

MD-90

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
GPWS TERRAIN switchlight OVRD
- 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).

▼ Continued on next page ▼

▼ 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

▼ Continued on next page ▼

▼ 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

▼ Continued on next page ▼

▼ **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**

▼ **Continued on next page** ▼

▼ **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.

▼ **Continued on next page** ▼

▼ **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.



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.



Emergency Descent

Condition: A rapid descent is needed.

1 Throttles IDLE

Note: Autothrottle 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.



EFB Failure – All

Condition: One of the following occurs:

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

1 Choose one:

◆ Failure occurs **on the ground**:

▶▶ **Go to step 2**

◆ Failure occurs **in flight**:

▶▶ **Go to step 6**

2 If not at gate, return to gate.

3 Attempt to obtain spare EFBs.

4 Choose one:

◆ Two EFBs available:

Proceed normally.



◆ Only **one** EFB available:

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



◆ **No** spare EFBs available:

▶▶ **Go to step 5**

▼ **Continued on next page** ▼

▼ EFB Failure - All continued ▼

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

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

Caution! No dangerous goods allowed.



▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

6 Contact Dispatch.

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

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

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

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

Program the FMS for approach (if available).

Using the FMS, review the following approach information: runway length, 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 ▼

▼ 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

EFB Failure – Single

Condition: One of the following occurs:

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

1 Choose one:

◆ Failure occurs **before** pushback:

Attempt to obtain spare EFB.

Utilize EFB loaner cart if station is equipped.

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

▶▶ **Go to step 2**

◆ Failure occurs **after** pushback:

Attempt to obtain spare EFB.

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

▶▶ **Go to step 2**

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

2 Choose one:

◆ Spare EFB **available**:

Utilize spare EFB.

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

Coordinate with Dispatch to determine future need of replacement EFB.



◆ Spare EFB **unavailable**:

►► **Go to step 3**

3 Contact Dispatch. Operation with only one operative EFB may be authorized. Additional printed materials may be required.

4 Conserve battery on remaining EFB.

Note: Use powered keyboard or approved charging device.

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

5 Choose one:

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

Continue operation with one operative EFB.



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

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

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

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



EFB or Application Unresponsive

Condition: One of the following occurs:

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

1 Choose one:

◆**EFB** is unresponsive:

▶▶**Go to step 3**

◆**Application** within EFB is unresponsive:

Close and restart application.

▶▶**Go to step 2**

2 Choose one:

◆Application operates **normally**:

Continue normal operation.



◆Application within EFB remains **unresponsive**:

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

3 Battery powerCheck

If able, verify EFB battery status indicator displays at least 10% battery power available. Connect power source, if necessary.

▼ Continued on next page ▼

▼ **EFB or Application Unresponsive continued** ▼

4 When sufficient battery power is available:

Power button Press and hold

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

Power button Press and release

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

5 Choose one:

◆ **EFB normal operation is restored:**

Accomplish normal logon procedure.



◆ **EFB fails** to restart:

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

▶▶ **Go to step 6**

▼ **Continued on next page** ▼

▼ EFB or Application Unresponsive continued ▼

6 Choose one:

◆ EFB normal operation is **restored**:

Accomplish normal logon procedure.



◆ EFB **fails** to restart:

Refer to applicable EFB Non-Normal Checklist.



Emergency Landing Considerations

Condition: The captain has determined a red emergency exists.

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

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

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 ▼

▼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.”



Overweight Landing

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

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



Overweight Landing Considerations

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

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

Note: When considering an immediate return to the takeoff runway, the landing distance is 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 ▼

▼ 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.



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.

▼ Continued on next page ▼

▼ 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.



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 selectorON
- 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 Engine/Airfoil Anti-IceON

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

8 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.

9 Engine parameters Monitor

10 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 ▼

▼ Volcanic Ash continued ▼

11 Choose one:

◆ Engines run **normally**:

▶▶ **Go to step 12**

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

▶▶ **Go to the Two Engine Flameout checklist on page 7.5.**



12 **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.

13 Avoid use of windshield wipers.

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

15 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.





Non-Normal Checklists

Chapter NNC

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

Section 1

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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. |



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.



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. |



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).

MISC

DRAIN MAST HEAT

Messages: DRAIN MAST HEAT

Condition: Drain mast heater is inoperative.

