tank pump switches . . . . . ON

Note: Remaining center tank fuel may be used by leaving tank pump switches in one main tank OFF. When CTR FUEL QTY indicates zero or INLET FUEL PRESS LOW is annunciated, move main tank pump switches for that tank back to ON.

■ ■ ■ ■

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AC EMER BUS OFF

Condition: The emergency AC power system failed.

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

1 Choose one:

◆**Critical** phase of flight and Captain's flight instruments are inoperative:

EMER PWR switch . . . . . .ON

Caution! With EMER PWR switch in ON, battery cannot be relied upon for more than 30 minutes. Use emergency power only as required.

►►**Go to step 2**

◆**Not** critical phase of flight:

►►**Go to step 3**

▼ Continued on next page ▼

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▼AC EMER BUS OFF continued▼

2 Choose one:

◆Captain's flight instruments **are not** restored:

EMER PWR switch . . . . . OFF

►►Go to step 4

◆Captain's flight instruments **are** restored:

Use emergency power as long as phase of flight is critical. When no longer critical, move EMER PWR switch to OFF.

►►Go to step 4

▼ Continued on next page ▼

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▼AC EMER BUS OFF continued▼

3 Choose one:

◆Captain's flight instruments are **operative**:

EMERGENCY AC BUS SENSING
CB - C7*, if tripped . . . . . Reset

Caution! One reset of tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

■ ■ ■ ■

◆Captain's flight instruments are **inoperative**:

►►Go to step 4

4 Continue flight with unaffected instruments.

5 EMER AC BUS FEED (K7) and ALTERNATE EMER AC BUS FEED (L8) CBs (Upper EPC). . . . . .Check

▼ Continued on next page ▼

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▼AC EMER BUS OFF continued▼

6 Choose one:

◆Both circuit breakers are tripped or only ALTERNATE EMER AC BUS FEED circuit breaker **has** tripped:

ALTERNATE EMER AC BUS FEED (L8) CB (only one time) . . . . . Reset

Caution! If circuit breaker will not reset or trips again, do not reset EMER AC BUS FEED circuit breaker and do not move EMER PWR switch to ON. A bus fault may exist.

►►Go to step 7

◆ALTERNATE EMER AC BUS FEED circuit breaker **has not** tripped:

►►Go to step 8

▼ Continued on next page ▼

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▼AC EMER BUS OFF continued▼

7 Choose one:

- ALTERNATE EMER AC BUS FEED circuit breaker **will not reset** or trips again:

  ►►Go to step 10

- ALTERNATE EMER AC BUS FEED circuit breaker **resets**:

  Do not reset EMER AC BUS FEED C/B (if tripped).

■ ■ ■ ■

8 Continue operation with affected equipment inoperative.

Note: Refer to emergency AC bus portion of overhead circuit breaker panel to determine affected circuits.

9 At Captain's discretion,

EMER PWR switch. . . . . .ON

Note: With EMER PWR switch in ON, battery cannot be relied upon for more than 30 minutes. Use emergency power only as required.

▼ Continued on next page ▼

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▼AC EMER BUS OFF continued▼

10 Choose one:

◆EMER AC BUS OFF light is **OFF**:

Use emergency power only as required.

Note: Battery charger will not operate while EMER PWR switch is in ON.

■ ■ ■ ■

◆EMER AC BUS OFF light is **ON**:

EMER PWR switch . . . . . OFF

►►Go to step 11

11 Continue flight with affected instruments inoperative.

Note: Refer to emergency AC bus portion of overhead circuit breaker panel to determine affected circuits.

■ ■ ■ ■

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ELEC

APU GEN OFF

Messages: APU GEN OFF

Condition: The generator control breaker is open.

1 APU BUS switches. . . . . OFF

Message is normal if APU MASTER switch is ON, but APU generator is not in use.

2 Indicator Selector switch . . . . . APU

Attempt only one reset.

3 ⚠ APU GEN switch. . . . . Reset

4 Choose one:

◆AC Volts/Frequency **is not** within allowable limits:

Generator capability lost.

■ ■ ■ ■

◆AC Volts/Frequency **is** within allowable limits:

APU BUS switches (one at a time) . . . .ON

►►**Go to step 5**

▼ Continued on next page ▼

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▼APU GEN OFF continued▼

5 Choose one:

◆AC Volts/Frequency is **zero** or APU GEN OFF message **stays displayed**:

Generator capability lost.

APU BUS switches . . . . . OFF

■ ■ ■ ■

◆AC Volts/Frequency is **normal** and APU GEN OFF message **blanks**:

Continue normal operation.

■ ■ ■ ■

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ELEC

CSD OIL PRESS LOW

Messages:	L CSD OIL PRESS LOW R CSD OIL PRESS LOW
Condition:	Indicates oil pressure in left/right CSD is below operating limits.

▼ Continued on next page ▼

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▼CSD OIL PRESS LOW continued▼

1 Choose one:

◆Associated GEN OFF **is illuminated**:

Associated GEN switch . . . . . OFF

Caution! Next switch action is irrevocable. Make certain switch selected is for malfunctioning CSD.

Associated CSD Disconnect switch (hold 3 seconds) .Confirm . . . . . DISC

Note: CSD disconnect can be confirmed by observing AC VOLTS and FREQUENCY below scale.

Electrical transients associated with CSD disconnect may cause ON BATT annunciator on IRS MODE SELECT panel to momentarily illuminate.

Utilize APU generator if available.

Note: If there is only one source of normal AC power (one engine generator or APU), land at the nearest suitable airport.

■ ■ ■ ■

◆Associated GEN OFF **is not illuminated**:

►►Go to step 2

▼ Continued on next page ▼

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▼CSD OIL PRESS LOW continued▼

2 Choose one:

◆APU generator **is not** available:

Continue operation of engine generator at captain's discretion.

■ ■ ■ ■

◆APU generator **is** available:

Utilize APU generator.

APU BUS switch (Engine With CSD OIL PRESS LOW shown) . . . . . .ON

Associated GEN switch . . . . . OFF

Caution! Next switch action is irrevocable. Make certain switch selected is for malfunctioning CSD.

Associated CSD Disconnect switch (hold 3 seconds) . Confirm . . . . . DISC

Note: CSD disconnect can be confirmed by observing AC VOLTS and FREQUENCY below scale.

Note: If there is only one source of normal AC power (one engine generator or APU), land at nearest suitable airport.

■ ■ ■ ■

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CSD Oil Outlet Temperature High

Condition: The outlet temperature for the CSD is high.

1 Choose one:

- CSD oil outlet temperature increasing into **caution (yellow)** zone:

  ►►Go to step 2

- Temperature steadily increases toward **danger (red)** zone:

  ►►Go to step 3

2 Choose one:

- Temperature remains in **caution** zone and frequency is within limits:

  Monitor temperature and frequency.

  ■ ■ ■ ■

- Temperature increases towards **danger** zone:

  ►►Go to step 3

▼ Continued on next page ▼

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▼CSD Oil Outlet Temperature High continued▼

3 Choose one:

- Temperature **steadily increases** toward danger (red) zone or frequency is out of limits or fluctuating:

  Associated GEN switch . . . . . OFF

  ►►Go to step 4

- Temperature **increases and stabilizes** in danger (red) zone or frequency is out of limits:

  ►►Go to step 5

4 Choose one:

- Temperature stabilizes **below** danger zone and frequency is **within** limits:

  Continue operation with GEN switch OFF.

  Utilize APU generator, if available.

  ■ ■ ■ ■

- Temperature increases and stabilizes **in** danger (red) zone or frequency is **out of** limits:

  ►►Go to step 5

5 Associated GEN switch . . . . . OFF

Caution! Next switch action is irrevocable. Make certain switch selected is for malfunctioning CSD.

▼ Continued on next page ▼

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▼CSD Oil Outlet Temperature High continued▼

6 Associated CSD Disconnect switch (hold 3 seconds) . . . Confirm . . . . . DISC

Note: CSD disconnect can be confirmed by observing AC VOLTS and FREQUENCY below scale and/or CSD OIL PRESS LOW message.

7 Utilize APU generator, if available.

■ ■ ■ ■

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ELEC

DC BUS OFF

Messages: DC BUS OFF

Condition: The DC bus is not energized.

1 Choose one:

- DC load meters are **abnormal**:

  ►►**Go to step 2**

- DC load meters are **normal**:

  ►►**Go to step 3**

▼ Continued on next page ▼

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▼DC BUS OFF continued▼

2 Choose one:

◆Affected transformer rectifier CBs **are** tripped:

TRANSFORMER RECTIFIER
-1 or -2 CBs . . . . . RESET

- Left 1 K1, K2, K3 (upper EPC); right 1 L1, L2, L3 (upper EPC)

- Left 2 K4, K5, K6 (upper EPC); right 2 RIGHT XFMR RECTIFIER-2 (left console ground service bus)

If -1 CBs will not reset, try resetting -2 CBs. If TR CBs will not reset, continue with affected equipment inoperative.

Caution! Do not attempt to move DC BUS X TIE switch to CLOSE if TR CBs cannot be reset.

If right DC bus cannot be powered:

Flight deck door deadbolt . . . Locked

■ ■ ■ ■

◆Affected transformer rectifier CBs **not** tripped:

DC BUS X TIE switch . . . . . CLOSE

■ ■ ■ ■

▼ Continued on next page ▼

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▼DC BUS OFF continued▼

3 DC BUS OFF SENSING CB R23
(Lower EPC) (If Tripped) . . . . . Reset

Note: If DC BUS OFF message stays displayed and DC load meters are normal, sensing circuit is faulty.

■ ■ ■ ■

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DC EMER BUS OFF

Condition: The emergency DC bus is not powered.

Inoperative Items

#1 Comm and Navigation radios inop

Captain's overhead speaker inop

Interphone inop

PA inop

No current to captain's pitot heat

Emergency evacuation lights illuminate

Note: Continue with affected equipment inoperative until time is available to complete this procedure.

1 EMERGENCY DC BUS SENSING circuit breaker (B12*). . . . . Pull/Reset

2 Choose one:

◆Reset **is** successful in restoring normal indications:

Flight may continue.

Fault is on bus sensing circuit.

■ ■ ■ ■

◆Reset is **not** successful in restoring normal indications:

►►Go to step 3

▼ Continued on next page ▼

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▼DC EMER BUS OFF continued▼

3 Choose one:

◆Emergency DC bus feed CB (N37) **is** tripped:

Reset CB, only one time.

Caution! If a circuit breaker will not reset or trips again, do not move EMER PWR switch to ON, a bus fault may exist.

Note: If CB does not reset, continue with affected equipment inoperative.

Avoid icing conditions.

Select DFGC #2.

Consider turning off EMER LTS in order to conserve battery life.

■ ■ ■ ■

◆Emergency DC bus feed CB (N37) is **not** tripped:

►►Go to step 4

4 Continue operation with affected circuits inoperative.

▼ Continued on next page ▼

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▼DC EMER BUS OFF continued▼

5 At captain's discretion,

EMER PWR switch. . . . . ON

Operation with EMER PWR switch in ON will power emergency AC bus, and emergency DC bus. With BATT switch in ON, DC transfer bus is powered regardless of EMER PWR switch position. Battery, if fully charged, will supply power for certain emergency equipment for approximately 30 minutes. Only equipment essential for safe flight should be used.

■ ■ ■ ■

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ELEC

DC TRANSFER BUS OFF

Messages: DC TRANSFER BUS OFF

Condition: Verify loss of DC TRANSFER BUS:
- Standby horizon off flag in view
- Left EOAP screen inoperative
- Fire warning test inoperative

If standby horizon indicator power off flag is not in view, DC transfer bus may still be powered. DC TRANSFER BUS OFF may be annunciated by malfunctioning sensing circuit or tripped circuit breaker. Resetting DC TRANSFER BUS SENSING circuit breaker (X37) may restore normal indication.

1 Choose one:

◆Loss of DC transfer bus **is** verified:

►►**Go to step 3**

◆Loss of DC transfer bus is **not** verified:

►►**Go to step 2**

▼ Continued on next page ▼

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▼DC TRANSFER BUS OFF continued▼

2 Choose one:

◆DC transfer bus sensing CB is **not** tripped:

Flight may continue.

■ ■ ■ ■

◆DC transfer bus sensing CB **is** tripped:

DC TRANSFER BUS SENSING
CB (X37) . . . . . Reset

If CB trips again or will not reset:

Flight may continue.

Fault is on bus sensing circuit.

■ ■ ■ ■

▼ Continued on next page ▼

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▼DC TRANSFER BUS OFF continued▼

3 Choose one:

◆DC transfer bus feed CB (N36) (lower EPC panel) **is** tripped:

Reset CB, only one time.

Caution! One reset of tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

If CB will not reset or trips again,

Note: Consider DC TRANSFER BUS unpowered.
Master warning and master caution system inoperative.
Engine/APU fire detection and protection inoperative.
APU door actuator inoperative (No APU start).
First officer's audio panel receive functions inoperative.

Land at nearest suitable airport.

■ ■ ■ ■

◆DC transfer bus feed CB (N36) (lower EPC panel) is **not** tripped:

►►Go to step 4

▼ Continued on next page ▼

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▼DC TRANSFER BUS OFF continued▼

4 DC transfer bus feed CB (N36). . . . . Pull

5 Charger and transfer relay control CB (N38) . . . . . Pull

Battery should restore power to DC transfer bus. Battery charger will be inoperative. Land at nearest suitable airport.

Inoperative Items

Battery charger inop

Note: Fully charged batteries will provide approximately 30 minutes of power.

Use only equipment essential to flight.

■ ■ ■ ■

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Generator Bus Circuit Breakers (35 or 50 Amp) Tripped

Condition: One or more 35 or 50 amp generator bus circuit breaker(s) has tripped.

1 AC X TIE switch . . . . . OPEN

2 Affected Generator Bus Circuit Breakers (All). . . . . OPEN (Pull)

Note: If circuit breaker(s) of one or two phases of a particular load is tripped, associated circuit breaker(s) should also be opened (pulled).

When a circuit breaker trips, a 2-minute cooling period should be observed before reset.

3 Affected Generator Bus Circuit Breakers (All). . . . . Reset

4 **If** reset is successful,

AC X TIE switch . . . . . AUTO

■ ■ ■ ■

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ELEC

GEN OFF

Messages: L GEN OFF R GEN OFF

Condition: Loss of generator due to action of fault protection.

Attempt only one reset.

1 Associated GEN switch . . . . . Reset/OFF

2 Indicator selector switch . . . . . Associated GEN

3 Choose one:

◆AC Volts/Frequency **are** within allowable limits:

Associated GEN switch . . . . . ON

►►**Go to step 4**

◆AC Volts/Frequency are **not** within allowable limits or generator will not stay connected to distribution system:

►►**Go to step 5**

▼ Continued on next page ▼

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▼GEN OFF continued▼

4 Choose one:

◆AC Volts/Frequency **are** within allowable limits:

Monitor system.

■ ■ ■ ■

◆AC Volts/Frequency are **not** within allowable limits:

►►Go to step 5

5 Associated GEN switch . . . . . OFF

Note: All buses will be powered through AC crosstie relay.

Caution! Next switch action is irrevocable. Make certain switch selected is for malfunctioning CSD.

6 Associated CSD Disconnect switch (hold 3 seconds). . . .Confirm . . . . . DISC

Note: CSD disconnect can be confirmed by observing AC VOLTS and FREQUENCY below scale. Electrical transients associated with CSD disconnect may cause ON BATT annunciator on IRS MODE SELECT panel to momentarily illuminate.

7 AC LOAD Meter (Operating Generator) . . .Monitor

Note: If there is only one source of normal AC power (one engine generator or APU), land at nearest suitable airport.

▼ Continued on next page ▼

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▼GEN OFF continued▼

8 **If** APU start is desired,

9 APU L and R BUS switches . . . . . OFF

10 APU . . . . . START

11 Choose one:

◆APU **starts**:

APU PWR AVAIL light . . . . . ON

Note: Move APU generator switch to RESET if required.

Indicator selector switch . . . . . APU

AC Volts/Frequency . . . . . Normal

APU L and R BUS switch (switch with inoperative generator) . . . ON

APU Power in Use light . . . . . ON

Note: APU electrical load can be reduced by turning off the galley power or one AIR CONDITIONING SUPPLY switch.

■ ■ ■ ■

◆APU **does not** start:

►►**Go to step 12**

12 Prior to landing,

13 One AIR CONDITIONING SUPPLY switch . . . . OFF

14 GALLEY switch . . . . . OFF

▼ Continued on next page ▼

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▼GEN OFF continued▼

15 **If** only APU generator operating prior to landing:

Remaining APU BUS switch . . . . . .ON

APU will crosstie in flight but not on the ground.

■ ■ ■ ■

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Intermittent AC Power Interruptions

Condition: This condition may be characterized by:
- loud buzzing/chattering sound from the EPC and any combination of random circuit breaker trips and,
- inappropriate CAWS messages,
- loss of some flight instruments,
- flashing flight deck annunciators,
- loss of left or right AC bus(es).

Caution! Do not use this procedure for a bus or generator fault accompanied by an AC X TIE lockout annunciation.

1 AC BUS X TIE switch . . . . . OPEN

▼ Continued on next page ▼

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▼Intermittent AC Power Interruptions continued▼

2 Choose one:

◆L, R GEN OFF **stays displayed**:

Associated GEN switch . . . . . .Reset/OFF

Note: A generator must be reset only once for a given fault. If a fault trips the generator after reset, the fault should be located and corrected before attempting to place the generator on its bus again.

Indicator selector switch . . . . . .Associated GEN

►►Go to step 3

◆L, R GEN OFF **blanks**:

►►Go to step 9

3 Choose one:

◆AC Volts/Frequency **are** within allowable limits:

Associated GEN switch . . . . . .ON

►►Go to step 4

◆AC Volts/Frequency are **not** within allowable limits or generator will not stay connected to distribution system:

►►Go to step 5

▼ Continued on next page ▼

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▼Intermittent AC Power Interruptions continued▼

4 Choose one:

◆AC Volts/Frequency/AC Load **are** within allowable limits:

Circuit Breaker(s) . . . . . Check/Reset

Note: If circuit breaker(s) of one or two phases of a particular load are tripped, the associated circuit(s) should also be opened (pulled) and all phases reset together.

Caution! One reset of tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

Monitor system.

■ ■ ■ ■

◆AC Volts/Frequency are **not** within allowable limits:

►►Go to step 5

5 Associated GEN switch . . . . . OFF

6 DC BUS X TIE switch. . . . . CLOSE

▼ Continued on next page ▼

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▼Intermittent AC Power Interruptions continued▼

7 Circuit Breaker(s) . . . . . Check/Reset

Note: If circuit breaker(s) of one or two phases of a particular load are tripped, the associated circuit breaker(s) should also be opened (pulled) and all phases reset together.

Caution! One reset of tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

Note: Prior to starting APU, verify APU L, R BUS switches are in OFF.

▼ Continued on next page ▼

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▼Intermittent AC Power Interruptions continued▼

8 Choose one:

◆APU generator **is** available (AC volts/frequency within limits) and only one generator is operative:

APU L or R BUS switch
(Side with inoperative generator) . . . . ON

Note: During approach, verify GALLEY switch is in OFF then move other APU BUS switch to ON (or both APU BUS switches to ON if operating with two engine generators).

Caution! Do not return AC BUS X TIE switch to AUTO.

■ ■ ■ ■

◆APU generator is **not** available and only one generator is operative:

►►Go to step 9

9 Land at nearest suitable airport.

10 Prior to landing,

11 One AIR CONDITIONING SUPPLY switch . . . . OFF

12 GALLEY switch . . . . . OFF

Caution! Do not return AC BUS X TIE switch to AUTO.

■ ■ ■ ■

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Blank

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Aborted Start - Manual

Condition: During a ground start, an abort engine start condition occurs.

1 Fuel lever . . . . . OFF

2 ENG IGN selector . . . . . OFF

3 **If** START switch is still engaged:

Engine rotation . . . . . Continue

Continue rotation 20 seconds to clear fuel.

START switch . . . . . OFF

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

▼ Continued on next page ▼

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▼Aborted Start - Manual continued▼

4 Choose one:

- If start aborted due to either **no N1 rotation** or **no N2 rotation** or **hung start**:

  ►►Go to step 5

- If start aborted due to either **no oil pressure** or **no ignition** or **rapid EGT rise toward limit**:

  ►►Go to step 6

5 Choose one:

- If **no N1 rotation**:

  ►►Go to the No Rotation, N1 checklist on page 7.33

- If **no N2 rotation**:

  ►►Go to the No Rotation, N2 - START VALVE OPEN checklist on page 7.34

- If **hung start**:

  ►►Go to the Hung Start checklist on page 7.27

▼ Continued on next page ▼

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▼Aborted Start - Manual continued▼

6 Choose one:

◆ If **no oil pressure**:

Circuit breakers (A1, A10) . . . . . Check

If no circuit breaker is tripped, contact maintenance.

►►**Go to step 7**

◆ If **no ignition**:

Circuit breakers (K26, L26, C18*) . . . . . Check

If no circuit breaker is tripped, select ENG IGN Selector to BOTH.

►►**Go to step 7**

◆ If **rapid EGT rise toward limit**:

Allow engine to cool below 100 degrees Celsius EGT prior to FUEL lever ON.

►►**Go to step 7**

7 **If** another start is to be attempted:

Engine . . . . . Clear

After reaching max motoring, motor the engine for an additional 20 seconds with starter if not previously accomplished.

8 ENG IGN . . . . . as reqd

9 Use normal start procedure.

■ ■ ■ ■

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Engine Failure or Shutdown

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 affected side, N1 and/or N2 tachometers indicating 0%, rapid loss of hydraulic pressure and sudden loss of generator power. If severe damage is suspected,

►►Go to the Engine Severe Damage or Separation checklist on page 8.2

1 Autothrottles . . . . . OFF

2 Throttle
(Affected Engine) . . .Confirm . . . . . Idle

3 FUEL Control Lever
(Affected Engine) . . .Confirm . . . . . OFF

Note: After FUEL control lever is OFF, throttles should be used together.

4 Throttles . . . . . Align

5 Autothrottles . . . . . .As desired

6 TRP. . . . . MCT

7 AUX and TRANS HYD PUMP
switches . . . . . .ON

8 ENG IGN selector . . . . . .As required

▼ Continued on next page ▼

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▼Engine Failure or Shutdown continued▼

9 Fuel PUMPS switches and
FUEL X FEED Lever . . . . . As required

Note: Use fuel crossfeed as necessary to maintain fuel balance.

10 Electrical Loads . . . . . Check

Note: Start APU (if available) to reduce electrical load on operating generator.

11 **When** takeoff thrust is no longer required,

AIR COND SHUTOFF . . . . . OVRD

12 Choose one:

◆Engine start will be attempted:

►►**Go to the Inflight Start checklist on page 7.29**

■ ■ ■ ■

◆Engine start will **NOT** be attempted:

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

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Engine(s) Compressor Stall

Condition: One or more of these occur:
- Engine displays are unusual
- Engine displays are quickly nearing or show an exceedance
- Unusual engine noises are heard
- There is no response to throttle movement

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

Note: If an engine surge or compressor stall occurs during ground operations, or a takeoff is rejected due to an engine surge or compressor stall, a maintenance inspection is required prior to flight.

Note: For any loss of thrust during takeoff, the TAKEOFF - ENGINE FAILURE profile should be flown until reaching a safe altitude, or until obstacle clearance is assured. In the event of dual engine surging, both engines may be reduced to CLIMB thrust at or above 400 feet AGL. [AFM]

1 Autothrottles . . . . . OFF

▼ Continued on next page ▼

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▼Engine(s) Compressor Stall continued▼

2 Throttle(s)
(Affected Engine[s]) . Confirm . . . . . Retard

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

3 ENG IGN selector . . . . . OVRD

4 ENG Anti-Ice switches . . . . . ON

5 Choose one:

◆Engine(s) compressor stall(s) **stops**:

Operate engine(s) at level(s) at which compressor stall(s) does not recur.

ENG IGN selector. . . . . As required

ENG Anti-Ice switches . . . . . As required

Closely monitor engine(s) for remainder of flight.