- 1 Advise cabin crew not to use forward galley or lavatory sink drains if FWD DRAIN MAST HEATER CB (X27) is tripped, or if inoperative drain mast heater cannot be determined.



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. |



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.



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. |



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.



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. |



LOCK FAIL**LOCK FAIL (9220-9265)**

Condition: The flight deck door solenoid failed to engage the lock.

- 1 Verify Door Control Panel rotary switch is in the AUTO position.
- 2 Verify the KILL switch on the door control module is in the guarded NORM position (cover closed).
- 3 COCKPIT DOOR UNLOCK CB (P24) Pull/reset
- 4 Verify the flight deck door is closed and locked by pushing on the door and ensuring it does not move.
- 5 Choose one:
 - ◆ On the **ground**:
 - ▶▶ **Go to step 6**
 - ◆ In **flight**:
 - ▶▶ **Go to step 7**

▼ Continued on next page ▼

▼ **LOCK FAIL (9220-9265) continued** ▼

6 Choose one:

◆ **LOCK FAIL** annunciator light **extinguishes** and door is **locked**:

System operating normally.



◆ **LOCK FAIL** annunciator light remains **illuminated**:

Contact Maintenance.



7 Choose one:

◆ **LOCK FAIL** annunciator light **extinguishes** and door is **locked**:

System operating normally.



◆ **LOCK FAIL** annunciator light remains **illuminated**:

▶▶ **Go to step 8**

▼ **Continued on next page** ▼

▼ LOCK FAIL (9220-9265) continued ▼

8 Choose one:

◆ Door is **locked**:

Lock operating normally.
Any time the door is closed, the door must be verified that it is locked by either pushing or pulling on the door and ensuring it does not move.



◆ Door is **unlocked**:

Flight Deck Access System switch on
Door Control Module OFF
Lock the door with the deadbolt.



LOCK FAIL (9201-9219)

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

- 1 RAS Keypad circuit breaker (P24) and
RAS Control circuit breaker (T36) Pull

Removing power from the system will silence the aural alert.

- 2 Deadbolt lock. Locked, Key inoperable

Notes: 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.



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.



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.



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

Airloads 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.



Non-Normal Checklists
Air Systems

Chapter NNC
Section 2

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Intentionally
Blank

**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 exceed 14,000 feet:
PASS OXY MASK switch EJECT

▼ Continued on next page ▼

▼ 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: Autothrottle 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.

▼ Continued on next page ▼

▼ 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 the use of oxygen system can be discontinued. Request passenger and cabin status to include the lavatories.



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
(Affected Side) CLOSE
- 3 AIR CONDITIONING SUPPLY
(Affected Side) HP BLD OFF
- 4 **After** 1 minute,
- 5 Choose one:
 - ◆AIR COND TEMP HIGH message stays displayed:
▶▶Go to step 6
 - ◆AIR COND TEMP HIGH message blanks:
▶▶Go to step 8

▼ Continued on next page ▼

▼ **AIR COND TEMP HIGH** continued ▼

6 Choose one:

◆ Air conditioning flow indication **normal**:

Continue flight in established configuration.



◆ Air conditioning flow indication **abnormal**:

▶▶ **Go to step 7**

7 Choose one:

◆ **AIR CONDITIONING FLOW goes to LO**:

Continue flight in established configuration.

Note: AIR CONDITIONING FLOW
indication going to LO 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.



◆ **AIR CONDITIONING FLOW does not go to LO**:

▶▶ **Go to step 8**

8 Continue flight in established configuration.



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 FLOW Drops to LO checklist on page 2.10**

or

▶▶ **Go to the Unpressurized Flight checklist on page 2.26**



**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 CABIN PRESSURE controller switch. . . . AUTO 1 or
AUTO 2

Move CABIN PRESSURE controller switch to opposite system.

- 2 Choose one:

◆ Pressurization control is **normal**:

Monitor system.



◆ Pressurization control is **uncontrollable**:

▶▶ **Go to step 3**

- 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.

▼ Continued on next page ▼

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

4 CABIN ALT Control Wheel Push in and
attempt to move

5 Choose one:

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

▶▶ **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 ▼

▼ 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.



**FLOW Drops to LO
or
Air Conditioning/Pack - Single
System Failure**

Condition: FLOW gauge indicates air conditioning supply from respective system is LO.

- 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.

Associated AIR CONDITIONING
SUPPLY switch AUTO

▶▶▶ **Go to step 3**

◆

Associated TEMP CONTROL VALVE indicator **is not** in HOT range:

▶▶▶ **Go to step 4**
- ▼ Continued on next page ▼
- 2.10
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- October 7, 2016

▼ **FLOW Drops to LO continued** ▼

3 Choose one:

◆ **FLOW remains** at LO:

Pack is inoperative.

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



◆ **FLOW does not** remain at LO:

Associated TEMP

Selector AS DESIRED

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



4 Rotate TEMP selector toward HOT.

5 Associated AIR CONDITIONING
SUPPLY switch AUTO

▼ **Continued on next page** ▼

▼ FLOW Drops to LO continued ▼

6 Choose one:

◆ FLOW **remains** at LO:

Pack is inoperative.

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



◆ FLOW **does not** remain at LO:

Associated TEMP
Selector AS DESIRED

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



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 flow stops rising (12:30 position).

- 4 Choose one:

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

Descend to an altitude where normal pressurization can be maintained.

If FLOW pressure reads LO,

▶▶ Go to the FLOW Drops to LO checklist on page 2.10



◆ **FLOW light extinguishes.**



**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 flow ceases to rise (approximately 12:30 position). Adjust as required.

3 Speed Brakes. As required
■ ■ ■ ■

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 ▼

▼ 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 ▼

▼ 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.

▶▶ **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 ▼

▼ 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

9 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.

10 **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.

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

▼ Continued on next page ▼

▼ Manual Pressurization Control continued ▼

12 **When** cabin altitude and airplane 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 airplane altitude.



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.



MISC

PNEU SYSTEM FAULT

Messages: L PNEU SYSTEM FAULT R PNEU SYSTEM FAULT

Condition: Supply pressure exceeds normal due to malfunction of pressure regulator and shutoff valve (PRSOV) and/or high stage valve, or, malfunction of L/R pneumatic system controller, or, failure of pneumatic manifold sensor, or, loss of controller pressure.

- 1 PNEU X-FEED VALVE Lever
(Affected Side). CLOSE
- 2 AIR CONDITIONING SUPPLY switch
(Affected Side). OFF

Note: When both pneumatic crossfeed valves are open, an overpressure fault on one side may result in display of both L, R PNEU SYSTEM FAULT messages. Closing either pneumatic crossfeed valve will isolate source of fault. PNEU SYSTEM FAULT message for fault side will display.



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 switchVENTURI

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 PowerAs required

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

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

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



MISC

TAIL TEMP FAULT

Messages: L TAIL TEMP FAULT R TAIL TEMP FAULT

Condition: One or both channels of the tail temperature high controller is unable to detect a high tail temperature.

1 Choose one:

◆ On the **ground**:

Maintenance action required.



◆ In **flight**:

No further crew action required.



TAIL TEMP HIGH

Messages: L TAIL TEMP HIGH R TAIL TEMP HIGH

Condition: Tail compartment or pylon temperature exceeds normal. Or, during takeoff, both PODS sensors have simultaneously failed just prior to the takeoff.

Note: If both TAIL TEMP HIGH lights are illuminated, assume that the affected side is that of the TAIL TEMP HIGH light that illuminated first.

- 1

PNEU X-FEED VALVE Lever
(Affected Side) CLOSED
- 2

AIR CONDITIONING SUPPLY switch
(Affected Side) OFF
- 3

After 2 minutes,
- 4

Choose one:

◆ Both TAIL TEMP HIGH lights **illuminate**:
Land at nearest suitable airport.
■ ■ ■ ■

◆ One or both TAIL TEMP HIGH lights **extinguish**:
▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ TAIL TEMP HIGH continued ▼

5 Choose one:

◆ One TAIL TEMP HIGH light **remains illuminated**:

PNEU X-FEED VALVE Lever
(Opposite Side) CLOSED
AIR FOIL Anti-Ice OFF

Note: Minimize time in icing conditions.

With both pneumatic crossfeed valves closed, affected side is effectively isolated. However, tail compartment temperature may take 20 minutes to cool down to a level that will extinguish the TAIL TEMP HIGH light.

▶▶ **Go to step 6**

◆ TAIL TEMP HIGH light(s) **extinguish**:

▶▶ **Go to step 6**

6 Continue operation in established pneumatic system configuration.



Unpressurized Flight

Condition: Pressurization must be manually controlled and monitored.