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

◆Engine(s) compressor stall(s) **continues**:

►►Go to step 6

▼ Continued on next page ▼

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▼Engine(s) Compressor Stall continued▼

6 Choose one:

◆**Dual** engine compressor stalls continue:

FUEL Levers (one at a time) . . . . . OFF, then immediately ON

►►**Go to step 7**

◆**Single** engine compressor stalls continue:

►►**Go to step 9**

7 Choose one:

◆Dual engine compressor stalls **stop**:

ENG IGN selector . . . . . As required

ENG Anti-Ice switches . . . . . As required

Monitor engine for remainder of flight.

■ ■ ■ ■

◆Engine(s) compressor stall(s) **continues**:

►►**Go to step 8**

▼ Continued on next page ▼

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▼Engine(s) Compressor Stall continued▼

8 Choose one:

◆**Dual** engine compressor stalls continues:

Operate at minimum thrust for safe flight.

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

◆**Single** engine compressor stall continues:

►►**Go to step 9**

9 FUEL Lever
(affected engine) . . . Confirm . . . . . OFF, then immediately ON

▼ Continued on next page ▼

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▼Engine(s) Compressor Stall continued▼

10 Choose one:

◆Single engine compressor stall **continues**:

Note: Normally an engine should not be restarted if it was shut down due to a compressor stall. However, at Captain's discretion, a restart may be attempted if 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 has not resulted in engine damage.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

◆Single engine compressor stall **stops**:

►►**Go to step 11**

11 ENG IGN selector . . . . . As required

12 ENG Anti-Ice switches . . . . . As required

13 Closely monitor engine parameters for remainder of flight.

■ ■ ■ ■

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Two Engine Flameout

Condition: Engine speed for both engines is below idle.

1 EMER PWR switch . . . . . ON

2 ENG IGN selector . . . . . OVRD

3 CABIN ALT Control Lever. . . . . MANUAL (down)

4 Outflow valve. . . . . Close

5 Airspeed . . . . . Minimum maneuvering (not less than 170 KIAS)

6 Throttles . . . . . Idle

7 ENG Anti-Ice switches . . . . . ON

8 BATT switch . . . . . ON/Locked

9 DC START PUMP switch . . . . . ON

10 Fuel Boost Pump switches . . . . . All ON

11 GEN switches . . . . . OFF

12 ENG HYD PUMP switches . . . . . OFF

13 Fuel Control Levers . . . . . ON

14 FUEL X FEED Lever. . . . . OFF

▼ Continued on next page ▼

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▼Two Engine Flameout continued▼

15 Choose one:

◆**Neither** engine starts:

Note: If two engine flameout was caused by fuel starvation in left and right main tanks with fuel in center wing tank, optimum attitude for scavenging fuel out of the right main tank for APU or right engine is zero degrees pitch attitude and 1.5° right wing up.

APU MASTER switch . . . . . START/Release

Note: Attempt APU start regardless of altitude and airspeed.

►►**Go to step 16**

◆**One or both** engines start:

►►**Go to step 19**

16 Choose one:

◆APU **starts**:

L and R APU BUS switches . . . . . .ON

►►**Go to step 17**

◆APU **does not start**:

►►**Go to step 17**

17 Continue engine start attempts.

▼ Continued on next page ▼

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▼Two Engine Flameout continued▼

18 Choose one:

◆Repeated start attempts are **unsuccessful**:

►►**Go to the Crash Landing checklist on page 0.1**

◆One or both engines are **started**:

►►**Go to step 19**

19 Electrical System . . . . . As required

20 EMER PWR Switch . . . . . OFF

21 ENG HYD PUMP switches . . . . . As required

22 CABIN ALT Control Lever . . . . . .AUTO (up)

23 DC START PUMP switch . . . . . As required

24 ENG Anti-Ice switches . . . . . As required

25 ENG IGN selector . . . . . As required

Note: Continue engine and/or APU start until at least two are running.

26 Land at nearest suitable airport.

■ ■ ■ ■

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APU - No Rotation or No Start or Hung Start

Condition: During a ground start, an abnormal APU start condition occurs.

Caution! Observe starter duty cooling time prior to performing second start attempt.

1 Battery switch. . . . . ON/Lock

2 Choose one:

◆APU percent RPM gauge has **no indication**:

►►**Go to step 3**

◆APU percent RPM gauge is **stabilized** below idle RPM (green arc):

Note: No increase in EGT indicates no start. A continuing increase in EGT indicates a hung start.

►►**Go to step 10**

3 Choose one:

◆BATT VOLT indication after applying starter load is **less** than 22 volts:

Discontinue start attempt. Call maintenance.

■ ■ ■ ■

◆BATT VOLT indication after applying starter load is **more** than 22 volts:

►►**Go to step 4**

▼ Continued on next page ▼

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▼No Rotation or No Start or Hung Start - APU continued▼

4 APU MASTER switch . . . . . OFF

5 APU CONTROL (B21*) and APU DOOR CONTROL (U39) Circuit Breakers (If Tripped) . . . . . Reset

6 BAT DIRECT BUS CB (Reset handle is located on Captain's side lower rear pedestal) . . . . . Reset

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

7 Choose one:

◆GEAR HDL REL button is **retracted**:

Call maintenance.

Note: A retracted GEAR HDL REL button indicates an extended nose strut and failure of ground shift mechanism to go into ground mode.

■ ■ ■ ■

◆GEAR HDL REL button is **extended**:

►►Go to step 8

8 APU MASTER switch . . . . . RUN

▼ Continued on next page ▼

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▼No Rotation or No Start or Hung Start - APU continued▼

9 Choose one:

◆APU doors are **open**:

Attempt another start.

■ ■ ■ ■

◆APU doors are **closed**:

APU DOORS switch . . . . . NON RAM
24 seconds minimum,
then OFF

Attempt another start.

Note: After APU shutdown, move APU DOORS switch to AUTO to close APU doors.

Contact Maintenance.

■ ■ ■ ■

10 APU MASTER switch . . . . . OFF

11 DC START/TANK PUMP switch. . . . . As required

■ ■ ■ ■

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MISC

APU FAULT

Messages: APU FAULT

Condition: Indicates when APU system fault is detected.

1 Choose one:

◆On the **ground**:

Note: APU will not be available until cleared by maintenance.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Choose one:

◆APU **is** essential for continued safe flight:

Continue APU operation.

►►**Go to step 3**

◆APU is **not** essential for continued safe flight:

►►**Go to step 4**

▼ Continued on next page ▼

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▼APU FAULT continued▼

3 Choose one:

◆APU RPM and EGT **are** within allowable limits:

No further crew action required.

■ ■ ■ ■

◆APU RPM and EGT are **not** within allowable limits:

►►Go to step 4

4 APU FIRE CONT switch. . . . . OFF and AGENT ARM

5 APU AIR switch. . . . . OFF

6 APU DOORS switch. . . . . AUTO

7 APU MASTER switch. . . . . OFF

8 APU FIRE CONT switch. . . . . .NORM

■ ■ ■ ■

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MISC

APU OIL PRESS LOW

Messages: APU OIL PRESS LOW

Condition: Indicates APU oil pressure is below normal.

1 APU FIRE CONT switch. . . . . OFF and AGENT ARM

2 APU AIR switch. . . . . OFF

3 APU DOORS switch. . . . . AUTO

4 APU MASTER switch. . . . . OFF

5 APU FIRE CONT switch. . . . . .NORM

■ ■ ■ ■

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MISC

ART INOP with switch in AUTO

Messages: ART INOP

Condition: Indicates automatic reserve thrust is unavailable.

1 Choose one:

◆On the **ground**:

ART switch . . . . . Reset

ART SOLENOID CBs
(X32, Z32) (If Tripped) . . . . . Check/Reset

►►**Go to step 2**

◆In **flight**:

►►**Go to step 3**

2 Choose one:

◆ART INOP **stays displayed**:

Takeoff thrust/flaps . . . . . Determine

With the ART switch OFF, normal power takeoffs are **not** permitted. An alternate or maximum power takeoff must be made.

■ ■ ■ ■

◆ART INOP **blanks**:

■ ■ ■ ■

▼ Continued on next page ▼

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▼ART INOP with switch in AUTO continued▼

3 ART switch. . . . . OFF, then AUTO

4 ART SOLENOID CBs
(X32, Z32) (If Tripped) . . . . . Check/Reset

5 Choose one:

◆ART INOP **stays displayed**:

ARTS inoperative.

■ ■ ■ ■

◆ART INOP **blanks**:

■ ■ ■ ■

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EGT Inoperative or Reads High

Condition: EGT approaching or exceeding limit.

Note: Refer to Vol. 1, SP.7 for Engine Parameters Exceeded or Exceedance is Suspected in Flight.

1 Thrust . . . . . Reduce

2 Choose one:

◆EGT is **constant** and N1, N2, FUEL FLOW indications decrease:

Assume EGT circuit malfunction.

■ ■ ■ ■

◆EGT **exceeds** 630°C:

►►**Go to step 3**

3 Choose one:

◆EGT exceeds **630°C** but does not go beyond 645°C:

►►**Go to step 4**

◆EGT exceeds **645°C**:

►►**Go to step 5**

▼ Continued on next page ▼

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▼EGT Inoperative or Reads High continued▼

4 Choose one:

◆EGT exceeds 630°C and **cannot be decreased**:

Shut down engine.

■ ■ ■ ■

◆EGT exceeds 630°C but **does not go beyond 645°C** and thrust reduction decreases EGT below 625°C (other indications normal):

Continued engine operation is permissible. Make log entry of over limit and time.

■ ■ ■ ■

5 Accomplish precautionary engine shutdown at Captain's discretion.

6 **When** takeoff thrust is no longer required,

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

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Engine Instrument/System Display Panel Failure

Condition: A power interruption may cause a partial blanking of the engine instruments/system display. Dashes in either display panel indicate a loss of input signal.

1 Choose one:

◆Either panel is **blank**:

ENGINE INSTRUMENT DISPLAY PANEL CBs (Left panel - X36, B15*, Right panel - X35, C15*) . . . . . Pull/Reset

SYSTEM DISPLAY PANEL CBs (Left panel - S34, Right panel - T34) . . . . . Pull/Reset

■ ■ ■ ■

◆**Dashes** are displayed in either panel:

INSTRUMENT TRANSFORMER CBs (Left - K09, Right - L09) . . . . . Pull/Reset

■ ■ ■ ■

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EPR Erratic or High

Condition: May occur due to icing or EPR indication malfunction.

1 Choose one:

◆Icing conditions **exist**:

ENG IGN selector. . . . . SYS A or SYS B

ENG Anti-ice switches . . . . . ON

►►**Go to step 2**

◆Icing conditions **do not** exist:

►►**Go to step 3**

2 Choose one:

◆EPR indication and other parameters are **normal**:

■ ■ ■ ■

◆EPR indication and other parameters are **abnormal**:

►►**Go to step 3**

3 Autothrottles . . . . . OFF

4 Throttle/Indications . . . . . Adjust/Observe

5 Move throttle and observe EPR, EGT, N1, N2, and FUEL FLOW indications.

▼ Continued on next page ▼

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▼EPR Erratic or High continued▼

6 Choose one:

◆Normal response/EPR **erratic**:

Assume EPR circuit malfunction, use N1 for setting power. Refer to ODM, Abnormal Section, Operation Without Airspeed Indication.

■ ■ ■ ■

◆EPR **fixed**:

►►**Go to step 7**

7 Associated PRESSURE RATIO Circuit Breaker (C8* and L25) (If Tripped). . . . . Reset

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes, if the circuit breaker trips again, do not attempt another reset.

8 If EPR remains fixed, use N1 for setting power.

■ ■ ■ ■

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Hung Start or No Acceleration to Idle

Condition: Engine does not continue acceleration to idle and other indications are in normal range.

1 Choose one:

- N2 **fails to increase** above 42%:

  ►►Go to step 2

- N2 **is above** 42%, but below 50% and other engine instruments are normal:

  Throttle . . . . . Advance

  Advance throttle to momentarily increase N2 to 65% while closely monitoring EGT. This should close the surge valve.

  ■ ■ ■ ■

- Engine does not ACCELERATE to idle rpm within 2 minutes after FUEL lever is placed ON:

  ►►Go to the Aborted Start - Manual checklist on page 7.1

  ■ ■ ■ ■

2 Accomplish Aborted Start - Manual procedure.

Abort the start prior to reaching 500°C.

▼ Continued on next page ▼

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▼Hung Start or No Acceleration to Idle continued▼

3 **If** a second start is to be attempted:

Engine Anti-Ice . . . . . .ON

Engine Hydraulic Pump . . . . . OFF

ENG IGN Selector. . . . . .as reqd

Accomplish normal start procedure.

EGT . . . . . .Monitor

Ensure EGT is below 100°C prior to fuel on.

Monitor EGT until N2 stabilized at or above 50%.

If engine response and indication are normal:

Engine Anti-Ice . . . . . As required

Hydraulic Pump . . . . . .ON

■ ■ ■ ■

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Inflight Start

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

1 Autothrottles . . . . . OFF

2 Throttle . . . . . Confirm . . . . . Idle

3 Fuel Lever . . . . . Confirm . . . . . OFF

4 GEN switch (affected engine) . . . . . OFF

5 ENG HYD PUMP switch (affected engine) . . . . OFF

6 PNEU X-FEED VALVE Lever . . . . . CLOSE

7 ENG Anti-Ice . . . . . ON

8 Main Tank Fuel Pump switches. . . . . ON

9 Airspeed . . . . . As required

If initial EGT is 100°C or greater:	
20,000 feet	186-320 KIAS
19,000 feet	182-330 KIAS
18,000 feet and below	180-340 KIAS

If initial EGT is less than 100°C:	
20,000 feet	186-320 KIAS
18,000 feet	178-340 KIAS
16,000 feet	170-340 KIAS
15,000 feet and below	165-340 KIAS

10 Oil Pressure . . . . . Indicating

11 ENG IGN selector . . . . . OVRD

12 FUEL Lever (N2 Indicating) . . . . . ON

▼ Continued on next page ▼

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▼Inflight Start continued▼

Note:

If EGT and RPM rise does not occur within 20 seconds after FUEL control lever has been moved to ON, move FUEL control lever to OFF and discontinue airstart.

If start is not successful with initial EGT above 100°C, allow EGT to cool below 100°C before attempting a second start.

If start is still unsuccessful,

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

13 Engine Instruments . . . . . Stabilized

14 ENG IGN selector . . . . . As required

15 ENG Anti-Ice . . . . . As required

16 Engine Instruments . . . . . Stabilized

17 Hydraulic, Electrical, Fuel, Pneumatic and Air Conditioning Systems. . . . . Normal

■ ■ ■ ■

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N1 and/or N2 Overspeed

Condition: N1 exceeded 101.6% and/or
N2 exceeded 102.5%.

1 Thrust. . . . . Reduce

Note: Refer to Vol. 1, SP.7 for Engine Parameters Exceeded or Exceedance is Suspected in Flight.

2 Choose one:

◆N1 exceeded 101.6% but did **not exceed** 102.8% and/or N2 exceeded 102.5% but did **not exceed** 103.5% (all other indications normal):

Continue engine operation and make log entry of duration and RPM above maximum limit.

Contact MCC.

■ ■ ■ ■

◆N1 **exceeded** 102.8% and/or
N2 **exceeded** 103.5%:

Accomplish precautionary engine shutdown at Captain's discretion. Make log entry of duration and RPM overspeed.

When takeoff thrust is no longer required,

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

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No Load Idle EGT High - APU

Condition: No-load idle EGT is stabilized considerably above normal idle values (60-70%) when APU AIR switch is on and all pneumatic powered systems are off.

Note: Normally, idle EGT will rise momentarily when APU bleed air valve is opened until pneumatic ducting is pressurized, then return to original no-load value.

If EGT remains high, the most probable cause is a pneumatic duct leak.

1 APU AIR switch. . . . . OFF

2 APU MASTER switch. . . . . OFF

3 Call maintenance.

■ ■ ■ ■

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No Rotation, N1

Condition: Indicates possible N1 rotor seizure or N1 tachometer indicating failure.

1 Choose one:

◆N1 rotor rotation **is** confirmed with ground crew:

Proceed with engine start utilizing N2 and remaining engine indications.

Caution! Ensure ENG IGN Selector is ON as required.

■ ■ ■ ■

◆N1 rotor rotation is **not** confirmed with ground crew:

Maintenance action required.

■ ■ ■ ■

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ENG

No Rotation, N2 - START VALVE OPEN

Messages: L START VALVE OPEN R START VALVE OPEN

Condition: Indicates the respective engine start valve is not closed.

1 N1 Indication and/or
ENGINE OIL PRESS Indication . . . . . Observe

2 Choose one:

◆Rotation is **not** confirmed:

Discontinue start.

■ ■ ■ ■

◆Rotation **is** confirmed:

Caution! Ensure ENG IGN Selector is ON as required.

Continue start, use max motoring, no less than 5% N1 RPM for fuel on. START switch OFF at 12 to 20% N1 RPM.

■ ■ ■ ■

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ENG

OIL PRESS LOW - After Start

Messages: L OIL PRESS LOW R OIL PRESS LOW

Condition: Indicates respective engine oil pressure low.

1 Choose one:

◆Engine oil pressure is **at or above** 40 psi:

L, R OIL PRESS LOW message shown. . . . . Observe

With normal pressure, regardless of indication condition (on or off), continue operation, observe ENGINE OIL QUANTITY and ENGINE OIL TEMP indications.

■ ■ ■ ■

◆Engine oil pressure is **below** 40 psi, amber caution light illuminated:

Shut down engine, maintenance action required.

■ ■ ■ ■

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ENG

OIL PRESS LOW

Messages: L OIL PRESS LOW R OIL PRESS LOW

Condition: Indicates respective engine oil pressure low.

Note: Oil pressure between 35 and 40 PSI is not desirable and should be tolerated only for completion of flight, preferably at reduced thrust setting to as low a level as flight conditions permit.

1 Engine Thrust. . . . . Reduce

2 Choose one:

◆OIL PRESS LOW message is **shown**:

►►**Go to step 3**

◆OIL PRESS LOW message is **blank**, oil pressure indicates below 35 psi:

►►**Go to step 4**

▼ Continued on next page ▼

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▼OIL PRESS LOW continued▼

3 Choose one:

◆Oil pressure, oil temperature and oil quantity are **normal**:

Continue normal engine operation.

■ ■ ■ ■

◆Oil pressure, oil temperature or oil quantity are **abnormal**:

Shut down engine.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

4 Choose one:

◆Oil temperature and oil quantity are **normal**:

Continue normal engine operation.

■ ■ ■ ■

◆Oil temperature or oil quantity are **abnormal**:

Shut down engine.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

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Oil Pressure High

Condition: Oil pressure exceeds 55 psi.

1 Choose one:

◆Oil pressure above 55 psi, **other indications normal**:

Reduce thrust for completion of flight. Normal engine operation may be maintained if flight conditions require.

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

◆Oil pressure above 55 psi and **OIL QUANTITY increases above normal range**:

Shut down engine.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

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Oil Quantity Decreasing or Increasing

Condition: Engine oil quantity is decreasing or increasing.

Note: Normal oil consumption is less than 0.25 US quarts per hour. An engine which exceeds 0.64 US quarts per hour should be investigated.

1 Choose one:

◆Oil quantity **increases above** normal level:

►►**Go to step 2**

◆Oil quantity **decreases below** normal level:

►►**Go to step 3**

2 Choose one:

◆Oil pressure/fuel flow indications are **normal**:

Continue normal operation.

■ ■ ■ ■

◆Oil pressure **exceeds** 55 psi:

Shut down engine.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

▼ Continued on next page ▼

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▼Oil Quantity Decreasing or Increasing continued▼

3 Choose one:

◆Oil pressure/oil temperature indications are **normal**:

Anticipate engine oil pump cavitation or oil pressure loss.

■ ■ ■ ■

◆Oil pressure **fluctuates**:

Reduce thrust. If oil pressure loss is experienced, shut down engine.

When takeoff thrust is no longer required,

►►**Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45**

■ ■ ■ ■

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ENG

OIL STRAINER CLOG

Messages: L OIL STRAINER CLOG R OIL STRAINER CLOG

Condition: Indicates an excessive differential pressure across respective oil filter.

1 Choose one:

◆In **flight**:

Reduce thrust on affected engine.

►►Go to step 2

◆On the **ground**:

Note: OIL STRAINER CLOG messages displayed during throttle transients and shown for less than five seconds may be disregarded.

►►Go to step 4

▼ Continued on next page ▼

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▼OIL STRAINER CLOG continued▼

2 Choose one:

◆OIL STRAINER CLOG message **blanks**:

Continue at reduced thrust setting at or below setting necessary to keep message blank.

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

◆OIL STRAINER CLOG message **stays displayed**:

►►Go to step 3

3 Choose one:

◆All other engine parameters **remain within limits**:

Engine may be operated at idle until a landing can be made.

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

◆Any other engine parameters are **exceeded**:

Engine should be shut down.

►►Go to the Engine Failure or Shutdown checklist on page 7.4

■ ■ ■ ■

▼ Continued on next page ▼

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▼OIL STRAINER CLOG continued▼

4 Choose one:

◆Engine OIL TEMP indication is **above** 25°C:

Shut down engine.

■ ■ ■ ■

◆Engine OIL TEMP indication is **less than or equal to** 25°C:

Allow engine to warm up.

After five minutes,

►►Go to step 5

5 Choose one:

◆OIL STRAINER CLOG message **extinguishes**:

Continue normal engine operation.

■ ■ ■ ■

◆OIL STRAINER CLOG message **stays displayed**:

Shut down engine.

■ ■ ■ ■

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Oil Temperature High

Condition: Engine oil temperature is high.

Note: An increase in oil temperature can be associated with thrust reduction.

1 Throttle (affected engine) . . . . . Increase thrust

Note: Increasing thrust will provide higher fuel flow to improve oil cooling until lower fuel flow is capable of maintaining oil temperature within limits. Oil temperature stabilization may take several minutes following thrust changes.

2 Choose one:

◆Engine oil temperature decreases **below** 135°C:

Adjust throttle as required.

Monitor oil temperature.

■ ■ ■ ■

◆Engine oil temperature **exceeds** 135°C for more than 15 minutes or exceeds 165°C at any time:

Shut down engine.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

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One Engine Inoperative/ Reduced Thrust Landing

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

1 TRP (if required). . . . . MCT

2 PNEU X-FEED VALVE Lever
(Affected Engine) . . . . . CLOSE

3 FUEL TANKS Pumps/
FUEL X FEED Lever . . . . . As required

Note: Use fuel crossfeed as necessary to maintain fuel balance.

4 AIR COND SHUTOFF switch . . . . . OVRD

5 ENG SYNC Selector. . . . . OFF

6 AIR CONDITIONING SUPPLY switch
(Affected Engine) . . . . . OFF

7 Driftdown Performance . . . . . Check

Consult ODM, Abnormal Section and low altitude charts for driftdown data.

If FMS is available, engine out data may be obtained by selecting the ENG OUT prompt.

The FMS may not be used for range calculations or fuel management.

8 Plan to land at the nearest suitable airport.

Consider a passenger evacuation.

9 Transponder Function selector . . . . . TA

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

▼ Continued on next page ▼

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▼One Engine Inoperative/Reduced Thrust Landing continued▼

10 Landing Flap Configuration 28/Land

Note: Restricted rudder may result after applying maximum rudder due to asymmetric thrust. If RUDDER TRAVEL UNRESTRICTED light does not come on during deceleration, momentarily centering rudder pedals and rudder trim may allow rudder throw limiter to return to speed-scheduled position.

11 **If** rudder remains restricted:

►►**Go to the Rudder Restricted During Landing checklist on page 9.22**

12 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

▼ Continued on next page ▼

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▼One Engine Inoperative/Reduced Thrust Landing continued▼

Approach Considerations

For go-around, use flaps 11.

Autopilot must be disconnected prior to glide slope capture (for single engine ops only).

Approach Checklist

■Flight & nav instruments . . . . . verified C&F

Spoilers . . . . . RET & disarmed PM

Cabin notification . . . . . complete C

Altimeters . . . . . ___ , xckd C&F

Additional Deferred Items

Fuel tank pumps, crossfeed . . . . . as reqd PM

Once fuel crossfeed is complete, fuel tank pumps on and fuel crossfeed lever off.

Rudder trim should be zeroed before landing.

Landing Checklist

Landing gear . . . . . down, 3 green C&F

Flaps & slats . . . . . **28, 28, LAND** C&F

Spoilers . . . . . ARM C&F

Ignition . . . . . as reqd PM

Autobrakes. . . . . as reqd PM

Annunciator panel. . . . . ckd PM

■ ■ ■ ■

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HYD

REVERSER ACCUM LOW

Messages:	L REVERSER ACCUM LOW	R REVERSER ACCUM LOW
Condition:	Indicates hydraulic pressure at respective reverser accumulator is low.	

1 HYD PUMP switches (ENG, AUX, TRANS) . . . . .ON

2 Choose one:

◆One the **ground**:

►►**Go to step 3**

◆In **flight**:

►►**Go to step 5**

3 Choose one:

◆REVERSER ACCUM LOW message **blanks**:

HYD PUMP switches
(ENG, AUX, TRANS) . . . . . OFF

■ ■ ■ ■

◆REVERSER ACCUM LOW message **stays displayed**:

Contact Maintenance.

■ ■ ■ ■

4 Note hydraulic fluid quantity for associated system.

▼ Continued on next page ▼

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▼REVERSER ACCUM LOW continued▼

5 Assoc REVERSER ACCUM SHUT-OFF Circuit Breaker (Left S28, Right T28) . . . . . Pull, wait 3 seconds, reset

Note: Pull and reset circuit breaker one time only.

6 Choose one:

◆REVERSER ACCUM LOW message **blanks** and stays blank for 5 minutes or longer with **no decrease** on associated HYDRAULIC FLUID QUANTITY indication:

Continue normal operation.

■ ■ ■ ■

◆REVERSER ACCUM LOW message **stays displayed** or is shown within 5 minutes or HYDRAULIC FLUID QUANTITY **decreases**:

►►Go to step 7

7 Continued flight is permissible.

▼ Continued on next page ▼

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▼REVERSER ACCUM LOW continued▼

8 **After** landing,

9 Upon nose gear contact, apply down elevator and apply reverse thrust to idle reverse thrust detent. After reverse thrust is verified, gradually increase reverse thrust as required.

Note: During reverse thrust operation, if difficulty is experienced in maintaining directional control, reduce reverse thrust as required. Do not attempt to maintain directional control by using asymmetric reverse thrust.

Affected reverser may not extend and hydraulic supply system may be subject to quantity loss.

■ ■ ■ ■

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Reverser Deployed or REVERSE THRUST/UNLOCK Lights Illuminated In Flight

Condition: A fault occurs in the thrust reverser system.

1 Autothrottles . . . . . OFF

2 Throttle
(Affected Engine) . . . Confirm . . . . . Idle

3 Reverser Lever (Affected Engine) . . . FULL DOWN

Note: Reverser may not stow above 200 knots. Throttle should be left in idle position until reverser is stowed.

4 Choose one:

◆Airplane **is** buffeting or yawing:

Hydraulic Pumps (all). . . . . ON

FUEL Lever
(Affected Engine). Confirm.. . . . . OFF

Land at nearest suitable airport.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

◆Airplane is **not** buffeting or yawing:

Associated REVERSER ACCUM SHUT-OFF.
Circuit Breaker
(Left S28, Right T28) . . . . . Pull, wait 3 seconds, reset

►►**Go to step 5**

▼ Continued on next page ▼

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▼Reverser Deployed REVERSE THRUST/UNLOCK Lights Illuminated In Flight continued▼

5 Choose one:

- ENG REVERSE THRUST/ENG REVERSE UNLOCK Lights **extinguished**:

  Adjust throttles as required.

  ■ ■ ■ ■

- ENG REVERSE THRUST/ENG REVERSE UNLOCK Lights **illuminated**:

  Monitor engine operation.

  ■ ■ ■ ■

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Reverser Interlock Will Not Release or Reverser Lever Returns to Reduced Thrust

Condition: A fault occurs in the thrust reverser system.

1 Affected Reverser . . . . . Forward Idle

Use unaffected thrust reverser as necessary for deceleration within limits of directional controllability.

■ ■ ■ ■

Start Valve Fails to Open

Condition: The start valve is not in the commanded position.

1 Pneumatic Pressure . . . . . .Check

2 Associated START VALVE Circuit Breaker (U41, U42) (If Tripped) . . . . . Reset

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

3 **If** unable to electrically open start valve,

Maintenance action required.

■ ■ ■ ■

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ENG

START VALVE OPEN

Messages: L START VALVE OPEN R START VALVE OPEN

Condition: The start valve is not in the commanded position.

1 Choose one:

◆On the **ground** after start:

PNEU X-FEED VALVE Lever
(Affected Side) . . . . . CLOSE

Note: Closing pneumatic crossfeed valve isolates engine from opposite engine or APU pneumatic supply.

FUEL Control Lever
(Affected Engine) . . . . . OFF

ENG IGN selector . . . . . OFF

Caution! Shutdown should be completed prior to ground personnel approaching the engine.

Maintenance action required.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Autothrottles . . . . . OFF

3 Throttle
(Affected Engine) . . . Confirm . . . . . Idle

▼ Continued on next page ▼

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▼Start Valve Open continued▼

4 PNEU X-FEED
VALVE Levers. . . . . .(Affected Engine) CLOSE
(Unaffected engine) As required

5 AIR CONDITIONING
SUPPLY switches. . . (Affected Engine) HP BLD OFF
(Unaffected engine) AUTO

6 Start switch (Affected Engine) . . . . . OFF

7 Associated ENG START VALVE Circuit Breaker
(U41 or U42) . . . . . Pull

Caution! Start valve open in flight could result in an uncontained starter failure leading to engine fire or severe damage.

Note: Continue normal engine operation at Captain's discretion. Monitor engine parameters (EPR, N1, EGT, N2, oil pressure/temperature, fuel flow, etc.) for indications of an engine fire or severe damage.

With both crossfeeds closed, pneumatic pressure can be verified using air conditioning pressure/flow gages. For antiicing capability, open pneumatic crossfeed of unaffected engine as necessary.

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

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APU FIRE

Condition: Fire is detected in the APU.

1 APU FIRE CONT switch . . . . . OFF & AGENT ARM

2 Choose one:

◆APU FIRE light **illuminated**:

APU FIRE AGENT NO 1 or NO 2 . . . DISCH

After 30 seconds,

►►**Go to step 3**

◆APU FIRE light **extinguished**:

►►**Go to step 4**

3 Choose one:

◆APU FIRE light **illuminated**:

Remaining APU FIRE AGENT . . . . . DISCH

Land at nearest suitable airport.

►►**Go to step 4**

◆APU FIRE light **extinguished**:

►►**Go to step 4**

4 APU MASTER switch . . . . . OFF

■ ■ ■ ■

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Engine Fire or Engine Severe Damage or Separation

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

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

Indications of severe damage may include airplane vibration and, on affected side, N1 and/or N2 tachometers indicating 0%, rapid loss of hydraulic pressure and sudden loss of generator power.

1 Autothrottles . . . . . OFF

2 Throttle
(Affected Engine) . . . Confirm . . . . . Idle

▼ Continued on next page ▼

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▼Engine Fire or Engine Severe Damage or Separation continued▼

3 Choose one:

◆ENG FIRE handle light is illuminated
or
severe engine damage/separation is suspected:

FUEL Control Lever
(Affected Engine). Confirm.. . . . . OFF

ENG FIRE Handle
(Affected Engine). Confirm.. . . . . Pull

AGENT DISCH. . . . . .1 or 2

Pull handle completely out while turning to discharge bottle.

►►Go to step 4

◆ENG FIRE handle light is extinguished
or
severe engine damage/separation is not suspected:

Continue idle engine operation at Captain's discretion.

►►Go to step 7

▼ Continued on next page ▼

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▼Engine Fire or Engine Severe Damage or Separation continued▼

4 Choose one:

◆ENG FIRE handle light **remains illuminated** after 30 seconds:

ENG FIRE Handle . Confirm . . . . Discharge remaining agent

►►Go to step 5

◆ENG FIRE handle light **extinguishes** after 30 seconds:

►►Go to step 5

5 Throttles . . . . . Align

6 Autothrottles . . . . . If desired

7 TRP. . . . . MCT

8 PNEU X-FEED VALVE Lever (Affected Engine) . . . . . .VERIFY CLOSED

Caution! Do not open the affected PNEU X-FEED LEVER, as this will reset the ENG FIRE handle causing the fuel and hydraulic shutoff valves to open, as well as disarming the fire extinguishing agent.

9 AUX and TRANS PUMPS. . . . . .ON

10 Electrical Loads . . . . . .Check

▼ Continued on next page ▼

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▼Engine Fire or Engine Severe Damage or Separation continued▼

Note: Starting APU (if available) will reduce electrical load on operating generator.

11 **When** takeoff thrust is no longer required,

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

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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.

Note: Set regulator to EMER as required to clear mask.

3 Don smoke goggles, as needed.

4 Establish crew and cabin communications.

5 GALLEY power switch . . . . . OFF

6 Advise the cabin crew to turn **on**:

Aisle lights (as required)

7 Advise the cabin crew to turn **off**:

Upper and lower sidewall lights

8 **Anytime** the smoke or fumes becomes the greatest threat:

►►**Go to the Smoke or Fumes Removal checklist on page 8.25**

▼ **Continued on next page** ▼

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▼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 8.25, 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 ▼

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▼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 L AIR CONDITIONING SUPPLY switch . . . . . AUTO

15 R AIR CONDITIONING SUPPLY switch . . . . . OFF

16 Recirculation Fan Control CB (J7) . . . . . Pull

17 Ground Service Bus Control CB (L5) . . . . . Pull

Caution! In an attempt to depower non-essential items, this step removes power to the battery charger.

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

▼ Continued on next page ▼

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▼Smoke, Fire or Fumes continued▼

19 Choose one:

◆Smoke or fumes are **decreasing**:

►►Go to the Smoke or Fumes Removal checklist on page 8.25, if needed.

■ ■ ■ ■

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

R AIR CONDITIONING
SUPPLY switch . . . . . AUTO

L AIR CONDITIONING
SUPPLY switch . . . . . OFF

►►Go to step 20

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

21 Choose one:

◆Smoke or fumes are **decreasing**:

►►Go to the Smoke or Fumes Removal checklist on page 8.25, if needed.

■ ■ ■ ■

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

►►Go to step 22

22 L AIR CONDITIONING SUPPLY switch . . . . . AUTO

23 RADIO RACK switch . . . . . .VENTURI

24 EMER PWR switch. . . . . .ON

▼ Continued on next page ▼

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▼Smoke, Fire or Fumes continued▼

Note: If icing conditions exist or are expected, select R and L ENG anti-ice switches to ON and confirm valve position prior to selecting L and R GEN and L and R APU BUS switches OFF.

25 L and R GEN switches . . . . . OFF

26 L and R APU BUS switches . . . . . OFF

27 Consider an immediate landing.

Inoperative Items

First Officer's radio and flight deck speaker

All stall warning systems inop

Auto slats inop
Slats cannot be extended beyond midposition.

Flap, slat, and landing gear position indicating systems inop

Pilot to F/A and F/A to Pilot call button function inop

Note: Use PA to alert F/A.

Stabilizer inop

Auto brakes/anti-skid inop

Auto spoilers inop

Automatic flight deck/cabin temperature control inop

Flight director/autopilot/autothrottle inop

Note: Battery will power all aircraft equipment listed on overhead emergency circuit breaker panel and DC Transfer bus for approximately 30 minutes.

▼ Continued on next page ▼

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▼Smoke, Fire or Fumes continued▼

28 Choose one:

◆Aircraft is **trimmed** and flaps **are** 28 or 40:

Landing flaps . . . . . Existing flap setting

Landing speed . . . . . As appropriate for flap setting

►►Go to the Smoke or Fumes Removal checklist on page 8.25

■ ■ ■ ■

◆Aircraft is **out of trim** or flaps are **less than** 28:

►►Go to step 29

29 Landing flaps 15/EXT

Note: Do not reduce power until flare has been initiated and sink has been reduced.

▼ Continued on next page ▼

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▼Smoke, Fire or Fumes continued▼

30 Compute landing threshold speeds.

VREF is flaps 15 speedbook minimum maneuver speed, plus,

Add knot value for adjusted takeoff weight C.G. Interpolate as necessary from takeoff C.G. below.

Stab Angle	MD-88 Takeoff C.G.				
	0	5	10	15	20
-2	40	32	24	17	8
0	29	22	15	8	0
2	20	14	7	1	0
4	13	7	1	0	0
6	6	1	0	0	0

►►Go to the Smoke or Fumes Removal checklist on page 8.25

■ ■ ■ ■

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Tailpipe Fire or Torching

Condition: An engine tailpipe fire occurs on the ground with no engine fire warning.

1 FUEL Lever . . . . . Confirm . . . . . OFF

2 Choose one:

◆Starter **disengaged**:

Allow N2 to decrease to 20% or less then,

Caution! Do not select ignition to OVRD.

►►Go to step 3

◆Starter **engaged**:

►►Go to step 4

3 ENG START switch . . . . . ON

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.

▼ Continued on next page ▼

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▼Tailpipe Fire or Torching continued▼

4 **After** fire is extinguished,

ENG START switch . . . . . OFF

ENG IGN selector . . . . . OFF

5 Call maintenance.

■ ■ ■ ■

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Cargo Compartment FAULT Light Illuminated

Condition: A loop fault is detected in the cargo fire detection system.

1 Cargo Compartment Loop Selector . . . . . Set to operative loop

2 Choose one:

◆FAULT light **remains illuminated**:

►►**Go to step 3**

◆FAULT light **extinguishes**:

System is in single loop operation. An alarm of any detector of the operative loop will cause illumination of the CARGO FIRE light and automatically arms the suppression system.

■ ■ ■ ■

3 FAULT light remains illuminated with cargo loop selector set in any position.

Fire detection for associated compartment is inoperative.

▼ Continued on next page ▼

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▼Cargo Compartment Fault Light Illuminated continued▼

4 Choose one:

- On the **ground**:

  Maintenance or MEL action required.

  ■ ■ ■ ■

- In **flight**:

  Land at nearest suitable airport.

  ■ ■ ■ ■

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CARGO FIRE

Condition: The CARGO FIRE light, accompanied by the fire aural alerter, the affected FIRE/ARMED light on the cargo fire detection panel and MASTER WARNING lights will be illuminated.

1 Choose one:

◆Affected cargo compartment FIRE/ARMED light and the BTL 1 DISCH lights **illuminate**:

BTL 1 DISCH switch . . . . . .Push

BTL 1 DISCH light should extinguish within 15 seconds and AGT LOW light should illuminate.

BTL 2 DISCH light should illuminate.

BTL 2 will automatically discharge after approximately 15 minutes and the BTL 2 DISCH light should extinguish and AGT LOW light should illuminate within 20 minutes after discharge of BTL 2.

►►Go to step 5

◆Affected cargo compartment ARMED light and the #1 bottle DISCH lights **are not illuminated**:

►►Go to step 2

▼ Continued on next page ▼

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▼CARGO FIRE continued▼

2 Corresponding FIRE/ARMED switch . . . . . Push

Ensure switch corresponds to the correct cargo FIRE light on the cargo fire detection panel.

3 BTL 1 DISCH switch . . . . . Push

BTL 1 AGENT LOW light should illuminate within 15 seconds.

4 **After** approximately 15 minutes:

BTL 2 DISCH switch . . . . . Push

BTL 2 AGT LOW light should illuminate within 20 minutes after discharge of BTL 2.

5 Plan to land at the nearest suitable airport.

Warning! Do not open the affected cargo compartment door until ground emergency personnel and equipment are prepared to fight the cargo compartment fire.

■ ■ ■ ■

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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 8.6.

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 ▼

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▼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.

■ ■ ■ ■

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ENG

Engine/APU FIRE DETECTOR LOOP Message and LOOP A or B Light Without Fire Warning

Messages: FIRE DETECTOR LOOP

Condition: One or more fire detector loop lights illuminated with no fire warning.

1 Appropriate LOOP switch . . . . . Set to LOOP light not illuminated

Move appropriate LOOP switch from BOTH to LOOP light not illuminated.

2 Appropriate LOOP TEST Button . . . . . .Push

Note: This tests integrity of loop selected by LOOP switch. Refer to Additional Information for normal test indications.

3 Choose one:

◆Fire warning system test is **normal**:

Release LOOP TEST button. No further action required. Continue flight with switch in LOOP position successfully tested.

Note: Detection system is now limited to single loop but retains normal warning capability.

■ ■ ■ ■

◆Fire warning system test is **abnormal**:

►►Go to step 4

4 LOOP TEST Button . . . . . .Release

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▼Engine/APU FIRE DETECTOR LOOP Message and LOOP A or B Light Without Fire Warning continued▼

5 Appropriate LOOP switch . . . . . Set to opposite LOOP position

Move LOOP switch toward LOOP light that was illuminated.

6 Choose one:

◆APU FIRE WARNING is received:

►►**Go to the APU FIRE checklist on page 8.1**

■ ■ ■ ■

◆ENGINE FIRE WARNING is received:

►►**Go to the Engine Fire checklist on page 8.2**

■ ■ ■ ■

Additional Information

A normal fire warning test of a selected loop would provide the following indications:

- Engine Loop
  - Fire Bell
  - Vocal warning, "FIRE LEFT (RIGHT) ENGINE"
  - Master caution (2)
  - Fire warning light in engine fire shutoff handle (1)
  - All loop lights for selected loop (3)
  - Fire detector loop message
- APU Loop
  - Master warning (2)
  - Master caution (2)

▼ Continued on next page ▼

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▼Engine/APU FIRE DETECTOR LOOP Message and LOOP A or B Light Without Fire Warning continued▼

- All loop lights for selected loop (3)
- Fire detector loop message
- Overhead panel APU FIRE warning light

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Fire Warning Test Inoperative

Condition: ENG FIRE handle lights and bell, vocal warning and/or APU FIRE lights fail to operate during test. One LOOP light fails to come on during test.

1 LOOP Selector switch . . . . . Set to LOOP light illuminated

2 LOOP A and B TEST Buttons. . . . . Push

For a normal test, aural warning should sound and all lights except inoperative loop light should illuminate.

3 Choose one:

◆Test is **normal**:

Continue operation with single loop system.

■ ■ ■ ■

◆Test is **abnormal**:

Call maintenance.

■ ■ ■ ■

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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 ▼

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▼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.

Establish normal holding speed. High airspeed may prevent opening the window.

Open the first officer's sliding window.

►►Go to the Smoke, Fire or Fumes checklist on page 8.6 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 LAND ALT indicator . . . . . .9,500 feet

8 PNEU X-FEED VALVE Levers . . . . . .Verify CLOSED

▼ Continued on next page ▼

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▼Smoke or Fumes Removal continued▼

9 Open flight deck air outlets.

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 8.6 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 ALT Control lever . . . . MANUAL (down)

Outflow valve. . . . . .OPEN (rotate aft)

►►Go to the Smoke, Fire or Fumes checklist on page 8.6 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 autopilot is disconnected.

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

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

1 Autopilot (if engaged) . . . . . Disconnect

2 If stabilizer runaway continues,
Control Wheel Trim switches . . . . . Trim opposite direction of runaway as necessary

▼ Continued on next page ▼

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▼Runaway Stabilizer continued▼

3 Choose one:

◆Runaway movement **stops** when autopilot disconnected:

Do not re-engage the autopilot.

Use primary trim for the remainder of flight.

Do not exceed 0.78M.

Note: Use primary trim system to position longitudinal trim indicator to desired position.

■ ■ ■ ■

◆Runaway movement **continues** when autopilot disconnected:

►►Go to step 4

▼ Continued on next page ▼

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▼Runaway Stabilizer continued▼

4 Choose one:

◆LONG TRIM indicator **moves in opposite direction** of runaway:

AUTOPILOT & ALTN LONGITUDINAL TRIM CBs D9, D10, D11
(Upper EPC) . . . . . OPEN (Pull)

Continue flight using primary trim system.

Do not exceed 0.78M.

Autopilot is available, but autotrim function is inoperative. After trimming, autopilot may be engaged, but should be disconnected/retrimmed periodically as needed.

■ ■ ■ ■

◆LONG TRIM indicator **stops** with application of opposite direction primary trim:

►►Go to step 5

5 STABILIZER TRIM (Red Guarded) switch . . . STOP

6 ALT LONG TRIM switch . . . . . Retrim

7 **When** time and circumstances permit,

PRIMARY LONGITUDINAL TRIM CBs (Left Generator Bus circuit breaker panel, lower inboard EPC) . . . . . OPEN (Pull)

8 Continue flight using alternate trim system.

9 Autopilot is available.

■ ■ ■ ■

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Aileron Controls Jammed or Restricted

Condition: Aileron controls are jammed or restricted.

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

Some conditions that cause a jam or restriction in the controls may allow control input to the ailerons and spoilers on the unjammed side. Application of approximately 50 pounds of control wheel force can, in some cases, permit either control wheel to drive the unjammed aileron.

Note: Perform the following steps prior to attempting to override the restriction.

1 Seat Belts switch . . . . . .ON

2 Autopilot . . . . . DISCONNECT

3 Maximum Airspeed . . . . . 270 KIAS / 0.76M

4 Autothrottle . . . . . DISCONNECT

5 Control Wheels. . . . . Apply force as necessary

6 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.

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

■ ■ ■ ■

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Aircraft Oscillations or Yaw Displacement

Condition: Aircraft is oscillating or yawing without pilot inputs.

1 DFGC switch . . . . . Select other position

2 Choose one:

◆Aircraft flight condition is **normal**:

Autopilot / Autothrottle . . . . . As required

■ ■ ■ ■

◆Aircraft flight condition is **abnormal**:

►►Go to step 3

▼ Continued on next page ▼

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▼Airplane Oscillations or Yaw Displacement continued▼

3 RUD HYD CONT Lever . . . . . .MAN

Observe RUD CONTROL MAN message stays displayed.

4 Choose one:

◆Aircraft control is **normal**:

Continue flight with RUD HYD CONT lever in MAN.

Note: Minimum approach speed is 135 KIAS until landing is assured.

Do **not** execute an autoland.

■ ■ ■ ■

◆Aircraft control is **abnormal**:

►►**Go to step 5**

5 YAW DAMP Switch . . . . . .OVRD

Move YAW DAMP switch to OVRD and observe YAW DAMP OFF message is displayed.

Note: With YAW DAMP switch in OVRD, actuator will be deactivated, making yaw damper inoperative.

6 RUD HYD CONT Lever . . . . . .PWR

7 Autopilot/Autothrottle . . . . . .As required

■ ■ ■ ■

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CONT

AUTO SLAT FAIL

Messages: AUTO SLAT FAIL

Condition: Auto slat system malfunction.

1 Choose one:

◆On the **ground**:

►►Go to step 2

◆In **flight**:

Note: AUTO SLAT FAIL message shown will indicate failure of one or both stall warning systems. One operable system will be capable of providing auto slats, but not retracting them.

With dual system failure, pilot can still extend slats to at least mid-position. Full extension may be possible depending upon which system component has failed.

Caution! Do not extend slats until below 240 KIAS (fully extended slat limit speed), since slats may extend to full position. [AFM]

■ ■ ■ ■

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▼AUTO SLAT FAIL continued▼

2 Flaps/slats . . . . . .Recycle

The AUTO SLAT FAIL message can be reset and the test reaccomplished by cycling the FLAP/SLAT handle to UP/RET and back to flap takeoff range.

3 **If** AUTO SLAT FAIL message remains on, maintenance is required.

■ ■ ■ ■

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CONT

AUTO SPOILER FAIL or Auto Spoilers - Unable To Arm

Messages: AUTO SPOILER FAIL

Condition: Malfunction in ground spoiler system; does not preclude use of manual spoilers.

1 AUTO SPOILER CONTROL CBs (X30, P33) (If Tripped) . . . . . Reset

2 Choose one:

◆AUTO SPOILER FAIL message **blanks** and auto spoilers **arm normally**:

■ ■ ■ ■

◆AUTO SPOILER FAIL message **stays displayed** and/or auto spoilers **do not arm**:

►►**Go to step 3**

3 Choose one:

◆Before **takeoff**:

Maintenance action required.