1 Choose one:

◆ On the **ground**:

CABIN PRESSURE CONTROL CBs (4)
(H2, J2, 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 ▼

▼ Unpressurized Flight continued ▼

Note: If operating at reduced thrust:

▶▶ **Go to the One Engine Inoperative /
Reduced Thrust Landing checklist on
page 7.39**

4 Choose one:

◆ Air conditioning packs **are** available:

Air conditioning pack(s)As desired

■ ■ ■ ■

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

RAM AIR switchON

■ ■ ■ ■

Intentionally
Blank



Non-Normal Checklists

Chapter NNC

Anti-Ice, Rain

Section 3

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Intentionally
Blank

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.



ICE

AIRFL ICE PRES ABNML

Message: 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**

▼ Continued on next page ▼

▼ AIRFL ICE PRES ABNML continued ▼

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**

3 PNEU X-FEED VALVE

Lever(s) Verify OPEN

4 PNEU PRESS Gauge Above 22 PSI

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 ▼

▼ **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
3.19**

AIRFOIL ICE PROTECTION - AUTO

CB (N29) PULL



ICE

**ANTI-ICE FAULT
or
STRAKE ICE FAULT**

Messages: ANTI-ICE FAULT STRAKE ICE FAULT

Condition: Anti-ice fault in left or right strake with no ice protection for one or both strakes when L and/or R ENG anti-ice switch is selected ON.

Note: Message will be displayed to indicate a fault in the strake anti-icing system.

1 Choose one:

◆ On the **ground**:

Maintenance action required.



◆ In **flight**:

Depart icing area as soon as possible.

**Caution! Minimize time in icing areas.
Ice forming on strakes will
break off and may be
ingested by engines.**



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 CLOSED
- 2 PNEU PRESS Gauge OBSERVE
- 3 **When** PNEU PRESS gauge reads approximately 24
PSI, stop moving PNEU X-FEED VALVE levers.
Readjust when power, speed, or altitude is
changed.



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 S33, R T33 (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.



ICE**ICE FOD ALERT**

Messages: L ICE FOD ALERT R ICE FOD ALERT

Condition: • The ICE FOD ALERT message indicates a ground advisory of ice buildup on wing upper surface.

1 Choose one:

◆ On the **ground**:

▶▶ **Go to step 2**

◆ In **flight**:

Maintenance action required.

**2 Choose one:**

◆ Fuel temperature less than 4°C / 39°F or outside air temperature less than 10°C / 50°F:

Wing Upper

Surface. Tactile Wing Inspection

If contamination is detected, de-ice aircraft.

▶▶ **Go to step 3**

◆ Fuel temperature above 4°C / 39°F and outside air temperature is above 10°C / 50°F:

▶▶ **Go to step 3**

▼ **Continued on next page** ▼

▼ICE FOD ALERT continued▼

3 Wing ICE FOD Switch RESET

Move ICE FOD switch to RESET, hold momentarily, then release.

Note: System cannot be reset if ice is detected by sensors.

4 Choose one:

◆ ICE FOD ALERT remains displayed:

Maintenance action required.



◆ ICE FOD ALERT extinguished:

No further crew action required.



ICE

ICE FOD SYS INOP

Messages: L ICE FOD SYS INOP R ICE FOD SYS INOP

Condition: •The ICE FOD SYS INOP message indicates a ground advisory ice FOD alert system is inoperative.

1 Maintenance and/or MEL action required before takeoff.



ICE

ICE PROT TEMP HIGH

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

Condition: Pneumatic duct temperature control system malfunction, resulting in high duct temperature. Crossfeed valve(s) open with AIR FOIL anti-ice switch selected OFF.

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
- ■

■

■

ICE

ICE PROT TEMP LOW

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

Condition: Low engine power or pneumatic duct temperature control system malfunction.

- 1 Associated PNEU X-FEED
VALVE Lever. OPEN

Note: If at low engine power, advance power.

- 2 Wing and Tail Valves
CB (M24) (If Tripped) Reset
- 3 If message remains displayed:
Associated PNEU X-FEED
VALVE Lever CLOSED
- ■

■

■

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 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 Chapter 10.

- 2 Failed Unit(s) Determine
Rotate METER SEL & HEAT selector and check for heater current. If any unit indicates no heater current, cross-check appropriate instruments for valid indications.