■ ■ ■ ■

◆Before **landing**:

►►**Go to step 4**

4 SPD BRK Lever. . . . . DISARMED

5 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

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▼AUTO SPOILER FAIL or Unable To Arm Auto Spoilers continued▼

Deferred Items

Descent Considerations

Do **not** execute an autoland.

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

▼ Continued on next page ▼

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▼AUTO SPOILER FAIL or Unable To Arm Auto Spoilers continued▼

Landing Considerations

Spoilers must be extended manually for landing. Add 470 feet to landing distance on dry runway (540 feet on wet runway).

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats.	___ , ___, LAND	C&F
Spoilers.	**disarmed**	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel.	ckd	PM

Additional Deferred Item

SPD BRK Lever . . . . . UP/AFT/UP

Apply anti-skid braking consistent with runway conditions.

■ ■ ■ ■

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Elevator Controls Jammed or Restricted

Condition: The elevator controls are jammed or restricted.

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

Note: If freezing water is the cause of the condition, descending into warmer air may free the restriction. If pitch control is not considered adequate for the flight conditions, it may be possible to regain partial pitch authority by application of force on both control columns until the free column can be determined.

Note: Perform the following steps **prior** to applying additional force to the control column if pitch control remains jammed or restricted, or if pitch control is inadequate.

1 Seat Belts switch . . . . . .ON

2 Autopilot . . . . . DISCONNECT

3 Maximum Airspeed . . . . . 270 KIAS / 0.76M

4 Autothrottle . . . . . DISCONNECT

5 Control Columns. . . . . Apply force as necessary

▼ Continued on next page ▼

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▼Elevator Controls Jammed or Restricted continued▼

Additional Information

The amount of force necessary to achieve partial elevator control will depend upon the location of the elevator control jam and the "stretch" available in the control linkage on the jammed side.

If the pitch response is inadequate through application of force to the un-jammed control column, stabilizer trim will be the primary means of controlling pitch. In this condition, a long, straight-in approach should be planned and flown. A stable approach speed should be established and the flight path controlled, primarily by small thrust corrections.

■ ■ ■ ■

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Flap Abnormal Configuration

Condition: This procedure applies only if flaps/slats are other than up/retracted or 0 to extend. If flaps/slats are up/retracted or 0 to extend, refer to No Flap/No Slat or Flaps 0/Slats Extended Landing checklist.

1 **If** flaps fail to extend or retract to selected position:

2 Flap/Slat Handle. . . . . Operate

Return FLAP/SLAT handle to position which restores flap symmetry or flap and FLAP/SLAT handle position agreement.

3 Overhead Panel
GND PROX WARN switch . . . . . As required

If flaps are less than 28, use OVRD.

4 Approach/Threshold Speeds. . . . . .Compute

Refer to ODM for actual landing distances and VREF speeds.

Do not use autothrottles if asymmetry exists.

Autothrottles must be disconnected to slow aircraft to final approach speed if flaps are less than 28.

Fly final approach at chart VREF plus wind additives. There is no automatic 5 knot additive.

Check ODM for landing distances.

5 **If** flaps less than 28, autobrakes inoperative.

■ ■ ■ ■

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CONT

Mach Trim Failure or MACH TRIM INOP

Messages: MACH TRIM INOP

Condition: Mach trim compensator is inoperative or MACH TRIM COMP switch is at OVRD.

Note: Failure of Mach trim compensator is confirmed by Mach trim indicator failing to extend, retract, or is oscillating.

1 DFGC switch . . . . . Select other position

2 Choose one:

◆Mach trim is **operative**:

■ ■ ■ ■

◆Mach trim is **inoperative**:

►►**Go to step 3**

3 MACH TRIM COMP switch . . . . . OVRD

▼ Continued on next page ▼

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▼Mach Trim Failure or Mach Trim Inoperative continued▼

4 Choose one:

◆Mach trim indicator is **not** retracted:

MACH TRIM OVERRIDE CB
X33 (Lower EPC) . . . . . Pull/Reset

If Mach trim indicator did not retract,

MACH TRIM COMP switch . . . . Verify OVRD

MACH TRIM OVERRIDE CB . . . . Pull

Note: This action prevents inadvertent retraction.

►►**Go to step 5**

◆Mach trim indicator **is** retracted:

►►**Go to step 5**

5 Observe Mach speed limitation of .78. [AFM]

6 Retrim as required.

7 Use normal landing techniques.

■ ■ ■ ■

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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 Approach/Threshold Speeds . . . . . .Determine

Refer to ODM for actual landing distances and approach speeds.

Fly final approach at chart VREF plus wind additives. There is no automatic 5 knot additive.

3 Plan a wide pattern and longer than normal final approach for speed stabilization. Maintain a descent gradient of not less than 2.5°.

4 Overhead Panel
GND PROX WARN switch . . . . . OVRD

5 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

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

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

▼ Continued on next page ▼

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

Additional Deferred Items

Landing Gear . . . . . Extend

Gear Lights . . . . . 3 Green

Anti-Skid . . . . . Armed

Airspeed . . . . . .Establish

Establish UP/RET or 0/EXT minimum maneuvering speed on downwind and base legs.

After stabilization on final approach, reduce speed (while in level flight) until approach speed is established.

Autothrottles must be disconnected to slow aircraft to final approach speed.

Landing Considerations

Autobrakes must **not** be armed as they will not actuate.

Make positive main gear touchdown to minimize float.

▼ Continued on next page ▼

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

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats	**UP, UP, No lights**	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

After Touchdown

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

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.

■ ■ ■ ■

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HYD

RUD CONTROL MAN

Messages: RUD CONTROL MAN

Condition: Indicates there is no hydraulic power to the rudder.

1 Choose one:

◆On the **ground**:

Maintenance action required.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 RUD HYD CONT Lever . . . . . MAN

Continue operating in manual mode.

Note: Minimum approach speed is 135 KIAS until landing is assured. [AFM]

3 Do not attempt a go-around at less than 135 KIAS. The 30 knot crosswind capability remains.

4 Do **not** execute an autoland.

■ ■ ■ ■

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Rudder Restricted During Landing

Condition: RUDDER TRAVEL UNRESTRICTED advisory light does not illuminate on approach.

Note: RUDDER TRAVEL UNRESTRICTED light should illuminate (during deceleration) at a minimum of 165 KIAS.

If RUDDER TRAVEL UNRESTRICTED light does not come on during deceleration, momentarily centering rudder pedals and rudder trim may restore unrestricted rudder.

1 Annunciations . . . . . Test

Note: If an engine failure or other asymmetric condition occurs at high speed (rudder travel is restricted) and the rudder pedals and/or trim are used to displace the rudder to or near its restricted limit, the possibility exists for the rudder to remain restricted throughout the approach and landing. If this occurs, rudder travel for the appropriate airspeed can be restored by momentarily centering the rudder pedals and trim as airspeed decreases. This will ensure that full unrestricted rudder travel is available. If full travel is not restored, when below 160 knots, gently walk the rudder pedals to allow the limiter to drop out of the rudder control mechanism.

▼ Continued on next page ▼

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▼Rudder Restricted During Landing continued▼

Note: Use rudder trim (if available) and ailerons for directional control. If rudder input is not possible, use operative flight controls, trim, and thrust as required to maintain aircraft control.

2 On approach,

Approach Speed . . . . . .Determine

Compute normal approach speeds with additives for flaps 28 or 40 landing configuration but not below minimum approach speed of 135 KIAS until landing is assured.

Due to increased crab angles required, whenever possible avoid crosswind components greater than 12 knots.

During engine out go around, it may require up to approximately 8° of bank in direction of good engine to maintain a constant heading at V2 speed or 135 KIAS, whichever is higher.

3 AUTOBRAKE Selector . . . . . OFF

Do **not** execute an autoland.

Rudder pedal steering is inoperative. If directional control is a concern, use differential braking at high speed. Nosewheel steering can be used as speed decreases.

■ ■ ■ ■

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RUDDER TRAVEL UNRESTRICTED Light Illuminated (Above 200 KIAS)

Condition: RUDDER TRAVEL UNRESTRICTED advisory light remains illuminated on acceleration.

1 RUD HYD CONT Lever . . . . . .MAN

Note: Use light rudder forces. Yaw damper may be used.

2 During approach, at or below 180 KIAS,

3 Rudder/Rudder Trim . . . . . .Neutral

4 RUD HYD CONT Lever . . . . . .PWR

■ ■ ■ ■

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SLAT DISAG Light Illuminated

Condition: The left and right wing slat positions do not agree with handle position and/or with each other.

Caution! Do not move FLAP/SLAT handle until a safe altitude and airspeed have been attained.

1 Airspeed . . . . . Max 240 KIAS/.57 M

2 Autothrottles . . . . . OFF

Caution! Do not use autothrottles or speed command system as speed schedules may not be valid.

▼ Continued on next page ▼

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▼SLAT DISAG Light Illuminated continued▼

3 Choose one:

◆Flap asymmetry **exists**:

Move flaps/slats to the last symmetric position.

If this results in other than a normal landing configuration either:

►►Go to the No Flap/No Slat or Flaps 0/Slats Extended Landing with Hydraulic Pressure checklist on page 9.17

or

►►Go to the Abnormal Flap Configuration checklist on page 9.4

If return to departure station is not desired, consider fuel requirements.

■ ■ ■ ■

◆Flap asymmetry does **not** exist:

►►Go to step 4

4 Choose one:

◆SLAT DISAG light illuminated during **extension**:

FLAP/SLAT Handle . . . . . .15°/T.O. EXT

►►Go to step 5

◆SLAT DISAG light illuminated during **retraction**:

►►Go to step 5

▼ Continued on next page ▼

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▼SLAT DISAG Light Illuminated continued▼

5 Choose one:

◆SLAT DISAG light **remains illuminated**:

Do **not** exceed 240 KIAS/.57 M.

Note: If return to departure station is not desired, consider fuel requirements.

►►Go to step 6

◆SLAT DISAG light **extinguishes**:

Continue normal operation.

■ ■ ■ ■

6 Plan landing with flaps 28° or 40° and use slats retracted VREF speed (refer to ODM for VREF speeds).

Note: Ground spoilers will deploy upon main wheel spinup if spoiler lever has been armed.

■ ■ ■ ■

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Spoiler/Speed Brake Lever Not Fully Disarmed - In Flight

Condition: Spoiler/speed brake lever is not fully disarmed and the red arming placard is visible.

Note: Red arming placard will be partially exposed until ground spoiler actuator is retracted.

1 Squeeze SPEED BRAKE lever to retract the ground spoiler actuator.

2 Choose one:

◆SPEED BRAKE lever **is** fully disarmed:

■ ■ ■ ■

◆SPEED BRAKE lever is **not** fully disarmed:

►►**Go to step 3**

3 When speed brakes are required, pull lever up and aft to approximate speed brake stop position. Lever must be held in this position as long as speed brakes are required.

Caution! Speed brake stop and intermediate notches will not be engaged. Caution should be exercised to ensure lever is not inadvertently moved to full aft position as this would permit speed brakes to extend to full 60 degree position.

4 Add 470 feet to landing distance on dry runway (540 feet on wet runway).

■ ■ ■ ■

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Spoiler Float

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

Note: Rapid roll rate will develop during extension of flaps beyond 28°.

1 FLAP/SLAT Handle 28/LAND

2 Checklist Complete Except Deferred Items

Deferred Items

Approach/Landing Speeds

Approach and threshold speeds should be computed based on VREF for flaps 28 plus 10 knots.

Landing distance will be increased approximately 20%.

Do **not** execute an autoland.

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	.set	PM
Hydraulic panel.	.set	PM

▼ Continued on next page ▼

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▼Spoiler Float continued▼

Approach Checklist

■Flight & nav instruments . . . . . verified C&F
Spoilers . . . . . RET & disarmed PM
Cabin notification . . . . . complete C
Altimeters . . . . . ___ , xckd C&F

Landing Checklist

Landing gear . . . . . down, 3 green C&F
Flaps & slats **. . . . . 28 , 28, LAND** C&F
Spoilers . . . . . ARM C&F
Ignition . . . . . as reqd PM
Autobrakes. . . . . as reqd PM
Annunciator panel . . . . . ckd PM

■ ■ ■ ■

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Spoiler Stuck In Extended Position

Condition: Spoiler panel stuck in the extend position with the spoiler/speed brake lever not in the fully extend position.

Caution! Full aileron trim and approximately 70° 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 Stuck Spoiler Panel. . . . . .Identify

Determine which wing has extended spoiler panel by control input required to maintain wings level. Make visual inspection of spoiler panels if possible.

Note: If extended panel is located outboard, source of system pressure is right hydraulic system. If inboard, it is pressurized by left hydraulic system.

▼ Continued on next page ▼

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▼Spoiler Stuck In Extended Position continued▼

2 Choose one:

◆Spoiler panel remains extended or time is **limited**:

Trim airplane as required.

Note: Use rudder trim as required to counteract spoiler drag and effect of aileron trim.

Use 28° flaps for landing and add 10 knots to Vref. Spoilers may be armed for landing.

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

Do **not** execute an autoland.

■ ■ ■ ■

◆Spoiler panel remains extended or time is **available**:

Associated
Hydraulic System . . . . . Check Normal

SPD BRK Lever . . . . . Cycle

►►Go to step 3

▼ Continued on next page ▼

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▼Spoiler Stuck In Extended Position continued▼

3 Choose one:

◆Stuck spoiler panel **remains extended**:

Associated
ENG HYD PUMP Switch . . . . . OFF

AUX HYD PUMP Switch
(Right System Affected) . . . . . OFF

SPD BRK Lever . . . . . Cycle

Note: Cycling SPD BRK lever will depressurize hydraulic system.

►►Go to step 4

◆Spoiler panel **retracts**:

►►Go to step 5

▼ Continued on next page ▼

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▼Spoiler Stuck In Extended Position continued▼

4 Choose one:

◆Stuck spoiler panel **remains extended**:

Associated
ENG HYD PUMP Switch . . . . . .ON

HYDRAULIC PRESS
and HYD QTY . . . . . Check Normal

Trim airplane as required.

Note: Use rudder trim as required to counteract spoiler drag and effect of aileron trim.

Use 28° flaps for landing and add 10 knots to Vref. Spoilers may be armed for landing.

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

Do **not** execute an autoland.

■ ■ ■ ■

◆Spoiler panel **retracts**:

►►**Go to step 5**

5 Affected Hydraulic System . . . . . Depressurized

▼ Continued on next page ▼

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▼Spoiler Stuck In Extended Position continued▼

Note: Spoilers may be armed for landing.

When extending slats on a single hydraulic system, move FLAP/SLAT handle directly to 15/EXT.

Do **not** use auto brakes.

Anticipate longer than normal landing roll due to loss of 1/3 spoilers.

Do **not** execute an autoland.

6 **Before** landing,

7 Affected Hydraulic System . . . . . .Determine

▼ Continued on next page ▼

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▼Spoiler Stuck In Extended Position continued▼

8 Choose one:

◆**Right** hydraulic system affected:

Note: Maintain a minimum of 135 KIAS until landing is assured.

Gear Handle . . . . . DOWN

Emergency Gear
Extension Lever . . . . . Pull Full UP/Latched

Raise cover, pull emergency gear extension lever to full up position and check holding latch is engaged.

Gear Lights . . . . . 3 Green

Note: GEAR DOOR OPEN light will remain illuminated.

Nosewheel steering to left will be restricted.

After landing rollout, repressurize hydraulic system.

After landing, before moving airplane, ensure main gear doors are closed.

■ ■ ■ ■

◆**Left** hydraulic system affected:

Note: Nosewheel steering to right will be restricted.

After landing rollout, repressurize hydraulic system.

■ ■ ■ ■

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Stabilizer Inoperative In Flight

Condition: The stabilizer is inoperative.

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

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

1 STABILIZER TRIM (Red Guarded) Switch . . .NORM

Verify STABILIZER TRIM switch is in NORM and guarded.

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.

2 PRIMARY LONGITUDINAL TRIM (GEN Bus Panel) and AUTOPILOT & ALTERNATE LONGITUDINAL TRIM CBs (D9, D10, D11) (If Tripped) . . . . . Reset

3 Autopilot . . . . . OFF

▼ Continued on next page ▼

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▼Stabilizer Inoperative In Flight continued▼

4 Choose one:

◆Primary trim **normal**:

Continue normal operation.

■ ■ ■ ■

◆Primary trim **abnormal**:

►►Go to step 5

5 Choose one:

◆Alternate trim **normal**:

Allow for slower trim rate.

Autopilot may be used as desired.

■ ■ ■ ■

◆Alternate trim **abnormal**:

►►Go to step 6

▼ Continued on next page ▼

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▼Stabilizer Inoperative In Flight continued▼

6 Choose one:

◆Flaps **28 or 40**, aircraft on speed and **trimmed**:

Land with selected flaps.

■ ■ ■ ■

◆Any **other** flap setting or aircraft **not** trimmed:

►►Go to step 7

7 Use flaps 15 for landing and increase 15°/T.O. Vref (1.4 Vs) by speed increment from chart below.

Check ODM for landing distances.

Note: The force required on the control column may be greater than normal. The PM may assist by lacing his/her fingers behind the control column and applying back pressure as needed.

Stab Angle	**MD-88 Takeoff C.G.**				
	0	**5**	**10**	**15**	**20**
-2	40	32	24	17	8
0	29	22	15	8	0
2	20	14	7	1	0
4	13	7	1	0	0
6	6	1	0	0	0

▼ Continued on next page ▼

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▼Stabilizer Inoperative In Flight continued▼

8 Overhead Panel
GND PROX WARN switch . . . . . .OVRD

9 Autothrottle . . . . . Disconnect before 50 feet AGL

Note: Autothrottle will not retard if flaps are set less than landing range.

10 Autobrakes must **not** be armed as they will not actuate.

11 During landing flare, do not reduce approach thrust until landing flare has been initiated and sink rate has been reduced.

■ ■ ■ ■

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MISC

STALL IND FAILURE

Messages: STALL IND FAILURE

Condition: Indicates a system channel is inoperative or malfunctioning, or the post stall recovery system has been shut off either by a reduction in "g" force or by activation of the STICK PUSHER PUSH TO INHIBIT switch.

Note: Stick shaker or stall recognition system may be activated.

Note: A malfunction of one or both stall warning systems may result in illumination of AUTO SLAT FAIL message with slat extension.

Caution! Do not extend slats until below 240 KIAS as slats may extend to full position.

▼ Continued on next page ▼

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▼STALL IND FAILURE continued▼

1 Choose one:

◆STALL IND FAILURE message shown **with** stall warnings or recognition signal:

Airspeed and Attitude. . . . . .Check

Ensure airspeed and attitude are adequate for existing configuration.

STALL TEST Switch. . . . . SYS 1 or SYS 2

This action dims STALL lights.

When flight conditions permit,

CAPTAIN'S (X23) and FIRST OFFICER'S (Z23) STALL WARNING CBs. . . . . Pull

STALL TEST Switch. . . . . OFF

CAPTAIN'S (X23) and FIRST OFFICER'S (Z23) STALL WARNING CBs (One At a Time). . . . . Reset

Identify and isolate malfunctioning system.

After malfunctioning system is isolated,

Operational System. . . . . Test

Continue flight with remaining system operating.

■ ■ ■ ■

◆STALL IND FAILURE message shown **without** stall warnings or recognition signal:

►►Go to step 2

▼ Continued on next page ▼

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▼STALL IND FAILURE continued▼

2 STALL TEST Switch . . . . . SYS 1 then SYS 2

Test both systems by moving STALL TEST switch to SYS 1 and then to SYS 2.

3 Choose one:

◆One system test **unsuccessful**:

System 1 - CAPTAIN'S (X23) or
System 2 - FIRST OFFICER'S (Z23)
STALL WARNING CBs
(Affected System) . . . . . Pull

Continue flight with failed system deactivated.

■ ■ ■ ■

◆Both system test **successful**:

Note: If both system tests are successful, a false indication has occurred.

Continue normal operation.

■ ■ ■ ■

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Unscheduled Automatic Slat Extension

Condition: The DISAG and AUTO slat advisory lights on the center instrument panel are illuminated with the flap handle set at 13 degrees or less.

Note: Automatic slat extension will occur only if FLAP/SLAT handle is at settings from O°/T.O. EXT to 13°/T.O. EXT.

1 Airspeed . . . . . Observe

Caution! Do not exceed 240 KIAS (fully extended slat limit speed).

Caution! Do not move FLAP/SLAT handle until safe altitude has been attained.

2 Choose one:

◆After **takeoff**:

FLAP/SLAT Handle . . . . . .UP/RET

►►Go to step 3

◆On approach for **landing**:

FLAP/SLAT Handle . . . . . .15°/T.O. EXT

►►Go to step 3

▼ Continued on next page ▼

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▼Unscheduled Automatic Slat Extension continued▼

3 Choose one:

◆SLAT AUTO/DISAGREE lights **extinguished**:

Continue normal operation.

■ ■ ■ ■

◆SLAT AUTO/DISAGREE lights **illuminated**:

Do not exceed 240 KIAS (fully extended slat limit speed).

■ ■ ■ ■

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CONT

YAW DAMP OFF

Messages: YAW DAMP OFF

Condition: Indicates the yaw damper is inoperative, or the YAW DAMP switch is in OVRD, or the autopilot is not engaged and the switch is OFF.

1 YAW DAMP Switch . . . . . .ON

Verify YAW DAMP switch is on.

2 Choose one:

◆YAW DAMP OFF message **blanks**:

No further crew action required.

■ ■ ■ ■

◆YAW DAMP OFF message **stays displayed**:

►►**Go to step 3**

3 DFGC switch . . . . . Select other position

4 Autopilot and Autothrottle Systems . . . . . .As required

Note: If YAW DAMP OFF message stays displayed, yaw damper will be inoperative.

■ ■ ■ ■

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Airspeed Unreliable..... 10.1

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Airspeed Unreliable

Condition: Airspeed or Mach indications are suspected to be unreliable. (Items that might indicate unreliable airspeed are listed in the Additional Information section.)

1 Autopilot. . . . . DISCONNECT

2 Autothrottles . . . . . OFF

3 Flight Directors . . . . . OFF

4 If necessary to stabilize the aircraft or climb to a safe altitude, set the following gear up pitch attitude and thrust:

Flaps/slats 15/Ext. . . . . .6.0° and 75% N1

Flaps/slats Up/Ret. . . . . .2.5° and 75% 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.

5 HEATER CUR Indicator/METER SEL & HEAT switch. . . . . Check HEATER CURRENT

▼ Continued on next page ▼

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▼Airspeed Unreliable continued▼

6 The following are **reliable**:
- Attitude
- EPR
- N1
- Ground speed
- Radio altitude

Note: Stick shaker and overspeed warning alerts may sound erroneously or simultaneously.

Note: Speed command (fast/slow) indicator and Pitch Limit Indicator may be unreliable.

7 Refer to ODM, Chapter 7, Operation Without Airspeed Indication, and set the pitch attitude and thrust setting for the current airplane configuration and phase of flight.

8 When in trim and stabilized cross check the captain, first officer and standby airspeed indicators. An airspeed indication that differs by more than 20 knots or .03 mach from the airspeed shown in the table should be considered **unreliable**.

▼ Continued on next page ▼

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▼Airspeed Unreliable continued▼

9 Choose one:

◆Reliable airspeed indication can be **determined**:

STATIC AIR selector
(unreliable side) . . . . . ALT

►►**Go to step 10**

◆Reliable airspeed indication **cannot** be determined:

►►**Go to step 15**

10 Choose one:

◆Air data returns to **normal**:

►►**Go to step 13**

◆Reliable airspeed indication **cannot** be determined:

►►**Go to step 11**

11 CADC Selector
(unreliable side) . . . . . Select to other side

12 Choose one:

◆ Air data returns to **normal**:

►►**Go to step 13**

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

►►**Go to step 15**

▼ Continued on next page ▼

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▼Airspeed Unreliable continued▼

13 Flight director switch (reliable side) . . . . . .ON

14 Autopilot (reliable side) . . . . . .ON

Note: Do not re-engage the autothrottles.

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

■ ■ ■ ■

15 Set pitch attitude and thrust from the table in the ODM, Chapter 7, Operation Without Airspeed Indication for the airplane configuration and phase of flight, as needed.

Note: Maintain visual conditions if possible. Establish landing configuration early. Radio altitude reference is available below 2,500 feet. Use electronic and visual glideslope indicators, where available, for approach and landing.

■ ■ ■ ■

▼ Continued on next page ▼

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▼Airspeed Unreliable continued▼

Additional Information

One or more of the following may be evidence of unreliable airspeed or Mach indications:

- Speed/altitude information not consistent with pitch attitude and thrust setting
- A/S or MACH readout flag
- Variation between captain and first officer airspeed displays
- Radome damage or loss
- Overspeed warning
- Simultaneous overspeed and stall warnings

The following may or may not be reliable, depending on the cause of the lost or suspect airspeed/altitude:

- VSI
- Altimeter
- Altitude reporting, including TCAS
- PLI
- FMS NAV

The following will not be reliable:

- Flight director pitch bar
- ALFA SPD mode
- Overspeed warning

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CADC Failure

Condition: Failure of CADC 1 or 2 is indicated when airspeed, VSI, and altimeter instruments on associated side have OFF flags in view.

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

Note: CADC 1/2 DATA FAIL scratchpad messages indicate a data anomaly exists and do not require crew action. Scratchpad messages may be caused by an airspeed split and may not properly identify the erroneous CADC. Look for other erroneous indications on primary flight instruments.

Caution! If valid airspeed indication cannot be confirmed after evaluation of the situation, immediately accomplish the Airspeed Unreliable checklist.

1 CADC 1 (C1*) or CADC 2 (F12)
CB, if tripped . . . . . Reset

▼ Continued on next page ▼

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▼CADC Failure continued▼

2 Choose one:

◆OFF flags **disappear**:

■ ■ ■ ■

◆OFF flags **remain in view**:

►►**Go to step 3**

3 Choose one:

◆CADC **1** is inoperative:

CADC Selector. . . . . Both on 2

■ ■ ■ ■

◆CADC **2** is inoperative:

CADC Selector. . . . . Both on 1

■ ■ ■ ■

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EFIS Failure
or
ND Failure
or
PFD Failure

Condition: A PFD or ND screen is failed.

Note: Ensure IRS and FMS are functioning properly before performing the following procedures. Refer to NNC.11, Flight Management, Navigation section for compass or FMS abnormals. If required, refer to the ILS Approach Equipment Requirements Chart in Non-Normal Ops Info.

1 EFIS Selector switch. . . . . .Both on 1 or 2

Select BOTH ON 1 or 2 as applicable and attempt to regain all displays. A partial symbol generator failure can cause a single screen failure.

▼ Continued on next page ▼

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▼EFIS Failure or ND Failure or PFD Failure continued▼

2 Choose one:

◆**Both** screens are regained:

■ ■ ■ ■

◆**One** screen is totally blank:

EFIS Selector switch. . . . . .NORM

Compact Mode. . . . . .Select

Turn dimming CONTROL knob for failed screen past full dim to OFF.

Compacted ND uses ND WX knob for sky/ground brightness.

■ ■ ■ ■

◆**Both** screens are totally blank:

►►**Go to step 3**

3 Symbol Generator CBs . . . . . Pull and reset

Captain (C3*)

F/O (F4)

■ ■ ■ ■

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Instrument Off Flag

Condition: Flag appears when applicable instrument is lost.

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

1 Appropriate CB, if tripped. . . . . Reset

Instrument	Captain	First Officer
ALTIMETER	A3*	B1
MACH/AIRSPEED	A5*	B3
TA/VSI (TCAS)	A7*	L10 or J16
TAS/SAT	B6	B6
PFD	B3*, B4*	F11
ND	A1* or B3*	B4 or D7
* Overhead circuit breaker panel		

2 **If** problem is not corrected or airspeed and altimeter flags are displayed:

►►**Go to the CADC Failure checklist on page 10.6**

■ ■ ■ ■

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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 ▼

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▼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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FMC Failure

Condition: The following will be observed when the FMC has failed:

- FMA roll window will change to HDG HLD and pitch window will change to VERT SPD, ALT CAP, ALT HLD or IAS, as applicable.
- Captain's and First Officer's PFDs will display NAV FAIL.
- Captain's and First Officer's ND will display TRK FAIL, MAP FAIL, and VNAV FAIL.

Note: Notify ATC of loss of navigational capabilities as appropriate.

1 FMS data is not available.

2 Captain's and First Officer's Mode Select Panels . . . . . ROSE/ARC

3 NAV and VNAV functions will not be available.

4 IRS position information is available via the INIT/REF page, 2L POS prompt.

■ ■ ■ ■

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FMS Locked/Timeout

Condition:
- The FMS is locked up, i.e., no keyboard entries seem to work.
- The system times out. A timeout can be caused by an actual latch/fail occurrence.

1 MCDU status . . . . . Determine

Ascertain if any key may regain the FMS (e.g., if the SUBSYSTEM [TIMEOUT] page is displayed, press the MENU key, and that will display the MENU page, and selecting line select key 1L [AFMC #1] may regain the FMS).

2 Choose one:

◆No keyboard entry will regain the FMS:

FMS MCDU CBs
(D22, F10) . . . . . Pull and reset

►►Go to step 3

◆The FMS **is** regained:

►►Go to step 5

3 Choose one:

◆The FMS is **not** regained:

FMS Computer CB (D21). . . Pull and reset

►►Go to step 4

◆The FMS **is** regained:

►►Go to step 5

▼ Continued on next page ▼

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▼FMS Locked/Timeout continued▼

4 Choose one:

◆The FMS is **not** regained:

The FMS is inop for the remainder of the flight.

EGPWS Terrain feature is unavailable.

■ ■ ■ ■

◆The FMS **is** regained:

►►Go to step 5

5 DATA/ROUTE, as necessary . . . Reload/Reactivate

6 **After** a timeout or when the FMS/MCDU is repowered, the following must be reentered:

Reentering position for IRS equipped aircraft is not possible or required.

Verify IRS position by selecting POSITION page 2 (lines 2 and 3).

Performance data.

Route must be activated (it could still be loaded) and executed.

Direct INTC page select, activate, and execute to next waypoint.

■ ■ ■ ■

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FMS Map Failure

Condition: Map fail displayed on one/both ND(s).

Note: Differential recognition between a compass (heading) failure and an FMS related map failure is essential prior to response and the repositioning of either switches or circuit breakers.

1 ND Mode Control Panel . . . . . .ARC or ROSE

ARC or ROSE selection aids in determining type of fault.

2 PFD Status. . . . . Determine

Ascertain whether attitude information is available.

▼ Continued on next page ▼

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▼FMS Map Failure continued▼

3 Choose one:

◆Attitude and heading information remains available:

Aircraft attitude . . . . . Confirm

Confirm no heading or attitude differences exist between EFIS and standby compass and horizon.

►►Go to the FMS Locked/Timeout checklist on page 11.2

■ ■ ■ ■

◆Attitude and/or heading fail flags in view:

Aircraft attitude . . . . . .Determine

Use standby or remaining system instrumentation.

►►Go to the IRU FAULT Light - In flight checklist on page 11.11

■ ■ ■ ■

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MISC

IRS BATTERY FAIL

Messages: IRS 1 BATTERY FAIL IRS 2 BATTERY FAIL

Condition: Indicates that respective backup battery voltage has dropped below a minimum level and AC power loss will result in immediate loss of respective IRU.

1 Affected IRS BATTERY CBs 1 (E14) and 2 (E4) (If Tripped) . . . . . Reset

2 Choose one:

◆IRS (1 / 2) BATTERY FAIL message **stays displayed**:

Note: IRS backup battery capability will not be available.

■ ■ ■ ■

◆IRS (1 / 2) BATTERY FAIL message **blanks**:

Continue normal operation.

■ ■ ■ ■

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IRS NAV Only

Condition: Appears in scratchpad after loss of radio nav input for approximately 12 minutes. FMS position and map displays remain valid.

1 Closest appropriate NAV facility . . . . . .Tune

2 **If** message remains:

Continue flight.

Center Instrument Panel
GPWS TERRAIN OVRD switchlight . . . . . OVRD

Note: EGPWS warnings will be inhibited.

Pilot must verify aircraft position using other navigation systems if available.

■ ■ ■ ■

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MISC

IRS NO AIR

Messages: IRS 1 NO AIR IRS 2 NO AIR

Condition: Indicates loss of cooling air to IRU.

1 Choose one:

◆On the **ground**:

Shutdown respective IRU.

Maintenance action required before takeoff.

■ ■ ■ ■

◆In **flight**:

IRU may fail.

Plan flight accordingly.

■ ■ ■ ■

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MISC

IRS ON BATTERY

Messages: IRS 1 ON BATTERY IRS 2 ON BATTERY

Condition: Indicates respective IRU is operating on battery power.

Note: During normal operation, IRS (1 / 2) ON BATTERY light will illuminate for approximately 20 seconds when IRS mode selectors are rotated from OFF to NAV.

1 Choose one:

◆On the **ground**:

Maintenance action required.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Choose one:

◆Respective DC bus is **unpowered**:

IRU battery will power affected IRS for 30 minutes.

Plan flight accordingly.

■ ■ ■ ■

◆Respective DC bus is **powered**:

IRU will operate normally from its battery.

DC bus continues to charge IRU battery.

■ ■ ■ ■

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IRS Positions - Verify

Condition: IRS averaging function detects IRU position or velocity discrepancy outside of acceptable parameters.

1 POSITION page (2/2 or 2/3 & 3/3) . . . . . .Select

Determine which IRU position is most accurate. AFMC position may be used to assist in selection.

2 Most accurate IRU . . . . . .Select

Select by depressing USE key 5L or 5R.

Progress page will reflect choice in lower right corner.

Deselected IRU navigation data will be disregarded, but attitude information is still valid.

■ ■ ■ ■

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IRU FAULT Light - In flight

Condition: Illuminated FAULT light indicates that associated IRU is incapable of continued operation in present mode. All outputs from affected IRU will be invalid. Limited mode of operation may be resumed after affected IRU is switched to ATT mode. FAULT light should extinguish after ATT mode is selected. However, if FAULT light remains illuminated after ATT mode has been selected, all outputs are still invalid.

Once mode selector has been set to ATT, IRU will remain in attitude mode even if mode selector is rotated to NAV or ALN. Mode status will only be displayed on the EOAP.

1 IRS MODE selector . . Confirm . . . . . ATT

Set mode selector to ATT. Pull selector out of detent when setting from NAV. Select ATT mode for only that IRU which has had a FAULT light illuminated.

2 Hold airplane steady, straight and level, while maintaining a constant airspeed until the ALIGN light extinguishes.

3 ALIGN light illuminates for 20 seconds. IRU does not provide valid attitude and heading outputs during first 20 seconds after attitude mode is selected.

▼ Continued on next page ▼

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▼IRU FAULT Light - In flight continued▼

Caution! If FAULT light remains illuminated after the attitude mode has been selected, all outputs are still invalid and the affected IRU cannot be used.

4 Choose one:

◆IRU FAULT light **remains illuminated**:

IRS MODE selector. . .Confirm . . . . . OFF

Note: There is no autoland capability if either or both IRUs are in attitude mode or off.

EFIS BOTH ON 1 or 2 may be used.

■ ■ ■ ■

◆IRU FAULT light **extinguishes**:

►►Go to step 5

5 **When** ALIGN light extinguishes, initialize IRU with magnetic heading through MCDU.

6 MENU Key . . . . . PUSH

Push MENU key on MCDU and observe MENU page is displayed with IRS INIT/REF in data field 5L.

▼ Continued on next page ▼

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▼IRU FAULT Light - In flight continued▼

7 Line Select Key 5L . . . . . PUSH

Push line select key 5L on MCDU and observe IRS INIT/REF page is displayed with SET IRS HDG as header for data field 6R and data field 6R displays dashed prompts.

8 Airplane Heading . . . . . Enter into scratchpad

Enter current airplane heading into scratchpad using data entry keys.

9 Line Select Key 6R . . . . . PUSH

Push line select key 6R and observe data is displayed in data field 6R.

Note: A valid IRU heading consists of three numeric characters with a value between 000 and 360 inclusive; however 360 is displayed as 000.

If magnetic heading is not entered, the heading at which airplane was flying when attitude mode was selected becomes the zero-degree reference.

10 Center Instrument Panel
GPWS TERRAIN OVRD switchlight. . . . . OVRD

Note: EGPWS warnings will be inhibited.

11 Update heading periodically.

▼ Continued on next page ▼

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▼IRU FAULT Light - In flight continued▼

Note: Since a heading drift rate of up to 15 degrees per hour can occur in attitude mode, magnetic heading should be updated periodically from best alternative source.

In attitude mode, navigation outputs including position, velocities, and wind data are not provided and attitude output may not be as accurate as attitude output computed in NAV mode. There is no autoland capability if either or both IRUs are in attitude mode or off.

EFIS BOTH ON 1 or 2 may be used.

■ ■ ■ ■

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Approach With Less Than 1,000 Lb Fuel In Either Main Tank

Condition: Less than 1000 lbs of fuel in either main tank.

1 Fuel Pump switches (All) . . . . . ON

2 FUEL X FEED Lever . . . . . ON

3 ENG IGN selector . . . . . OVRD

4 **If** go-around is required, avoid sustained nose-up attitudes in excess of 10°.

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

■ ■ ■ ■

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ENG

CENTER FUEL PRESS LO or Center Tank Fails To Feed In Flight

Messages: CENTER FUEL PRESS LO

Condition: This procedure will be applicable when the center tank fuel boost pump is inoperative or when the center tank fuel stops feeding with greater than 11,000 pounds or fails to feed when either main tank reaches 3800 pounds and CTR TANK PUMP switches are in AUTO.

1 FUEL X FEED lever . . . . . OFF

2 CTR TANK PUMP switches . . . . . .ON

3 Main TANK PUMP switches . . . . . .ON

Caution! Do no reset any tripped fuel pump circuit breakers.

4 Choose one:

◆Center tank fuel quantity **decreases** at normal rate:

Continue normal operations.

■ ■ ■ ■

◆Center tank fuel quantity **does not decrease** at normal rate:

►►**Go to step 5**

5 Boost pumps in one main tank . . . . . OFF

▼ Continued on next page ▼

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▼CENTER FUEL PRESS LO or Center Tank Fails To Feed In Flight continued▼

6 Choose one:

◆L, R INLET FUEL PRESS LO message is **shown**:

Main TANK PUMP
switches (one or both) . . . . . ON

CTR TANK PUMP switches . . . . . OFF

Assume center tank fuel is unavailable.

Plan remainder of flight using main tank fuel only.

■ ■ ■ ■

◆L, R INLET FUEL PRESS LO message **blanks**:

Indicates center tank fuel is still available and feeding.

►►Go to step 7

▼ Continued on next page ▼

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▼CENTER FUEL PRESS LO or Center Tank Fails To Feed In Flight continued▼

7 Boost pump switches in other main tank . . . . OFF

8 **When** center tank quantity indicates 500 pounds,

9 Main TANK PUMP switches
(one or both pumps in each tank). . . . . .ON

Note: If required, remaining center tank fuel may be used by operating functioning center tank pump to supply one engine. Remaining engine should be operated using its associated main tank pump. Monitor fuel quantity and maintain fuel distribution within maximum lateral unbalance limits.

■ ■ ■ ■

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ENG

FUEL FIL PRES DROP

Messages: L FUEL FIL PRES DROP R FUEL FIL PRES DROP

Condition: Indicates a high differential pressure across respective fuel filter indicating a possible fuel filter clog.

Note: FUEL HEAT must be OFF for takeoff, final approach and go-around.

1 Choose one:

◆FUEL TEMP indications are **greater** than 15°C:

L or R FUEL FIL PRES DROP message with temperature above 15°C may be due to fuel filter clogging by solid contaminants other than ice. Continued engine operation is permissible if engine oil temperature is maintained within normal limits.

Caution! If both L, R FUEL FIL PRES DROP messages are shown, consider possibility of fuel contamination and land at nearest suitable airport.

■ ■ ■ ■

◆FUEL TEMP indications are **less** than 15°C:

►►Go to step 2

▼ Continued on next page ▼

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▼FUEL FIL PRES DROP continued▼

2 FUEL HEAT switches
(one at a time). . . . . .Both momentarily ON

Move both FUEL HEAT switches momentarily to ON. Observe FUEL HEAT lights come on and remain on for approximately 1 minute.

Check the fuel temperature gauges show an increase.

3 **After** 1 minute,

4 Choose one:

◆L, R FUEL FIL PRES DROP message **blanks**:

Continue normal engine operation.

■ ■ ■ ■

◆L, R FUEL FIL PRES DROP message **stays displayed**:

Note: Fuel heat applications may be repeated if required. Do **not** exceed oil temperature limitations.

►►Go to step 1

■ ■ ■ ■

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Fuel Flow Indication Inoperative or Reads High

Condition: Fuel flow indicator is inop or indicator reads high with normal engine indications.

1 Choose one:

◆Fuel flow indication is **inoperative**:

Adjust throttle,

If fuel flow indication does **not** respond,

Associated fuel flow circuit breakers (Upper EPC - Left K27, X36/Right L27, C15*) (If Tripped). . . . . Reset

Caution! One reset of a tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes, if the circuit breaker trips again, do not attempt another reset.

■ ■ ■ ■

◆Fuel flow indicates **high**:

Affected engine. . . . . Idle

►►Go to step 2

▼ Continued on next page ▼

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▼Fuel Flow Indication Inoperative or Reads High continued▼

2 Choose one:

◆Fuel flow gauge does **not** follow throttle movement:

Fuel flow gauge is inoperative.

■ ■ ■ ■

◆Fuel flow gauge **follows** throttle movement, but fuel flow is high:

Fuel consumption. . . . . .Check

Check fuel consumed during a specified time to confirm higher fuel flow.

This abnormal fuel flow would indicate an internal engine leak.

►►Go to step 3

3 Choose one:

◆Fuel leak is confirmed:

►►Go to the Fuel Leak checklist on page 12.13

■ ■ ■ ■

◆Fuel consumption is normal:

Continue engine operation.

■ ■ ■ ■

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Fuel Heat Inoperative

Condition: Fuel heat inoperative.

1 Fuel to the engine should be maintained at 5°C (40°F) or higher to preclude ice formation in the filters and fuel control.

2 **If** the fuel temp as indicated on the fuel temp gauge cannot be maintained at this level,

Decrease altitude or increase speed as indicated on the chart below.

▼ Continued on next page ▼

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▼Fuel Heat Inoperative continued▼

MINIMUM SPEED (MACH/KIAS) REQUIRED TO MAINTAIN 5° C

Pressure Altitude (1000 feet)	Static Air Temperature (°C)														
	-29.4	-28	-26	-24	-22	-20	-18	-16	-14	-12	-10	-8	-6	-4
35	M.84	M.82	M.79	M.76	M.73	M.70	224	213	201					
34	M.84	M.82	M.79	M.76	M.73	M.70	230	217	206					
32	M.84	M.82	M.79	M.76	M.73	M.70	241	228	215	202				
30	M.84	M.82	M.79	M.76	M.73	M.70	252	239	225	212	202			
28	M.84	M.82	M.79	M.76	M.73	M.70	263	249	235	221	207			
26	340	340	M.79	M.76	M.73	M.70	274	260	245	231	216			
24	340	340	340	M.76	M.73	M.70	285	271	256	241	225	208		
22	340	340	340	340	M.73	M.70	298	282	267	251	234	217		
20	340	340	340	340	340	M.70	309	293	278	261	244	226		
18	340	340	340	340	340	M.70	322	306	289	272	254	235		
16	340	340	340	340	340	340	335	318	300	282	264	244	224	200
14	340	340	340	340	340	340	340	330	312	294	274	254	233	209
12	340	340	340	340	340	340	340	340	324	305	285	264	242	218
10	340	340	340	340	340	340	340	340	337	317	295	274	251	226
8	340	340	340	340	340	340	340	340	340	328	307	284	260	234
6	340	340	340	340	340	340	340	340	340	340	318	294	270	243
4	340	340	340	340	340	340	340	340	340	340	329	305	279	253

NOTE: Flight deck fuel temperature indicators reflect fuel temperature at the fuel pump between stages and downstream of the heat exchanger. The fuel temperature in the tank may be significantly lower.

■ ■ ■ ■

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FUEL HEAT ON Light Illuminated

Condition: Indicates shutoff valve to the air/fuel exchanger is open.

1 FUEL HEAT switch. . . . . Check OFF

2 Respective HEAT TIMER CB (K29, L29) . . . . . Pull

This should force the fuel heat valve to close.

3 Choose one:

◆Fuel heat valve remains **open**:

Engine Thrust . . . . . Adjust

Adjust thrust as necessary to maintain oil temperature within limits.

Consider feeding from the main tanks utilizing colder fuel.

►►**Go to step 4**

◆Fuel heat valve **closes**:

►►**Go to step 5**

▼ Continued on next page ▼

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▼FUEL HEAT ON Light Illuminated continued▼

4 Choose one:

◆**Unable** to maintain engine oil temperature within limits:

Engine . . . . . Shut down

Engine may be restarted as desired for landing.

If engine not restarted for landing,

►►Go to the One Engine Inoperative/ Reduced Thrust Landing checklist on page 7.45

■ ■ ■ ■

◆**Able** to maintain engine oil temperature within limits:

Monitor engine indications for remainder of flight.

■ ■ ■ ■

5 **When** fuel heat is required:

FUEL HEAT TIMER CB (K29, L29) . . . . . Reset for one minute

■ ■ ■ ■

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Fuel Leak

Condition: An in flight fuel leak is suspected or confirmed. (Items which may indicate a fuel leak are listed in the Additional Information section.)

1 L and R AFT, L and R FWD Fuel Boost Pump switches . . . . . ON

2 CTR Fuel Boost Pump switches. . . . . OFF

3 FUEL X FEED lever . . . . . OFF

4 Choose one:

◆Either main tank quantity decreasing at **abnormal** rate:

►►**Go to step 8**

◆Main tank quantities decreasing at **normal** rate:

►►**Go to step 5**

5 **If** center tank quantity decreasing:

Center fuel tank leak is indicated.

6 CTR Fuel Boost Pump switches (If Applicable) . . . . . As required

▼ Continued on next page ▼

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▼Fuel Leak continued▼

Note: With center tank fuel available and full wing tanks, if the Captain elects to return center tank boost pumps to ON, and venting of fuel overboard is observed or suspected, immediately turn off both center tank boost pumps. Allow main tank quantities to decrease prior to selecting the center tank boost pumps back on.

7 Choose one:

◆Center tank quantity **is** decreasing:

Land at nearest suitable airport.

■ ■ ■ ■

◆**Unable** to determine fuel leak location:

Continue to closely monitor fuel quantity indications for possible verification of leak location.

Land at nearest suitable airport.

■ ■ ■ ■

◆**Unable** to verify existence of fuel leak:

If fuel remaining is not sufficient for planned flight, a diversion to another airport is required.

■ ■ ■ ■

▼ Continued on next page ▼

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▼Fuel Leak continued▼

8 Throttle (Affected Engine of Tank Decreasing at Abnormal Rate) . . Confirm . . . . . Idle

9 FUEL Lever (Affected Engine) . . . Confirm . . . . . OFF

10 ENG FIRE Handle (Affected Engine) . . . Confirm . . . . . PULL (Do **not** rotate)

11 PNEU X-FEED VALVE Lever . . . . . Verify Closed

Caution! Do not open the PNEU X-FEED VALVE lever since this will reset the ENG FIRE handle causing fuel shutoff valve to reopen.

12 FUEL X FEED Lever . . . . . As required

Note: Use fuel crossfeed as required to maintain lateral fuel balance.

13 L or R AFT, L or R FWD Fuel Boost Pump Switches (Affected Engine) . . . . . As required

14 CTR Fuel Boost Pump switches (If Applicable) . . . . . ON

15 Land at nearest suitable airport.

►►**Go to the Engine Failure or Shutdown checklist on page 7.4**

■ ■ ■ ■

▼ Continued on next page ▼

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▼Fuel Leak continued▼

Additional Information

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

- Excessive engine fuel flow
- MCDU message INSUFFICIENT FUEL displayed
- Fuel decreasing at an abnormal rate
- Lateral fuel imbalance
- Strong odor of jet fuel in cabin area
- Visual observation of fuel leak or spray from either wing
- A discrepancy of 500 pounds or more exists between planned versus actual fuel on board

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ENG

FUEL LEVEL LOW

Messages: FUEL LEVEL LOW

Condition: Indicates fuel quantity approximately 2000 lbs in either of the main tanks.