▼ Continued on next page ▼

▼ PITOT/STALL HEAT OFF continued ▼

- 3 Applicable Circuit Breakers (If Tripped) . . . Reset
- CAPTAIN'S PITOT HEATER CB (C12*)
 - AUX and F/O PITOT HEATER CBs (M28, N28)
 - L/R ANGLE OF ATTACK VANE HTR
CBs (X22, Z22) and
 - L/R STATIC PORT HEATER CBs (X21, Z21)
 - RUDDER Q LIMITER HTR CB (Z30)

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.



▼ Continued on next page ▼

▼ PITOT/STALL HEAT OFF continued ▼

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**

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**

▼ Continued on next page ▼

▼ PITOT/STALL HEAT OFF continued ▼

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

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. The PRIMARY RUD LIM FAULT light may be displayed if rudder pitot tube is obstructed.

▶▶ Go to step 9

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

▶▶ Go to step 9

▼ Continued on next page ▼

▼PITOT/STALL HEAT OFF continued▼

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":



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 IGNITION switch ON
- 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 TAT 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 in ON.

During extreme turbulence, fly attitude indicator as primary pitch reference. Sacrifice altitude to maintain attitude. Descend if necessary to improve buffet margin.

▼ Continued on next page ▼

▼ Severe Rain/Ice/Turbulence continued ▼

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.

8 Throttles SET

Note: Use speed brakes 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. 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.

During an unavoidable encounter of exceptionally severe icing conditions (those that occur on an infrequent basis), it is desirable to maintain a minimum of 60% N1.

▼ Continued on next page ▼

▼ Severe Rain/Ice/Turbulence continued ▼

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

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 IGNITION is on. 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 60% 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 1 minute, consider engine shutdown.



**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.



TAIL DE-ICE ON Light Illuminated Continuously

Condition: Illumination of this light indicates a stuck timer.

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

Note: With airfoil ice selected, moving the flaps to 40 will activate both wing and tail anti-ice simultaneously, and the WING ANTI-ICE ON and TAIL DE-ICE ON lights will illuminate until the aircraft is on the ground or flaps are repositioned to less than 40.

▼ Continued on next page ▼

▼ TAIL DE-ICE ON Light Illuminated Continuously continued ▼

1 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 2**

2 AIR FOIL Anti-Ice OFF

3 PNEU X-FEED VALVE Levers CLOSE

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

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



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.



Windshield Heat Beeping / Buzz

Condition: A malfunction has occurred in a window or windows that are receiving heat from the windshield anti-ice system.

Note: This noise has been verified to not be a safety hazard as long as there is no interference with routine crew duties.

1 Choose one:

◆ Time and duties **permit**:

Pull the following Windshield Heat CBs, one at a time, while listening for the buzz to diminish:

LEFT WINDSHIELD ANTI-ICE (X24)

CENTER WINDSHIELD ANTI-ICE
(X25)

RIGHT WINDSHIELD ANTI-ICE (Z24)



◆ Time and duties **do not** permit:

WINDSHIELD Heat switch OFF

Turn off windshield heat and observe windshield heat inoperative speed limitations.

Below 10,000 feet MSL:
315 KIAS [AFM]

Above 10,000 feet MSL:
no restrictions



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 ▼

**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 ▼

**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.



◆ Inner glass ply is **not** cracked:

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



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)

▼ Continued on next page ▼

**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.



**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 & PRESS ABNL CAUTION
CB (M21) (If Tripped) RESET

Caution!

A tripped circuit breaker may be reset only once. If a circuit breaker trips after it has been reset, cause should be determined and corrected before attempting a subsequent reset.

- 2

PNEU X-FEED VALVE Levers CLOSE

▼ Continued on next page ▼

**▼ 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

▼ Continued on next page ▼

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

5 **After** 1 minute,

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.

▼ Continued on next page ▼

▼ Autopilot Fails to Disconnect continued ▼

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.

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.



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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**Non-Normal Checklists
Communications**

**Chapter NNC
Section 5**

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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 MAINTENANCESelect

From the REPORTS page,
DIAGNOSTICSSelect

From the DIAGNOSTICS page,
TECHNICAL MENUSelect

From the TECHNICAL MENU page,
LINK STATUS.Select

From the LINK STATUS page,
LINK TESTSelect

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 pages.