Note: If main tank fuel quantities are above 2000 lbs, but are less than full, FUEL LEVEL LOW message may be shown during climb-out due to momentary grounding of one or both fuel level low float switches.

1 Choose one:

◆Center tank fuel quantity **is** zero:

►►**Go to step 2**

◆Center tank fuel quantity is **not** zero:

►►**Go to step 4**

▼ Continued on next page ▼

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▼FUEL LEVEL LOW continued▼

2 Choose one:

◆2000 lbs **or less** in either main tank:

Plan remainder of flight based on indicated fuel remaining.

■ ■ ■ ■

◆**More than** 2000 lbs in either main tank:

LOW FUEL LEVEL CB S41
(lower EPC). . . . . Pull/Reset

►►**Go to step 3**

3 Choose one:

◆FUEL LEVEL LOW message **blanks**:

No further crew action required.

■ ■ ■ ■

◆FUEL LEVEL LOW message **stays displayed**:

Total fuel remaining is 4000 lbs or less.

Warning! Fuel quantity indicating system may be inaccurate. If actual fuel quantity remaining is unknown, land at nearest suitable airport.

■ ■ ■ ■

▼ Continued on next page ▼

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▼FUEL LEVEL LOW continued▼

4 CTR TANK PUMPS switches . . . . . ON

5 Verify fuel feed from center tank is normal.

If fuel feed is abnormal:

►►Go to the CENTER FUEL PRESS LO checklist on page 12.2

Note: If main tank quantities are above 2000 lbs, FUEL LEVEL LO circuit may be reset by pulling and resetting LOW FUEL LEVEL CB S41 (lower EPC).

■ ■ ■ ■

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ENG

INLET FUEL PRES LO

Messages: L INLET FUEL PRES LO R INLET FUEL PRES LO

Condition: Indicates respective fuel supply pressure at engine is low.

Note: Under all fuel temperature conditions, suction feed capability is enhanced with an increase in fuel flow. If required, descents should be made at a higher engine power and with speed brakes extended.

1 Fuel Pump switches (All) . . . . . .ON

2 Choose one:

◆INLET FUEL PRES LO message **blanks**:

Continue normal fuel management.

■ ■ ■ ■

◆INLET FUEL PRES LO message **stays displayed**:

►►**Go to step 3**

▼ Continued on next page ▼

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▼INLET FUEL PRES LO continued▼

3 Choose one:

◆Fuel consumption/main tank balance **normal**:

Monitor engine operation.

Note: Quantity remaining in each main tank should be approximately equal, indicating normal fuel consumption.

■ ■ ■ ■

◆Fuel consumption/main tank balance **abnormal**:

►►Go to step 4

4 **If** consumption is **not** normal and/or a lateral unbalance condition exists:

►►Go to the Fuel Leak checklist on page 12.13

■ ■ ■ ■

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Tank Quantity Indicator Erroneous

Condition: Fuel tank quantity indicator on the center instrument panel is blank, displays 9s or reading is abnormal based on fuel used.

1 Quantity indicator. . . . . .Check

2 Choose one:

◆**Nines** are shown:

Annunciator Test Button . . . . . Press

Pressing Annunciator Test Button may clear nines indication.

Monitor tank quantity indications.

■ ■ ■ ■

◆**Nothing** is indicated:

Channel selector (other). . . . . .Select

FUEL QUANTITY POWER CB (J17 or H14), if tripped. . . . . Reset

Fuel quantity TEST button. . . . . Push

■ ■ ■ ■

◆Indications are **erroneous**:

Quantities/Totalizer . . . . . Disregard

Fuel remaining should be calculated by using fuel consumed indications.

Do **not** use the AFB system.

■ ■ ■ ■

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HYD

HYD PRESS LOW

Messages: L HYD PRESS LOW R HYD PRESS LOW

Condition: The hydraulic pressure is below normal.

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

1 **If** both hydraulic quantity and pressure are zero,

►►Go to the Hydraulic System Failure (Left System) checklist on page 13.19

or

►►Go to the Hydraulic System Failure (Right System) checklist on page 13.23

2 TRANS HYD PUMP switch. . . . . OFF

3 AUX HYD PUMP switch . . . . . OFF

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

4 Choose one:

◆Affected hydraulic **quantity** indication **low** or **abnormally high**:

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

►►Go to the Hydraulic Quantity Low or Decreasing or Abnormally High checklist on page 13.13

■ ■ ■ ■

◆Affected hydraulic quantity indication normal:

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

►►Go to step 5

5 **If** R HYD PRESS LOW message is shown:

Warning! Rudder may revert to manual. If rudder reverts to manual, minimum approach speed is 135 KIAS until landing is assured.

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

6 **When** ready to attempt repressurization,

Choose one:

◆**Right** hydraulic system affected:

►►**Go to step 10**

◆**Left** hydraulic system affected:

►►**Go to step 7**

7 AUX HYD PUMP switch . . . . . ON

Select the auxiliary pump (AUX) switch to the ON position and verify the right system hydraulic pressure and quantity are stable.

8 TRANS HYD PUMP switch. . . . . ON

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

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

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

9 Choose one:

◆Left hydraulic system pressure **normal**:

No further crew action required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

◆Left hydraulic system pressure **abnormal**:

TRANS HYD PUMP switch . . . . . OFF

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

Note: Excess air in the system may be the cause of the low pressure. If time permits and pressure is still low, turn affected ENG HYD PUMP and AUX / TRANS HYD PUMP switches OFF, wait several minutes and re-accomplish previous steps.

►►**Go to the Hydraulic System Failure (Left System) checklist on page 13.19**

■ ■ ■ ■

10 Verify rudder is neutral and rudder trim is zero.

11 AUX HYD PUMP switch . . . . . ON

Note: Right system pressure should be indicated within approximately 15 seconds.

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

12 Choose one:

◆Right hydraulic system pressure **normal**:

No further crew action required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

◆Right hydraulic system pressure **abnormal**:

►►Go to step 13

13 AUX HYD PUMP switch. . . . . OFF

14 TRANS HYD PUMP switch . . . . . .ON

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

Note: Right system pressure should be indicated within approximately 15 seconds.

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

15 Choose one:

◆Right hydraulic system pressure **normal**:

No further crew action required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

◆Right hydraulic system pressure **abnormal**:

TRANS HYD PUMP switch . . . . . OFF

Note: Excess air in the system may be the cause of the low pressure. If time permits and pressure is still low, turn affected ENG HYD PUMP and AUX / TRANS HYD PUMP switches OFF, wait several minutes and re-accomplish previous steps.

▼ Continued on next page ▼

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▼HYD PRESS LOW continued▼

Warning! Rudder may revert to manual. If rudder reverts to manual, minimum approach speed is 135 KIAS until landing is assured.

►►Go to the Hydraulic System Failure (Right System) checklist on page 13.23

■ ■ ■ ■

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HYD

HYD TEMP HIGH

Messages: L HYD TEMP HIGH R HYD TEMP HIGH

Condition: The hydraulic fluid temperature in the (left/right) reservoir is above normal.

1 TRANS HYD PUMP switch . . . . . OFF

2 (L/R) ENG HYD PUMP switch (Affected System) . . . . . OFF

3 **If** R HYD TEMP HIGH message is shown:

AUX HYD PUMP switch . . . . . OFF

Warning! Rudder will revert to manual. Minimum approach speed is 135 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 attempts until approximately 10,000 feet MSL, or 5,000 feet above destination airport elevation, whichever is higher.

4 **When** ready to attempt repressurization,

▼ Continued on next page ▼

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▼HYD TEMP HIGH continued▼

Choose one:

◆**Right** hydraulic system affected:

►►**Go to step 8**

◆**Left** hydraulic system affected:

►►**Go to step 5**

5 TRANS HYD PUMP switch . . . . . .ON

Caution! If right hydraulic system pressure is lost when TRANS HYD PUMPS switch is moved to ON, move TRANS HYD PUMPS switch to OFF.

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

6 Choose one:

◆Left hydraulic system pressure **normal**:

No further crew action required.

■ ■ ■ ■

◆Left hydraulic system pressure **abnormal**:

TRANS HYD PUMP switch . . . . . OFF

L ENG HYD PUMP switch . . . . . .ON

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

►►**Go to step 7**

▼ Continued on next page ▼

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▼HYD TEMP HIGH continued▼

7 Choose one:

◆Left hydraulic system pressure **normal**:

No further crew action required.

■ ■ ■ ■

◆Left hydraulic system pressure **abnormal**:

L ENG HYD PUMP switch . . . . . OFF

►►Go to the Hydraulic System Failure (Left System) checklist on page 13.19

■ ■ ■ ■

8 Verify rudder is neutral and rudder trim is zero.

9 AUX HYD PUMP switch . . . . . ON

Note: Right system pressure should be indicated within approximately 15 seconds.

10 Choose one:

◆Right hydraulic system pressure **normal**:

No further crew action required.

■ ■ ■ ■

◆Right hydraulic system pressure **abnormal**:

►►Go to step 11

11 AUX HYD PUMP switch . . . . . OFF

12 R ENG HYD PUMP switch . . . . . ON

▼ Continued on next page ▼

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▼HYD TEMP HIGH continued▼

Note: Right system pressure should be indicated within approximately 15 seconds.

13 Choose one:

◆Right hydraulic system pressure **normal**:

No further crew action required.

■ ■ ■ ■

◆Right hydraulic system pressure **abnormal**:

R ENG HYD PUMP switch . . . . . OFF

Warning! Rudder will remain in manual. Minimum approach speed is 135 KIAS until landing is assured.

►►Go to the Hydraulic System Failure (Right System) checklist on page 13.23

■ ■ ■ ■

Additional Information

This message may display 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

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Hydraulic Quantity Low or Decreasing or Abnormally High

Condition: Left/right system hydraulic quantity low or decreasing below normal or is abnormally high.

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

Confirm APU AIR switch is off during ground operations to prevent possible contamination of cabin air.

1 TRANS HYD PUMP switch . . . . . OFF

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

2 Choose one:

◆**Right** hydraulic system affected:

►►**Go to step 7**

◆**Left** hydraulic system affected:

►►**Go to step 3**

3 L ENG HYD PUMP switch . . . . . OFF

▼ Continued on next page ▼

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▼Hydraulic Quantity Low or Decreasing or Abnormally High continued▼

Note: An attempt to repressurize the affected system for landing may be made if any hydraulic fluid remains.

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

4 Choose one:

◆Left system quantity **remaining**:

►►Go to step 5

◆**No quantity** remaining in left system:

►►Go to the Hydraulic System Failure (Left System) checklist on page 13.19

■ ■ ■ ■

5 **When** ready to attempt repressurization,

L ENG HYD PUMP switch . . . . . .ON

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

▼ Continued on next page ▼

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▼Hydraulic Quantity Low or Decreasing or Abnormally High continued▼

6 Choose one:

◆Left hydraulic system pressure **normal**:

No further crew action required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

◆Left hydraulic system pressure **abnormal**:

L ENG HYD PUMP switch . . . . . OFF

►►Go to the Hydraulic System Failure (Left System) checklist on page 13.19

■ ■ ■ ■

▼ Continued on next page ▼

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▼Hydraulic Quantity Low or Decreasing or Abnormally High continued▼

7 R ENG HYD PUMP switch . . . . . OFF

8 AUX HYD PUMP switch. . . . . OFF

Warning! Rudder will revert to manual. Minimum approach speed is 135 KIAS until landing is assured or right system pressure is restored.

Note: An attempt to repressurize the affected system for landing may be made if any hydraulic fluid remains.

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

9 Choose one:

◆Right system quantity **remaining**:

►►**Go to step 10**

◆**No quantity** remaining in right system:

►►**Go to the Hydraulic System Failure (Right System) checklist on page 13.23**

■ ■ ■ ■

10 **When** ready to attempt repressurization, verify rudder is neutral and rudder trim is zero.

▼ Continued on next page ▼

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▼Hydraulic Quantity Low or Decreasing or Abnormally High continued▼

11 R ENG HYD PUMP switch . . . . . ON

12 AUX HYD PUMP switch . . . . . ON

Note: Right system pressure should be indicated within approximately 15 seconds.

13 Choose one:

◆Right hydraulic system pressure **normal**:

No further crew action required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

◆Right hydraulic system pressure **abnormal**:

AUX HYD PUMP switch . . . . . OFF

R ENG HYD PUMP switch. . . . . OFF

▼ Continued on next page ▼

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▼Hydraulic Quantity Low or
Decreasing or Abnormally High continued▼

Warning! Rudder will remain in manual. Minimum approach speed is 135 KIAS until landing is assured.

►►Go to the Hydraulic System Failure (Right System) checklist on page 13.23

■ ■ ■ ■

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Hydraulic System Failure (Left System)

Condition: Left hydraulic quantity and pressure indicate zero.

Note: If pressure is low/zero, but quantity is normal or increasing, accomplish HYD PRESS LOW procedure first.

1 LEFT ENG HYD PUMP switch. . . . . OFF

2 TRANS HYD 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.

3 Use normal flap/slat configuration.

Note: When extending slats on a single hydraulic system, slow to below 240 KIAS/.57 Mach, not less than UP/RET Vref speed (1.25 Vs).

Move FLAP/SLAT handle directly to 15° detent.

Inoperative Items

Inboard spoiler panels inop

The following will work on accumulator pressure:

Left thrust reverser
Elevator augmentation

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▼Hydraulic System Failure (Left System) continued▼

4 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters . . . . . ___ , xckd		C&F
■Minimums . . . . . ___ , xckd		C&F
■Landing data . . . . . ___,___ , xckd		C&F
■Approach briefing . . . . . complete		PM
Seat belt signs . . . . . ON		PM
Engine sync . . . . . OFF		PM
Pressurization panel . . . . . set		PM
AUX HYD PUMP . . . . . ON		PM
TRANS HYD PUMP . . . . . OFF		PM

Approach Checklist

■Flight & nav instruments . . . . . verified		C&F
Spoilers . . . . . RET & disarmed		PM
Cabin notification . . . . . complete		C
Altimeters . . . . . ___ , xckd		C&F

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▼Hydraulic System Failure (Left System) continued▼

Landing Considerations

Do **not** use autoland.

Use normal landing gear extension.

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats.	___ , ___, LAND	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel.	ckd	PM

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▼Hydraulic System Failure (Left System) continued▼

After Landing

Note: Nosewheel steering to right will be restricted.

Left thrust reverser may remain deployed.

Brakes will operate normally for 7-9 applications. Once the left brake accumulator is depleted, the brakes will be less effective. Use caution when taxiing in congested areas.

Use single engine taxi as required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

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Hydraulic System Failure (Right System)

Condition: Right hydraulic quantity and pressure indicate zero.

Note: If pressure is low/zero, but quantity is normal or increasing, accomplish HYD PRESS LOW procedure first.

1 RIGHT ENG HYD PUMP switch . . . . . OFF

2 AUX/TRANS HYD PUMP switches . . . . . 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.

3 RUDDER POWER CONTROL lever . . . . . MANUAL

Use normal approach speed, not less than 135 KIAS, until landing assured.

4 Use normal flap/slat configuration.

Note: When extending slats on a single hydraulic system, slow to below 240 KIAS/.57 Mach, not less than UP/RET Vref speed (1.25 Vs).

Move FLAP/SLAT handle directly to 15° detent.

▼ Continued on next page ▼

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▼Hydraulic System Failure (Right System) continued▼

Inoperative Items

Outboard spoiler panels inop

The following will work on accumulator pressure:

Right thrust reverser

5 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters . . . . . ___ , xckd		C&F
■Minimums . . . . . ___ , xckd		C&F
■Landing data . . . . . ___,___ , xckd		C&F
■Approach briefing . . . . . complete		PM
Seat belt signs . . . . . ON		PM
Engine sync . . . . . OFF		PM
Pressurization panel . . . . . set		PM
AUX HYD PUMP . . . . . OFF		PM
TRANS HYD PUMP . . . . . OFF		PM

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▼Hydraulic System Failure (Right System) continued▼

Approach Checklist

■Flight & nav instruments . . . . . verified C&F

Spoilers . . . . . RET & disarmed PM

Cabin notification . . . . . complete C

Altimeters . . . . . ___ , xckd C&F

Landing Considerations

Do **not** use autoland.

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.

Airspeed . . . . . .MAX 300 KIAS/.70M

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.

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▼Hydraulic System Failure (Right System) continued▼

Gear lights. . . . . .3 GREEN

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

GEAR DOOR OPEN light will remain illuminated.

Stop on the runway. Gear doors will contact the runway at low speeds.

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats.	___ , ___, LAND	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

Prior to Taxiing

Install landing gear pins 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.

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▼Hydraulic System Failure (Right System) continued▼

Emergency Gear
Extension Lever . . . . . Stow

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

Apply left pressure at base of hold open arm initially while pulling back on the emergency landing gear extension lever.

Close and latch main gear doors manually.

Note: Nosewheel steering to left will be restricted.

Right thrust reverser may remain deployed.

Use single engine taxi as required.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

■ ■ ■ ■

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Landing with No Hydraulic Pressure or Loss of Both Hydraulic Systems

Condition: Left and right hydraulic pressures indicate zero.

Note: **If** flaps and/or slats are extended, they will tend to remain in their last selected position.

Speedbrakes/spoilers are **not** available.

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

Reverse thrust, brakes (7-9 applications), powered elevator augmentation, and anti-skid are available through accumulators.

Autobrakes should **not** be armed for landing.

In order to preserve maximum accumulator capacity, do **not** depress brake pedals prior to touchdown.

1 Hydraulic Pumps (all) . . . . . OFF

2 Gross Weight . . . . . Reduce

Reduce gross weight to lowest practicable.

3 Checklist Complete Except Deferred Items

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▼Landing with No Hydraulic Pressure or
Loss of Both Hydraulic Systems continued▼

Deferred Items

Descent Considerations

Refer to ODM, Abnormal section or appropriate chart to determine actual landing distance and maneuvering, approach and VREF speeds for existing configuration. Fly final approach at chart VREF plus wind additives. There is no automatic 5 knot additive.

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	.set	PM
AUX HYD PUMP	**OFF**	PM
TRANS HYD PUMP	**OFF**	PM

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▼Landing with No Hydraulic Pressure or
Loss of Both Hydraulic Systems continued▼

Approach Considerations

Plan a wide pattern and longer than normal final approach for speed stabilization on final. Maintain a descent gradient of not less than 2.5°.

Approach Checklist

■Flight & nav instruments . . . . . verified C&F

Spoilers . . . . . RET & disarmed PM

Cabin notification . . . . . complete C

Altimeters . . . . . ___ , xckd C&F

Additional Deferred Items

If flaps/slats are not 28/EXT or 40/EXT:

GND PROX WARN switch . . . . . OVRD

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 ▼

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▼Landing with No Hydraulic Pressure or Loss of Both Hydraulic Systems continued▼

Gear Lights . . . . . 3 Green

Note: It may be necessary to slow to 1.3 VS to allow nose gear to latch down.

Note: GEAR DOOR OPEN light will remain illuminated.

RUD HYD CONT Lever . . . . . MAN

Autothrottles . . . . . As desired

Autothrottles must be disconnected to allow aircraft to slow to final approach speed unless flaps/slats are at least 28/EXT.

IAS . . . . . Establish

After stabilization on final approach, reduce speed (while in level flight) until approach speed is established.

Note: With RUD HYD CONT lever in MAN, minimum approach speed is 135 KIAS until landing is assured.

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

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.

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▼Landing with No Hydraulic Pressure or
Loss of Both Hydraulic Systems continued▼

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats	___ , ___, LAND	C&F
Spoilers	**disarmed**	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

Additional Deferred Items

Reverse Thrust . . . . . Idle reverse

Apply reverse thrust symmetrically. Do not use asymmetrical reverse thrust to maintain directional control. Increase reverse thrust above idle only if necessary.

If directional control problems occur, reduce to idle reverse. Maintain idle reverse until airplane is stopped and parking brake is set.

Do **not** attempt to taxi.

Caution! Do not start the APU unless required to power the aircraft. This will prevent ingestion of fluids into the APU inlet.

▼ Continued on next page ▼

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▼Landing with No Hydraulic Pressure or
Loss of Both Hydraulic Systems continued▼

Caution! If APU use is required, do not use APU air. This will prevent ingestion of hydraulic fluid into the air conditioning system.

Before airplane is towed, ensure gear safety pins are installed and main gear doors are closed.

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.

Emergency Gear
Extension Lever . . . . . Stow

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

Apply left pressure at base of hold open arm initially while pulling back on the emergency landing gear extension lever.

Close and latch main gear doors manually.

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Brake Failure

Condition: Aircraft does not respond to normal wheel braking.

1 Brake pedals . . . . . .Release

2 Anti-skid switch . . . . . OFF

3 Brakes . . . . . .Re-apply

Modulate brakes as in a full manual brake landing.

4 Reverse thrust . . . . . .As necessary

■ ■ ■ ■

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Brake Overheat

Condition: The brake overheat light is illuminated.

Note: OVHT light will illuminate when any one brake temperature exceeds 305°C and will extinguish when brakes cool to 260°C.

1 Choose one:

◆On the **ground**:

Stop airplane as soon as practical. Do **not** set parking brake.

Warning! Ground crew must remain clear of main gear. Fuse plugs may melt. If brake temperature exceeds gauge limit, loss of braking may result.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Flight conditions permitting, extend gear until OVHT light extinguishes.

Temperature should drop and/or OVHT light should extinguish within 10 minutes.

If it does not, assume an indicator fault and continue normal operation.

Retract landing gear.

■ ■ ■ ■

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GEAR DOOR OPEN Light (LEFT, NOSE, RIGHT Gear Lights Green) - In Flight

Condition: Indicates either main gear door not closed.

Note: This procedure assumes hydraulic pressure is normal and gear handle is down.

Performing this procedure will open the doors (if not already open) and allow door(s) to float, minimizing possible damage.

1 Emergency Gear Extension Lever . . . . . Pull Full UP/Latched

Raise cover, pull emergency gear extension lever to full up position and check holding latch is engaged.

Caution! Do not stow emergency gear extension lever until malfunction has been corrected or until the gear door hydraulic bypass lever has been pulled.

Note: Gear doors will remain open and GEAR DOOR OPEN light will be illuminated.

Nosewheel steering to left will be restricted.

2 Stop the airplane on the runway.

3 Close and latch the main gear doors manually.

4 Install landing gear pins prior to taxi or tow.

■ ■ ■ ■

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HYD

INBD ANTI-SKID or OUTBD ANTI-SKID

Messages:	L INBD ANTI-SKID	L OUTBD ANTI-SKID
Messages:	R INBD ANTI-SKID	R OUTBD ANTI-SKID
Condition:	Malfunction of anti-skid protection for specific wheel.	

1 ANTI-SKID switch . . . . . .OFF, then ARM

2 ANTI-SKID CBs (P40, R40), if tripped . . . . . Reset

3 Choose one:

◆L, R OUTBD ANTI-SKID or L, R INBD ANTI-SKID message(s) **blanks**:

►►**Go to step 4**

◆L, R OUTBD ANTI-SKID or L, R INBD ANTI-SKID message(s) **stays displayed**:

►►**Go to step 6**

4 Anti-skid system. . . . . Test

Note: Activate Anti-skid TEST CKT switch. All ANTI-SKID messages are displayed on the EOAP provided ANTI-SKID switch is in the ARM position and landing gear handle is DOWN. All messages are removed when switch is released.

▼ Continued on next page ▼

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▼ANTI-SKID continued▼

5 Choose one:

◆Anti-skid system tests **normal**:

No further crew action required.

■ ■ ■ ■

◆Anti-skid system tests **abnormal**:

►►**Go to step 6**

6 AUTO BRAKE Selector . . . . . OFF

Note: If any anti-skid message is displayed, auto brake system will be inoperative.

7 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

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▼ANTI-SKID continued▼

Deferred Items

Descent Considerations

Landing Performance . . . . . .Check

Refer to appropriate performance chart in the ODM to determine additional stopping distance with anti-skid inoperative.

Note: Use maximum landing flaps and consider reducing weight.

Do **not** turn off anti-skid.

Select longest runway available for existing conditions.

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

▼ Continued on next page ▼

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▼ANTI-SKID continued▼

Approach Checklist

■Flight & nav instruments	verified	C&F
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

Landing Considerations

Perform normal landing.

Brakes . . . . . Apply smoothly and gradually

Note: Use full reverse thrust while applying brakes smoothly and gradually to prevent wheel lock up.

Landing Checklist

Landing gear	down, 3 green	C&F
Flaps & slats	___ , ___, LAND	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

■ ■ ■ ■

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Landing Gear Handle Jammed in UP Position

Condition: Landing gear handle will not move out of the up position.

Note: It may be necessary to decrease airspeed to 1.3 Vs to allow nose gear to latch down.

Observe gear extension and full down speed of 300 KIAS or .70M.

1 Emergency Gear
Extension Lever . . . . . Pull Full UP/Latched

Raise cover, pull emergency gear extension lever to full up position and check holding latch is engaged.

2 Gear Lights . . . . . 3 Green

3 Gear Handle. . . . . Try to move DOWN

▼ Continued on next page ▼

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▼Landing Gear Handle Jammed in UP Position continued▼

4 Choose one:

◆Gear handle **moves** DOWN:

Stow emergency gear extension lever to allow gear doors to close.

Apply left pressure at base of hold open arm initially while pulling back on the emergency landing gear extension lever.

■ ■ ■ ■

◆Gear handle **does not** move DOWN:

Caution! Do not stow emergency gear extension lever until malfunction has been corrected or until the gear door hydraulic bypass lever has been pulled.

Note: Gear doors will remain open and GEAR DOOR OPEN light will be illuminated.

Nosewheel steering to left will be restricted.

►►Go to step 5

5 Stop the airplane on the runway.

6 Close and latch the main gear doors manually.

7 Install landing gear pins prior to taxi or tow.

■ ■ ■ ■

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Landing Gear Handle - Unable To Raise After Takeoff

Condition: Landing gear handle will not move out of the down position.

1 Using normal force, attempt to turn steering wheel to left or right.

2 Choose one:

◆Nosewheel is **locked** and index centered and it is necessary to raise the landing gear:

GEAR HDL REL Button . . . . Push and hold

Gear Handle . . . . . UP

■ ■ ■ ■

◆Nosewheel is **steerable** and index is not centered:

►►Go to step 3

3 Gear Handle. . . . . Do **not** raise

Caution! Do not retract gear. Nosewheel may not remain centered and damage may occur if gear is retracted. Do not exceed 300 KIAS/.70M.

4 GROUND CONTROL RELAY CBs (K33, L33). . . . . Pull

5 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

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▼Landing Gear Handle - Unable To Raise After Takeoff continued▼

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	.set	PM
Hydraulic panel.	.set	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

▼ Continued on next page ▼

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▼Landing Gear Handle - Unable To Raise After Takeoff continued▼

Additional Deferred Items

CABIN ALT Control Lever . . . . . MANUAL

Outflow Valve . . . . . Valve Open

Note: With SPD BRK lever disarmed, ground spoilers must be extended manually during landing. Add 470 feet to landing distance on a dry runway (540 feet on a wet runway).

Landing Checklist

Landing gear . . . . . down, 3 green C&F

Flaps & slats . . . . . ___ , ___, LAND C&F

Spoilers . . . . . **disarmed** C&F

Ignition . . . . . as reqd PM

Autobrakes . . . . . **OFF** PM

Annunciator panel . . . . . ckd PM

Additional Deferred Items

After touchdown,

Ground Spoilers . . . . . Manually extend

During taxi,

GROUND CONTROL RELAY
CBs (K33, L33) . . . . . Reset

■ ■ ■ ■

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Landing Gear Unsafe – Gear Handle Down

Condition: The landing gear is unsafe with the landing gear handle down.

Note: Main landing gear position may be verified at any time when crew duties permit utilizing the visual downlock(s)/periscope. For periscope operation, refer to Additional Information at the end of this checklist. Nose gear is down and locked when the pedestal indicator pin is extended.

1 Choose one:

◆Any **green** light is **not** illuminated with no **red** unsafe indications:

Annunciator digital lights test button . . . . . .Push

►►Go to step 2

◆Any **gear** light illuminated **red**:

►►Go to step 6

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

2 Choose one:

◆Lamp test **is** normal:

►►**Go to step 4**

◆Lamp test is **not** normal:

Bulbs . . . . . Replace

►►**Go to step 3**

3 Choose one:

◆Landing gear indications normal:

Notify MCC after landing.

■ ■ ■ ■

◆Landing gear indications **not** normal:

►►**Go to step 4**

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

4 Visual downlocks . . . . . .Check

5 Choose one:

◆Nose and both main gear visually confirmed **down** and **locked**:

■ ■ ■ ■

◆Nose gear and both main gear **not** visually confirmed down and locked:

►►**Go to the Landing With Abnormal Landing Gear Configuration checklist on page 14.27**

■ ■ ■ ■

6 Choose one:

◆NOSE gear light illuminated red with **main gear** lights illuminated **green**:

►►**Go to step 7**

◆Any **main gear** light(s) illuminated **red**:

►►**Go to step 8**

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

7 Choose one:

◆Nose landing gear pin **is** extended:

No further crew action required.

■ ■ ■ ■

◆Nose landing gear pin is **not** extended:

►►**Go to step 8**

8 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.

Note: When emergency gear extension lever is raised, GEAR DOOR OPEN light will remain illuminated.

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

9 Choose one:

◆All 3 gear lights **are** illuminated green:

Emergency Gear Extension Lever . . Stow

Apply left pressure at base of hold open arm initially while pulling back on the emergency landing gear extension lever.

◆ **►►Go to step 10**

All 3 gear lights are **not** illuminated green:

►►Go to step 11

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

10 Choose one:

◆Gear lights illuminated green and GEAR DOOR OPEN light **is** extinguished:

No further crew action required.

■ ■ ■ ■

◆Gear light(s) illuminated red or GEAR DOOR OPEN light is **not** extinguished:

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.

Note: Nosewheel steering to the left will be restricted.

Stop airplane on runway.

Install gear safety pins and close main gear doors before taxi in.

■ ■ ■ ■

11 Emergency Gear Extension Lever . . . . . Stow

Apply left pressure at base of hold open arm initially while pulling back on the emergency landing gear extension lever.

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

►►Go to the Landing With Abnormal Landing Gear Configuration checklist on page 14.27

■ ■ ■ ■

Additional Information

Main Landing Gear Periscope Operation

Aircraft . . . . . Depressurize

Differential pressure must be less than 2 psi.

Periscope . . . . . Locate

Periscope is located between three and four windows aft of the aft overwing emergency exit. Raise the carpet, floor cover plate and periscope dust cap.

Downlock indicator light switch . . . . . Hold on

Switch is located adjacent to periscope assembly.

Index marks . . . . Align to view desired landing gear downlock indicator

Rotate periscope 180° to view opposite landing gear downlock indicator.

Note: Periscope can be removed by pulling straight up in order to clean the lens surface.

▼ Continued on next page ▼

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▼Landing Gear Unsafe – Gear Handle Down continued▼

Landing gear downlock indicator . . . . . .View

Gear is down and locked when orange stripe on overcenter brace is in a straight line.

After inspection is complete:

Replace periscope dust cap, floor cover and carpet.

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Landing Gear Unsafe with Landing Gear Handle Up

Condition: One or more red gear lights are illuminated with the landing gear handle in the up position.

1 Airspeed . . . . . 230 KIAS maximum

2 SPD BRK Lever. . . . . Verify disarmed

Caution! If SPD BRK lever cannot be disarmed, speed brake stop and intermediate notches will not be engaged. Ensure lever is not inadvertently moved to full aft position as this would extend speed brakes to full 60° position.

Caution! If damage to landing gear is suspected or if previous gear malfunction has been indicated, do not cycle gear as this may cause further damage and make it impossible to reextend gear.

3 HYD PUMPS switches . . . . . .All ON

Move left and right ENG PUMPS, TRANS and AUX switches to ON.

4 Gear Handle . . . . . DOWN

▼ Continued on next page ▼

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▼Landing Gear Unsafe with Landing Gear Handle Up continued▼

5 Choose one:

◆All gear lights are green and GEAR DOOR OPEN light is **extinguished**:

►►Go to step 6

■ ■ ■ ■

◆Any gear light **illuminated red**:

►►Go to the Landing Gear Unsafe – Gear Handle Down checklist on page 14.13

◆GEAR DOOR OPEN light **illuminated**:

►►Go to the GEAR DOOR OPEN Light (LEFT, NOSE, RIGHT Gear Lights Green) - In Flight checklist on page 14.3

6 Choose one:

◆Landing gear/tire damage suspected:

Do not retract gear.

Plan to land at nearest suitable airport.

■ ■ ■ ■

◆Landing gear/tire damage is not suspected:

►►Go to step 7

▼ Continued on next page ▼

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▼Landing Gear Unsafe with Landing Gear Handle Up continued▼

7 Gear Handle . . . . . Up

8 Choose one:

◆All gear lights and GEAR DOOR OPEN light **extinguished**:

ENG/AUX/TRANS HYD PUMPS switches . . . . . As required

Reconfigure hydraulic pump switches for cruise.

■ ■ ■ ■

◆All gear lights and GEAR DOOR OPEN light **not** extinguished:

►►**Go to step 9**

9 Indicated Airspeed . . . . . 300 KIAS/.70M maximum

10 Electrical Circuits . . . . . Check

Note: Takeoff warning and inoperative automatic pressurization after flap retraction indicate ground shift is in ground mode.

11 Choose one:

◆Electrical circuits are **not** in ground mode:

■ ■ ■ ■

◆Electrical circuits **are** in ground mode:

►►**Go to step 12**

▼ Continued on next page ▼

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▼Landing Gear Unsafe with Landing Gear Handle Up continued▼

12 GROUND CONTROL RELAY
CBs K33, L33 (Upper EPC) . . . . . Pull

Caution! To prevent premature system actuation (such as automatic spoiler deployment), do not reset GROUND CONTROL RELAY circuit breakers until after landing.

13 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

▼ Continued on next page ▼

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▼Landing Gear Unsafe with Landing Gear Handle Up continued▼

Approach Checklist

■Flight & nav instruments . . . . . verified C&F

Spoilers . . . . . RET & disarmed PM

Cabin notification . . . . . complete C

Altimeters . . . . . ___ , xckd C&F

Additional Deferred Items

CABIN ALT Control Lever . . . . . MANUAL

Outflow Valve . . . . . Valve Open

Note: With SPD BRK lever disarmed, ground spoilers must be extended manually during landing. Add 470 feet to landing distance on a dry runway (540 feet on a wet runway).

Landing Checklist

Landing gear . . . . . down, 3 green C&F

Flaps & slats. . . . . ___ , ___, LAND C&F

Spoilers**. . . . . disarmed** C&F

Ignition . . . . . as reqd PM

Autobrakes **. . . . . OFF** PM

Annunciator panel. . . . . ckd PM

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▼Landing Gear Unsafe with Landing Gear Handle Up continued▼

Additional Deferred Item

During taxi,

GROUND CONTROL RELAY
CBs (K33, L33) . . . . . Reset

■ ■ ■ ■

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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, for 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 SMOK/SEAT BELTS Switches . . . . . ON

2 Plan a flaps 40 landing.

Caution! Do not use auto brakes.

3 GROUND PROXIMITY WARNING COMPUTER CB (F20) . . . . . Pull

4 LANDING GEAR WARNING CB (P38) . . . . . 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 ▼

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▼Landing With Abnormal Landing Gear Configuration continued▼

Deferred Items

Descent Checklist

Altimeters	___ , xckd	C&F
■Minimums	___ , xckd	C&F
■Landing data	___,___ , xckd	C&F
■Approach briefing	complete	PM
Seat belt signs	ON	PM
Engine sync	OFF	PM
Pressurization panel	set	PM
Hydraulic panel	set	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Spoilers	RET & disarmed	PM
Cabin notification	complete	C
Altimeters	___ , xckd	C&F

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▼Landing With Abnormal Landing Gear Configuration continued▼

Additional Deferred Items

AIR CONDITIONING SUPPLY 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 Pressurization . . . . . Depressurize manually

Note: Manual control wheel forces will be high unless airspeed is low.

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

▼ Continued on next page ▼

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▼Landing With Abnormal Landing Gear Configuration continued▼

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:

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.

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.

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▼Landing With Abnormal Landing Gear Configuration continued▼

After stopping, do the Evacuation checklist, if needed.

►►Go to Landing Checklist (Nose gear unsafe) 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.

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 and braking within limits of directional control to stop airplane.

After stopping, do the Evacuation checklist, if needed.

►►Go to Landing Checklist (One or both main gear unsafe) below

▼ Continued on next page ▼

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▼Landing With Abnormal Landing Gear Configuration continued▼

If other combination of extended/retracted landing gear exists:

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 (One or both main gear unsafe) below

---

Landing Checklist (Nose gear unsafe)

Landing gear	**down**	C&F
Flaps & slats	**40, 40, LAND**	C&F
Spoilers	ARM	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel	ckd	PM

▼ Continued on next page ▼

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Landing Checklist (One or both main gear unsafe)

Landing gear	**down**	C&F
Flaps & slats	**40, 40, LAND**	C&F
Spoilers.	**disarmed**	C&F
Ignition	as reqd	PM
Autobrakes	**OFF**	PM
Annunciator panel.	ckd	PM

■ ■ ■ ■

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HYD

PARKING BRAKES ON (In Flight, Gear Down)

Messages: PARKING BRAKES ON

Condition: Parking brakes are set. When parking brakes are not set, indicates an anti-skid malfunction.

1 Rudder Pedal Brakes . . . . . Depress

2 Choose one:

◆PARKING BRAKES ON message **blanks**:

No further crew action required.

■ ■ ■ ■

◆PARKING BRAKES ON message **stays displayed**:

►►**Go to step 3**

3 During landing,

Assume anti-skid system is inoperative.

Refer to appropriate performance chart in the ODM, Abnormal section to determine stopping distance with anti-skid inoperative.

Do **not** use auto brakes.

■ ■ ■ ■

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Tire Failure(s)

Condition: One or more tires have failed, or are suspected to have failed.

1 Choose one:

- Known or suspected tire failure occurs during takeoff:

  ►►Go to step 2

- Known or suspected tire failure occurs during landing or taxi:

  If possible, clear the runway and stop.

  Contact ATC and advice of possible debris on the runway.

  Contact flight dispatch.

2 Choose one:

- Takeoff continued:

  ►►Go to step 3

- Takeoff is rejected:

  If possible, clear the runway and stop.

  Contact ATC and advise of possible debris on the runway.

  ►►Go to the Brake Overheat checklist on page 14.2

  Contact flight dispatch.

■ ■ ■ ■

▼ Continued on next page ▼

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▼Tire Failure(s) continued▼

3 Choose one:

◆Landing gear **extended**:

Do not retract the landing gear unless performance requirements dictate otherwise.

Contact ATC and advise of possible debris on the runway.

Contact flight dispatch to determine if flight should return, divert or continue.

Go to Landing Considerations.

◆Landing gear **retracted**:

Contact ATC and advise of possible debris on the runway.

Contact flight dispatch to determine if flight should return.

Go to Landing Considerations.

▼ Continued on next page ▼

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▼Tire Failure(s) continued▼

Landing Considerations:

Avoid landing overweight.

Flyby's not recommended.

Use normal approach and landing techniques.

Caution! Do not hold nose gear off the runway.

If the landing gear was retracted, consider lowering gear early to assess the condition.

Use differential braking as needed to assist directional control.

If a nose gear tire(s) failed:

Autobrakes may be used at lower setting (MED or MIN).

Gently lower nose gear and expect abnormal vibration during the landing roll.

Increase or decrease control column pressure to minimize vibrations.

Use idle reverse if runway length permits.

If main gear tire(s) failed:

Do not use autobrakes.

Expect adverse yaw, braking effectiveness may be reduced.

▼ Continued on next page ▼

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▼Tire Failure(s) continued▼

Minimize landing roll through application of maximum reverse thrust if able.

If uncertain which tire(s) failed, assume nose gear tire failure but be ready to counter the affects of adverse yaw.

After landing, taxi off the runway if possible.

Notify ATC.

Notify flight dispatch.

■ ■ ■ ■

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MISC

CAWS FAIL

Messages: CAWS FAIL

Condition: Indicates central aural warning system has failed.

1 Choose one:

◆On the **ground**:

Maintenance action required.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 Circuit breakers (if tripped) . . . . . Reset

CAWS SSRS-1 LDG GR, T/O, A/P, SP BK, CAB ALT CB (P38, lower EPC)

CAWS SSRS-2 ALT ALERT CB (R38, lower EPC)

Note: **If** CAWS FAIL message stays displayed, aural warnings will be either unreliable or inoperative.

■ ■ ■ ■

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MISC

FLT RECORDER OFF

Messages: FLT RECORDER OFF

Condition: Indicates flight recorder deenergized or built-in-test requirements are not met.

1 Choose one:

◆On the **ground**:

Note: FLT RECORDER OFF message will be shown when parking brake is set.

If FLT RECORDER OFF message is displayed with parking brake off and either fuel lever on:

Maintenance action is required.

■ ■ ■ ■

◆In **flight**:

►►**Go to step 2**

2 FLIGHT RECORDER CB F21 (Upper EPC) (If Tripped) . . . . . Reset

Note: **If** circuit breaker is not tripped or will not reset, flight recorder will be inoperative.

■ ■ ■ ■

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MISC

GPWS FAIL

Messages: GPWS FAIL

Condition: Indicates ground proximity warning system is inoperative.

1 GROUND PROXIMITY WARNING COMPUTER CB F20 (Upper EPC) (If Tripped) . . . . . Reset

Warning! If circuit breaker is not tripped or will not reset, consider GPWS inoperative. GPWS cannot be relied upon to provide aural and visual warnings for abnormal airplane configurations and terrain closure.

■ ■ ■ ■

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Overspeed Warning System Sounds Earlier Than Scheduled

Condition: Overspeed warning sounds with aircraft in clean configuration and airspeed below Vmo/Mmo or airspeed below 280 KIAS/ .57 M with slats extended.

Note: Maximum speed warning will sound when Vmo/Mmo is exceeded or if slats are extended above 280 KIAS/.57 M.

1 Speed . . . . . Reduce

Reduce speed below speed at which warning sounds.

2 **If** system activates below 325 KIAS/.79M and slats are retracted,

CAWS OVERSPEED, ENG FIRE, HORIZ STAB CB U31 (Lower EPC) . . . . . Pull

Caution! With circuit breaker pulled, in addition to overspeed warning, engine fire and horizontal stabilizer aural warnings will be disabled. [AFM]

3 Do **not** exceed 325 KIAS or .79M, whichever is lower. [AFM]

■ ■ ■ ■

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MISC

TRANSPONDER INOP

Messages: TRANSPONDER INOP

Condition: Indicates failure of selected transponder.

1 XPDR selector . . . . . .1 or 2

Move switch to other position.

2 Choose one:

◆TRANSPONDER INOP message **blanks**:

No further crew action required.

■ ■ ■ ■

◆TRANSPONDER INOP message **stays displayed**:

►►**Go to step 3**

3 ATC MODE S CBs 1: D13, 2: D1; CONTROL PANEL: E13 (Upper EPC) (If Tripped) . . . . . Reset

Note: **If** circuit breakers will not reset or are not tripped, transponder is inoperative.

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Non-Normal Operational Information Chapter NNOI

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RNAV Approach Equipment Requirements
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RNAV Enroute Equipment Requirements
(Not for Dispatch) NNOI.1.3

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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 in addition to FAR 121.305	CAT I	CAT II	CAT III
Autobrakes (G)	0	0	
Autospoilers (F)	0	1	
Autothrottles (F)	0	1	
CADC	1	2	
DFGC	1	1	
DH Light	0	2 (1/side)	
EFIS Display (D)	4 OR 3	4 OR 3	
EFIS Symbol Generator	2 OR 1 (C)	2	
Flight Director Displays (A) (B) and/or Autopilot	1 OR 1	2 AND 1(H)	
FMA	1	2	
Instrument Comparator System	0	1	
IRS (E)	1	2	
Localizer and Glide Slope Receiver	1	2	
Marker beacon system	0	0(I)	
Operating Engines	1 OR 2	2	
Radio Altimeter	1	2	

(A) FD CMD Selector Switch may be in any position.
(B) If operable both the Autopilot and Flight Director will be utilized for all ILS approaches when the reported weather is below 4000 feet RVR or 3/4 mile.
(C) EFIS CMD Selector Switch may be in any position.
(D) If either pilot's PFD fails, the other pilot can fly to CAT I minimums. If either pilot's ND fails, the other pilot can fly to his appropriate minimums.
(E) IRS may be in ATT or NAV, except Autoland requires NAV mode.
(F) Any Autoland requires use of Autothrottles and Autospoilers. [AFM]
(G) If operable, must be used for CAT III.
(H) Both Flight Directors and one (1) Autopilot (including Autoland) must be operative.
(I) Inner Marker is required for CAT II RA/NA.

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RNAV Approach Equipment Requirements (Not for Dispatch)

To Be Developed

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RNAV Enroute Equipment Requirements (Not for Dispatch)

To Be Developed

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Non-Normal Checklist Instructions — Chapter NNCI
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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, Engine 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.

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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 AIRFL ICE 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.

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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.

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- 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.

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Circuit Breaker Reset

WARNING: Do not reset any tripped fuel pump or hydraulic auxiliary pump circuit breakers.

Note: Circuit breaker locations showing an asterisk indicate that the circuit breaker is located on the flight deck overhead circuit breaker panel.

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 desireable 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.

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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.

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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 control lever
- ENG FIRE handle
- IRS mode selector
- CSD DISC switch

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.

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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.

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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.

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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

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Revision Record — Chapter RR
Revision Record — Section RR

Model Identification . . . . . RR.ModID

Introduction . . . . . .RR.Intro

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Organization RR.Intro.2
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Example Page Number RR.Intro.4
Warnings, Cautions, and Notes RR.Intro.5
Aircraft Effectivities RR.Intro.6

Abbreviations . . . . . .RR.Abbrev

Revision Record . . . . . RR.RR

QRH List of Effective Pages . . . . . RR.LEP

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Revision Record
Model Identification

General

The airplanes listed in the table below are covered in the operations manual. The table information is 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 airplanes.

Note: 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.

Airplane number is supplied by the operator. Registry number is supplied by the national regulatory agency. Serial number is supplied by Boeing.