▼ Continued on next page ▼

▼ **ACARS - NO COMM (Touchscreen) continued** ▼

3 If NO COMM message remains:

From the LINK STATUS page,

VHF CNTRLSelect

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.



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



**ACARS Touchscreen / Printer
Inop or Reset**

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

- 1 ACARS CBs Open
 - DATA LINK DC (or ACARS MEMORY CLOCK) - B18*
 - DATA LINK IDU - F14 (or F26)
 - DATA LINK MU (or ACARS) - F18
 - DATA LINK PRINTER (or ACARS PRINTER) - F23

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.

▼ Continued on next page ▼

▼ ACARS Touchscreen/Printer Inop or Reset continued ▼

- 4 ACARSReinitialize 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.



**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.



Audio Control Panel Fault

Condition: A fault has occurred in the audio control panel or the panel is in the default mode.

1 ALT Switch-LightPush

Pressing the ALT switch-light should select the alternate Station Control Card (SCC) extinguishing the FAULT light.

Priority for use of the alternate SCC is:

- Captain
- First Officer
- Observer

2 If FAULT light remains illuminated:

System Status:

- The alternate SCC is not available.
- Default mode remains available on either Captain's or First Officer's audio control panel by selecting VHF-1, INT, or PA microphone switch-lights.

Note: FAULT light remains illuminated while in default mode. Default mode provides audio control through the VHF-1, NAV-1, INT, or PA switch-lights.



**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.

▼ Continued on next page ▼

▼ Cabin Interphone System Inoperative continued ▼

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



PA System Inoperative

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

1 Flight AttendantsNotify

Contact Flight Leader and establish plan for communications under normal conditions, including:

Use of standard flight deck/cabin call signals.

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

Use of evacuation signal.

Advise Flight Leader 20 minutes and 5 minutes before landing.

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

Brief the Flight Attendants on the following alternate emergency procedures.

▼ Continued on next page ▼

MD-90 Operations Manual

▼ **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)		



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.



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:

MAINTENANCESelect

From the MAINTENANCE menu:

DIAGNOSTICSSelect

From the DIAGNOSTICS menu:

LINK STATUS.Select

From the LINK STATUS menu:

VHF CNTRLSelect

From the VHF CNTRL menu:

Voice frequency Enter

CHANGE MODESelect

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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Non-Normal Checklists
Electrical

Chapter NNC
Section 6

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Complete Loss Of AC Power

Condition: The AC buses are not powered.

1 EMER PWR switch ON

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

Battery will power all equipment listed on overhead emergency circuit breaker panel and DC TRANSFER BUS for approximately 45 minutes.

Use only that equipment essential to flight.

2 **If** flight deck lighting is inoperative and EOAP is not displaying any messages:

BATTERY DIRECT BUS FEED CB (D17*). . . Reset

3 Flight Deck Door Deadbolt Lock

4 CABIN ALT Control Lever MANUAL

Manually control pressurization schedule.

5 BUS TIE switches OPEN

▼ Continued on next page ▼

▼ **Complete Loss of AC Power continued** ▼

6 GEN switches Reset/ON

Note: When operating on EMER PWR, each APU start attempt will reduce remaining battery energy by approximately 6 percent.

Normal deterioration and wear of the APU may adversely affect APU starting capability at the FL350 maximum start altitude. If time and conditions permit, crews should consider descending below FL330.

7 APU (If Available) START

8 AC Bus Power Observe

9 Choose one:

- ◆ Both GEN buses **are** restored:
 - Note:** If FMAs are blank, pushing either autopilot release button will reset DFGC.
 - CABIN ALT Control Lever AUTO
 - EMER PWR switch OFF, then ARM
 - APU As required
 - ■ ■ ■
- ◆ Both GEN buses are **not** restored:
 - ▶▶ **Go to step 10**

▼ **Continued on next page** ▼

▼ Complete Loss of AC Power continued ▼

10 Choose one:

◆ One GEN bus **is** restored:

Note: Attempt to restore generator bus not powered using APU. Move affected bus tie switch to AUTO. If APU generator trips off line, move bus tie switch to OPEN, then move APU generator switch to RESET and to ON, and move bus tie switch on side with operating generator to AUTO. This will automatically provide APU backup power should operating generator fail. **If** both generator buses are restored, refer to previous decision block, “Both GEN buses restored.”