Ship Number	Registry Number	Serial Number	Model
0904	N904DL	49535	MD-88
0905	N905DL	49536	MD-88
0906	N906DL	49537	MD-88
0907	N907DL	49538	MD-88
0908	N908DL	49539	MD-88
0910	N910DL	49541	MD-88
0911	N911DL	49542	MD-88
0912	N912DL	49543	MD-88
0913	N913DL	49544	MD-88
0914	N914DL	49545	MD-88
0915	N915DL	49546	MD-88
0916	N916DL	49591	MD-88
0917	N917DL	49573	MD-88
0918	N918DL	49583	MD-88
0919	N919DL	49584	MD-88

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Ship Number	Registry Number	Serial Number	Model
0920	N920DL	49644	MD-88
0921	N921DL	49645	MD-88
0922	N922DL	49646	MD-88
0923	N923DL	49705	MD-88
0924	N924DL	49711	MD-88
0925	N925DL	49712	MD-88
0926	N926DL	49713	MD-88
0927	N927DA	49714	MD-88
0928	N928DL	49715	MD-88
0929	N929DL	49716	MD-88
0930	N930DL	49717	MD-88
0931	N931DL	49718	MD-88
0932	N932DL	49719	MD-88
0933	N933DL	49720	MD-88
0934	N934DL	49721	MD-88
0935	N935DL	49722	MD-88
0936	N936DL	49723	MD-88
0937	N937DL	49810	MD-88
0938	N938DL	49811	MD-88
0939	N939DL	49812	MD-88
0940	N940DL	49813	MD-88
0941	N941DL	49814	MD-88
0942	N942DL	49815	MD-88
0943	N943DL	49816	MD-88
0944	N944DL	49817	MD-88
0945	N945DL	49818	MD-88
0946	N946DL	49819	MD-88

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Ship Number	Registry Number	Serial Number	Model
0947	N947DL	49878	MD-88
0948	N948DL	49879	MD-88
0949	N949DL	49880	MD-88
0950	N950DL	49881	MD-88
0951	N951DL	49882	MD-88
0952	N952DL	49883	MD-88
0953	N953DL	49884	MD-88
0954	N954DL	49885	MD-88
0955	N955DL	49886	MD-88
0956	N956DL	49887	MD-88
0957	N957DL	49976	MD-88
0958	N958DL	49977	MD-88
0959	N959DL	49978	MD-88
0960	N960DL	49979	MD-88
0961	N961DL	49980	MD-88
0962	N962DL	49981	MD-88
0963	N963DL	49982	MD-88
0964	N964DL	49983	MD-88
0965	N965DL	49984	MD-88
0966	N966DL	53115	MD-88
0967	N967DL	53116	MD-88
0968	N968DL	53161	MD-88
0969	N969DL	53172	MD-88
0970	N970DL	53173	MD-88
0971	N971DL	53214	MD-88
0972	N972DL	53215	MD-88
0973	N973DL	53241	MD-88

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Ship Number	Registry Number	Serial Number	Model
0974	N974DL	53242	MD-88
0975	N975DL	53243	MD-88
0976	N976DL	53257	MD-88
0977	N977DL	53258	MD-88
0978	N978DL	53259	MD-88
0979	N979DL	53266	MD-88
0980	N980DL	53267	MD-88
0981	N981DL	53268	MD-88
0982	N982DL	53273	MD-88
0983	N983DL	53274	MD-88
0984	N984DL	53311	MD-88
0985	N985DL	53312	MD-88
0986	N986DL	53313	MD-88
0987	N987DL	53338	MD-88
0988	N988DL	53339	MD-88
0989	N989DL	53341	MD-88
0990	N990DL	53342	MD-88
0991	N991DL	53343	MD-88
0992	N992DL	53344	MD-88
0993	N993DL	53345	MD-88
0994	N994DL	53346	MD-88
0995	N995DL	53362	MD-88
0996	N996DL	53363	MD-88
0997	N997DL	53364	MD-88
0998	N998DL	53370	MD-88
0999	N999DN	53371	MD-88
9000	N900DE	53372	MD-88

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Ship Number	Registry Number	Serial Number	Model
9001	N901DE	53378	MD-88
9002	N902DE	53379	MD-88
9003	N903DE	53380	MD-88
9004	N904DE	53409	MD-88
9005	N905DE	53410	MD-88
9006	N906DE	53415	MD-88
9007	N907DE	53416	MD-88
9008	N908DE	53417	MD-88
9009	N909DE	53418	MD-88
9010	N910DE	53419	MD-88
9011	N911DE	49967	MD-88
9012	N912DE	49997	MD-88
9013	N913DE	49956	MD-88
9014	N914DE	49957	MD-88
9015	N915DE	53420	MD-88
9016	N916DE	53421	MD-88
9017	N917DE	49958	MD-88
9018	N918DE	49959	MD-88
9019	N919DE	53422	MD-88
9020	N920DE	53423	MD-88

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Revision Record
Introduction

General

The manufacturer has developed normal and non-normal procedures for the MD-88 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 MD-88 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 > Administration > 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.

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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.

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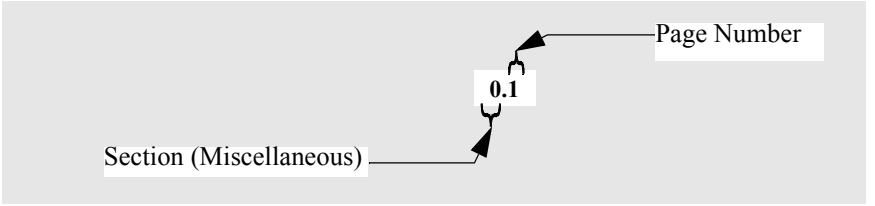
Page Numbering

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



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Warnings, Cautions, and Notes

The following levels of written advisories are used throughout the manual.

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.

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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.

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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

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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	
ABV	Above
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
ADM	Air Data Module
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
AIL	Aileron
AIMS	Airplane Information Management System
ALFA	Safe Stall Margin Speed
ALT	Altitude
ALT ACQ	Altitude Acquire
ALT HOLD	Altitude Hold
ALTN	Alternate
AM	Amplitude Modulation

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AMI	Airline Modifiable Information
AMM	Aircraft Maintenance Manual
ANP	Actual Navigational Performance
ANT	Antenna
ANU	Aircraft Nose Up
AOA	Angle of Attack
AOC	Airline Operational Communication Data Link
A/P	Autopilot
APB	All Pilots Bulletin
APL	Airplane
APP	Approach
APU	Auxiliary Power Unit
AR	Authorization Required
ARINC	Aeronautical Radio, Incorporated
ARPT	Airport
ARR	Arrival
ART	Automatic Reserve Thrust
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
ATM	Assumed Temperature Method
ATT	Attitude
AUTO	Automatic
AUTO–THROT	Autothrottle
AUX	Auxiliary
AVAIL	Available
AWABS	Automated Weight and Balance System
B	
BARO	Barometric
BAT	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
BLW	Below
BRG	Bearing
BRT	Bright
BTL	Bottle
BTL DISCH	Bottle Discharge (fire extinguisher)
BTMS	Brake Temperature Monitoring System

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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
CHKL	Checklist
CHR	Chronograph
CKD	Checked
CKT	Circuit
CL	Close
CLB	Climb
CLMP	Computer Lockout Manual Power
CLR	Clear
CMD	Command

CO	Company
COMM	Communication
COMP	Comparator
COMPT	Compartment
CON	Continuous
CONFIG	Configuration
CONT	Control
COOL	Cooling
CRM	Crew Resource Management
CRS	Course
CRT	Cathode Ray Tube
CRZ	Cruise
CTL	Control
CTR	Center
CWS	Control Wheel Steering
D	
DA	Decision Altitude
DA(H)	Decision Altitude (Height)
DC	Direct Current
DCU	Display Concentrator Unit
D/D	Direct Descent
DDA	Derived Decision Altitude (MDA +50 feet)
DDG	Dispatch Deviations Guide
DEL	Delete
DEP	Departure
DEP ARR	Departure Arrival
DEPR	Depressurize

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DES	Descent
DEU	Display Electronic Unit
DFCS	Digital Flight Control System
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
DH	Decision Height
DIFF	Differential
DIR	Direct
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	
EADI	Electronic Attitude Director Indicator
ECON	Economy
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
ENT	Entry
EO or E/O	Engine Out
EOAP	Electronic Overhead Annunciation Panel
EPC	Electrical Power Center
EPR	Engine Pressure Ratio
EQPT or EQUIP	Equipment
ETOPS	Extended Range Operation with Twin Engine Airplanes
ETP	Equal Time Point
EVAC	Evacuation

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EXEC	Execute
EXT	Extend or External
F	
F	Fahrenheit
FAC	Final Approach Course
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
FAF	Final Approach Fix
FAR	Federal Aviation Regulation
FB	Fleet Bulletin
FCC	Flight Control Computer
FCTL	Flight Control
FCTM	Flight Crew Training Manual
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 CH or FLCH	Flight Level Change
FLT	Flight
FLT CTRL	Flight Control
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
FREQ	Frequency
F/S	Fast/Slow
FT	Feet
FWD	Forward
FWSOV	Fire Wall Shut Off Valve
FX	Fix
G	
GA	Go–Around
GEN	Generator
GLS	GNSS Landing System
GMT	Greenwich Mean Time
GND	Ground
GNSS	Global Navigation Satellite System
GP or G/P	Glide Path
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
GS	Ground Speed
G/S	Glide Slope

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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
HPA	Hectopascals
HPSOV	High Pressure Shut Off Valve
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
HYD	Hydraulic
I	
IAF	Initial Approach Fix
IAN	Integrated Approach Navigation
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organization
IDENT	Identification
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
IND	Indicator
IND LTS	Indicator Lights
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

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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
LBS	Pounds
LD	Load
LDA	Localizer-type Directional Aid
LDG	Landing
LDG ALT	Landing Altitude
LE	Leading Edge
LIM	Limit
LIM SPD	Limit Speed
LKD	Locked
L NAV or LNAV	Lateral Navigation
LOC	Localizer
LOC-BC	Localizer Back Course
LOE	Line Oriented Evaluation
LOM	Locator Outer Marker
LON	Longitude
LPR	Landing Performance Request
LRC	Long Range Cruise
LRU	Line Replaceable Unit
LSK	Line Select Key
LT	Light
LWR CTR	Lower Center
LWR DSPLY or LWR DSPL	Lower Display
M	
M	Mach
MAG	Magnetic
MAHP	Missed Approach Holding Point
MAN	Manual
MAP	Missed Approach Point
MASI	Mach/Airspeed Indicator
MAX	Maximum
MCA	Minimum Crossing Altitude
MCC	Maintenance Control Center
MCDU	Multi-function Control and Display Unit
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
MEL	Minimum Equipment List
MFD	Multifunction Display
MHZ	Megahertz
MIC	Microphone
MIN	Minimum
MKR	Marker
MLS	Microwave Landing System
MM	Middle Marker
MMO	Maximum Mach Operating Speed
MNPS	Minimum Navigation Performance Specification
MOCA	Minimum Obstruction Clearance Altitude
MOD	Modify
MORA	Minimum Off Route Altitude
MSA	Minimum Safe Altitude
MSG	Message
MSGS RCVD	Messages Received
MSL	Mean Sea Level
MTRS	Meters
MUH	Minimum Use Height
MVA	Minimum Vector Altitude

N	
N	Normal
NADP	Noise Abatement Departure Procedures
NAR	North American Route
NASA	National Aeronautics and Space Administration
NATS	North Atlantic Track System
NAV	Navigation
NAV RAD	Navigation Radio
ND	Navigation Display
NGS	Nitrogen Generation System
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
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)

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O	
OAP	Overhead Annunciator Panel (a.k.a. EOAP)
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
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PASS	Passenger
PBE	Protective Breathing Equipment
PCP	Pilot Call Panel
PDC	Pitch Data Computer or Performance Data Computer or Pre-Departure Clearance
PED	Personal Electronic Device
PERF	Performance
PERF INIT	Performance Initialization
PES	Pitch Enhancement System
PF	Pilot Flying
PFAF	Precision Final Approach Fix
PFC	Primary Flight Computer
PFD	Primary Flight Display
PI	Performance Inflight
PIP	Product Improvement Package
PLI	Pitch Limit Indicator
PM	Pilot Monitoring
PMC	Power Management Control
PNF	Pilot Not Flying
PNL	Panel
POS	Position
POS INIT	Position Initialization
POS REF	Position Reference
PPI	Planned Position Indicator
PPOS	Present Position
PRES or PRESS	Pressure

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PREV	Previous
PRI	Primary
PRAIM	Predictive Receiver Autonomous Integrity Monitoring
PROG	Progress
PROX	Proximity
P/RST	Push To Reset
PRV	Pressure Regulating Valve
PSI	Pounds Per Square Inch
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
REC	Recorder
RECIR or RECIRC	Recirculation
REF	Reference
RET	Retract
REV	Reverse
RF	Radius-to-Fix (RF) Legs or Refill
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
RST	Reset
RSVR	Reservoir
R/T	Radio Transmit
RTE	Route
RTO	Rejected Takeoff
RTP	Radio Tuning Panel
RUD	Rudder
RVR	Runway Visual Range

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RVSM	Reduced Vertical Separation Minimum
S	
SAAAR	Special Aircraft and Aircrew Authorization Required
SAARU	Secondary Attitude Air Data Reference Unit
SAT	Static Air Temperature or Satellite
SB	Service Bulletin
S/B	Speedbrake
S/C	Step Climb
SDF	Simplified Directional Facility
SEI	Standby Engine Indicator
SEL	Select
SELCAL	Selective Calling
SENS	Sensitivity
SERV	Service
SG	Symbol Generator
SMGCS	Surface Movement and Guidance Control System
SPD	Speed
SPDBRK	Speedbrake
SMS	Safety Management System
STA	Station
STAB	Stabilizer
STAT	Status
STBY	Standby
STD	Standard
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
T/C	Top of Climb
TCA	Terminal Control Area
TCAS	Traffic Alert and Collision Avoidance System
T/D	Top of Descent
TDZ	Touch Down Zone
TDZE	Touch Down Zone Elevation
TE	Trailing Edge
TEM	Threat Error Management
TEMP	Temperature
TERP	Terminal Instrument Procedures
TERR	Terrain
TFC	Traffic
TFR	Transfer
THR	Throttle or Thrust

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THR HOLD	Throttle Hold
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/GA	Takeoff/Go–Around
TOPR	Takeoff Performance Request
TPC	Tactical Pilotage Charts
TR	Traffic Resolution
TRK	Track
TRP	Thrust Rating Panel
TRU	Transformer Rectifier Unit
TURB	Turbine or Turbulence
U	
UNLKD	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
VASI	Visual Approach Slope Indicator
VDP	Visual Descent Point
VEF	Speed at Engine Failure
VERT	Vertical
VFR	Visual Flight Rules
VG	Vertical Gyro
VHF	Very High Frequency
VIB	Vibration
VLOF	Lift Off Speed
VLV	Valve
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
VOR	VHF Omnidirectional Range
VP	Tire Hydroplaning Speed
VR	Rotation Speed
VREF	Reference Speed
VRNP	Vertical Required Navigation Performance

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V/S	Vertical Speed
VSCF	Variable Speed Constant Frequency
VSD	Vertical Situation Display
VSI	Vertical Speed Indicator
VTK	Vertical Track
V1	Takeoff Decision Speed
V1 (MCG)	Minimum V1 for Control on the Ground
V2	Scheduled Takeoff Target Speed
W	
W	Warm
WATRS	Western Atlantic Route System
WDR	Weight Data Record
WGS-84	World Geodetic System of 1984
WHL	Wheel
WPT	Waypoint
WT	Weight
WXR	Weather Radar
X	
X–FEED	Crossfeed
XPDR or XPNDR	Transponder
XTK	Cross Track

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Revision Record

Revision Transmittal Letter

To: All holders of Delta Air Lines, Inc. MD-88 Operations Manual, Quick Reference Handbook.

Subject: Operations Manual Revision.

This revision reflects the most current information available to Delta Air Lines, Inc. through the subject revision date. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed	No.	Revision Date	Date Filed
1	April 1, 2009		2	June 1, 2009	
3	June 2, 2009		4	August 1, 2009	
5	October 1, 2009		6	January 1, 2010	
7	April 26, 2010		8	June 21, 2010	
9	June 22, 2010		10	February 17, 2011	
11	March 15, 2012		12	August 30, 2012	
13	November 7, 2012		14	June 6, 2013	
15	September 26, 2013		16	May 8, 2014	
17	October 23, 2014		18	July 30, 2015	
19	September 24, 2015		20	January 1, 2016	
21	October 7, 2016				

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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 date the revision material is distributed and considered current. EFB revision downloads and/or flight deck distribution should be accomplished as soon as possible, but may take as much as 21 days after the revision date for completion.

Revisions include a Transmittal Letter, Revision Record, Revision Highlights, and a List of Effective Pages. Use the information on the new Revision Record to review the revised operations manual content.

Revision Highlights

Pages containing revised technical and non-technical material have revision bars associated with the changed text or illustration.

Chapter NNC - Non-Normal Checklists

Section 0 - Miscellaneous

Ditching

0.1 - Added switch location for clarity.

0.1 - Added Note: EGPWS warnings will be inhibited.

Section 1 - Airplane General, Emergency Equipment, Doors, Windows

ACCESS COMPT DOOR

1.1 - Revised step to "Plan to land at the nearest suitable airport."

AFT CABIN DOOR

1.2 - Revised step to "Plan to land at the nearest suitable airport."

AFT CARGO DOOR

1.3 - Revised step to "Plan to land at the nearest suitable airport."

AFT GALLEY DOOR

1.4 - Revised step to "Plan to land at the nearest suitable airport."

ELECT COMPT DOOR

1.5 - Revised step to "Plan to land at the nearest suitable airport."

FWD CABIN DOOR

1.6 - Revised step to "Plan to land at the nearest suitable airport."

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FWD CARGO DOOR

1.7 - Revised step to "Plan to land at the nearest suitable airport."

FWD GALLEY DOOR

1.8 - Revised step to "Plan to land at the nearest suitable airport."

FWD STAIRWAY DOOR

1.9 - Revised step to "Plan to land at the nearest suitable airport."

LOCK FAIL

1.10 - Added "flight deck" to language of the condition for clarity.

MID CARGO DOOR

1.11 - Revised step to "Plan to land at the nearest suitable airport."

Section 2 - Air Systems

Air Conditioning/Pack - Dual System Failure During or Immediately After Takeoff

2.7 - Revised title to "Air Conditioning/Pack - Dual System Failure During or Immediately After Takeoff."

Cabin Differential Pressure Uncontrollable, Off Schedule or Oscillates

2.10 - Reformatted step for clarity.

Air Conditioning/Pack - Single System Failure

2.12 - Revised title to "Air Conditioning/Pack - Single System Failure"

Section 3 - Anti-Ice, Rain

Severe Rain/Ice/Turbulence

3.15 - Revised reference to the Airway Manual.

Windshield Cracked

3.24 - Changed title from "Cracked Windshield" to "Windshield Cracked" to align with other NNC's.

Section 6 - Electrical

AC EMER BUS OFF

6.16 - Revised reference to the Airway Manual.

CSD OIL PRESS LOW

6.25 - Added space above and below "Associated GEN switch" to prevent step from being missed by Caution.

6.25 - Revised step for clarity.

6.26 - Revised position of steps for clarity.

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Section 7 - Engines, APU

Aborted Start - Manual

7.2-3 - Revised steps for clarity.

7.3 - Revised statement to emphasize that engine should be motored for an additional 20 seconds after max motoring is reached.

No Acceleration to Idle

7.28 - Added step "ENG IGN Selector.....as reqd."

No Rotation, N1

7.33 - Added Caution "Ensure ENG IGN Selector is ON as required."

No Rotation, N2 - START VALVE OPEN

7.34 - Added Caution "Ensure ENG IGN Selector is ON as required."

Section 8 - Fire Protection

Smoke, Fire or Fumes

8.6 - Added Note: Set regulator to EMER as required to clear mask.

8.10 - Added "Pilot to F/A and F/A to Pilot call button function inop" to list of inoperable items.

Section 9 - Flight Controls

Runaway Stabilizer

9.1 - Revised reference to the Airway Manual.

9.1 - Added "if engaged" to step to disconnect the autopilot.

9.1 - Revised step for clarity.

9.1 - Removed note regarding use of LONG TRIM handles.

9.2 - Added note to use primary trim system.

9.3 - Revised location of circuit breakers.

Flap Abnormal Configuration

9.14 - Revised title to "Flap Abnormal Configuration" for improved indexing.

9.14 - Added "Overhead Panel" to step for clarity of its location.

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

9.17 - Added "Overhead Panel" to step for clarity of its location.

Stabilizer Inoperative In Flight

9.37 - Revised reference to the Airway Manual.

9.39 - Added note about control force needed.

9.40 - Added "Overhead Panel" to step for clarity of its location.

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Section 10 - Flight Instruments, Displays

Airspeed Unreliable

10.1 - Changed OFF to DISCONNECT, for consistency with other steps.

10.4 - Revised reference to the Airway Manual.

CADC Failure

10.6 - Revised reference to the Airway Manual.

Instrument Off Flag

10.10 - Revised reference to the Airway Manual.

10.10 - Removed stand alone item "VSI" as it is covered on this row "TA/VSI."

Section 11 - Flight Management, Navigation

IRS NAV Only

11.7 - Revised step to keep pilots from confusing the center instrument panel switchlight with the guarded overhead switch.

11.7 - Added Note: EGPWS warnings will be inhibited.

IRU FAULT Light - In flight

11.11-12 - Added "Confirm" to the step to match Non-Normal Checklist Instructions.

11.13 - Revised step to keep pilots from confusing the center instrument panel switchlight with the guarded overhead switch.

11.13 - Added Note: EGPWS warnings will be inhibited.

Section 13 - Hydraulics

Hydraulic System Failure (Left System)

13.20 - Revised and split steps for clarity.

Hydraulic System Failure (Right System)

13.24 - Split steps for clarity.

Loss of Both Hydraulic Systems

13.29 - Split steps for clarity.

Section 14 - Landing Gear

Landing Gear Handle Jammed in UP Position

14.9 - Added instruction on how to stow the Emergency Gear Extension Lever.

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Landing Gear Unsafe – Gear Handle Down

14.17-18 - Added instruction on how to stow the Emergency Gear Extension Lever.

Section 15 - Warning Systems

GPWS FAIL

15.3 - Removed NNC "NO TCAS Annunciation" and "TA/VSI Failure", as they are no longer needed.

Chapter NNCI - Non-Normal Checklist Instructions

Section 1 - Non-Normal Checklists

Non-Normal Checklist Assumptions

NNCI.1.3 - Revised language to consult the MEL.

Circuit Breaker Reset

NNCI.1.5 - Added Note: Circuit breaker locations showing an asterisk indicate that the circuit breaker is located on the flight deck overhead circuit breaker panel.

Chapter RR - Revision Record

Section ModID - Model Identification

RR.ModID.1 - Removed ship 0909, as it is no longer flying.

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.4 - Added DP - Departure Procedures.

RR.Abbrev.5 - Added FOQA - Flight Operations Quality Assurance.

RR.Abbrev.6 - Added IMPF - Improved Performance.

RR.Abbrev.6 - Added IQ - Initial Qualification.

RR.Abbrev.7 - Added LOE - Line Oriented Evaluation.

RR.Abbrev.7 - Added LPR - Landing Performance Request.

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RR.Abbrev.7 - Added MCA - Minimum Crossing Altitude.

RR.Abbrev.8 - Added MVA - Minimum Vector Altitude.

RR.Abbrev.8 - Added NASA - National Aeronautics and Space Administration.

RR.Abbrev.8 - Added NATS - North Atlantic Track System.

RR.Abbrev.8 - Added NTSB - National Transportation Safety Board.

RR.Abbrev.9 - Added PNF - Pilot Not Flying.

RR.Abbrev.10 - Added RAS - Remote Access system.

RR.Abbrev.10 - Added RATOW - Runway Allowable Takeoff Weight.

RR.Abbrev.11 - Added SMS - Safety Management System.

RR.Abbrev.11 - Added TEM - Threat Error Management.

RR.Abbrev.11 - Added TERP - Terminal Instrument Procedures.

RR.Abbrev.12 - Added TOPR - Takeoff Performance Request.

RR.Abbrev.12 - Added TPC - Tactical Pilotage Charts.

RR.Abbrev.12 - Added VLOF - Lift Off Speed.

RR.Abbrev.12 - Added VP - Tire Hydroplaning Speed.

Section RR - Revision Record

RR.RR.1 - Removed extraneous sentence.

RR.RR.2 - Revised to match the electronic-only methodology.

RR.RR.2 - updated per 5230

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Revision Record — Chapter RR
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Evacuation Checklist is on the reverse side of this page.

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Evacuation

Condition: An evacuation is needed.

1 PARK BRAKE . . . . . set
2 EMER PWR switch . . . . . .ON
3 SPD BRK lever . . . . . RET
4 FLAP/SLAT handle. 28/LAND
5 CABIN ALT lever . . . . . .Manual
6 CABIN ALT wheel (outflow valve) . . . . . .Full back
7 EMER LTS switch . . . . . .ON
8 Notify flight attendants "EASY VICTOR, EASY VICTOR, EASY VICTOR".
9 FUEL levers . . . . . OFF
10 ENG FIRE handles. . . . . PULL
11 FIRE AGENT(S) (if reqd) . . . . . DISCHARGE
12 Notify flight attendants "THIS IS THE CAPTAIN. EVACUATE, EVACUATE."
13 Advise the tower.
14 BATT switch . . . . . OFF

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