CABIN ALT Control Lever AUTO

EMER PWR switch. OFF, then ARM

▶▶ Go to step 11

◆ Both GEN buses are **not** restored:

Note: Attempt to restore generator bus power using APU. Move bus tie switches, one at a time, to AUTO. If APU generator trips off line, move that bus tie switch to OPEN, then move APU generator switch to RESET and to ON, and verify unaffected bus tie switch is in AUTO. **If** one or both generator buses are restored, refer to previous decision block “ONE GEN BUS RESTORED,” or to “BOTH GEN BUSES RESTORED.”

▶▶ Go to step 12

▼ Continued on next page ▼

▼ Complete Loss of AC Power continued ▼

11 Choose one:

 ◆ Center tank fuel **is** available:

CTR Tank Pump switches ON

 Main Tank Pump switches
 (One at a Time) OFF

When CTR FUEL QTY indicates 500 pounds,
 Main Tank Pump switches ON

Note: Remaining center tank fuel may be used by leaving both tank pump switches in one main tank off. When CTR FUEL QTY indicates zero, move both tank pump switches in that tank to ON.


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

Continue normal fuel management.



12 Land at nearest suitable airport.

▼ Continued on next page ▼

▼ Complete Loss of AC Power continued ▼

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

Elevator load feel 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

13 Choose one:

◆ **Flaps 28 or 40** and airplane is on speed and trimmed:

Continue approach and land with selected flaps.



◆ Flaps are at any setting **other than** flaps 28 or 40, or if the airplane is **not** trimmed:

▶▶ **Go to step 14**

14 Landing flaps 15/EXT

▼ Continued on next page ▼

▼ Complete Loss of AC Power continued ▼

- 15 Compute landing threshold speeds.
VREF is flaps 15 speedbook minimum maneuver speed, plus add knot value from takeoff C.G. from chart below.
Interpolate as necessary.
- 16 Do not reduce thrust until landing flare has been initiated and sink rate has been reduced.

Stab Angle	MD-90 Takeoff C.G.				
	0	5	10	15	20
-2	39	33	27	20	12
0	29	22	16	10	3
2	20	13	7	1	0



ELEC

AC BUS OFF

Messages: L AC BUS OFF

R AC BUS OFF

Condition: The AC bus is not energized.

- 1 Associated CONV AC BUS SENSING CB
(EPC Generator Bus Panel) (If Tripped) Reset



AC EMER BUS OFF
or
DC EMER BUS OFF

Condition: The emergency power system failed.

- 1

EMER PWR switchON
- 2

Affected Bus StatusVerify

AC EMER BUS – Captain’s flight instruments.

DC EMER BUS – Captain’s pitot heater.

Verify bus power status by observing
instruments powered by that bus:

▼ Continued on next page ▼

▼ AC EMER BUS OFF or DC EMER BUS OFF continued ▼

3 Choose one:

◆ Affected bus **is** powered:

BUS SENSING

Circuit Breakers. Check/Reset

Check/reset affected circuit breaker:

EMERGENCY AC BUS SENSING
CB C7*

EMERGENCY DC BUS SENSING
CB B12*

EMER PWR switch OFF, then ARM

If circuit breaker will not reset or trips again or is not tripped, consider sensing circuit faulty. Rotate EMER PWR switch to OFF.



◆ Affected bus is **not** powered:

EMER PWR switch OFF

Note: Affected bus power will not be available.



ELEC

AC PWR FAULT

Messages: L AC PWR FAULT R AC PWR FAULT

Condition: Indicates the respective AC bus is not powered.

Note: L, R AC PWR FAULT message is displayed when a malfunction occurs in the left or right generator system. Generator may or may not operate.

At Captain’s discretion, start the APU to provide backup power. Above 20,000 feet, APU rotation will be delayed approximately 1 minute after start is initiated.

- 1 Choose one:
- ◆ On the **ground**:
 - GEN switch OFF
 - Maintenance action required.
 - ■ ■ ■
 - ◆ In **flight**:
 - ▶▶ Go to step 2

▼ Continued on next page ▼

▼ AC PWR FAULT continued ▼

2 Choose one:

◆ Associated GEN OFF message **blanks**:

Monitor electrical system.



◆ Associated GEN OFF message **stays displayed**:

▶▶ **Go to step 3**

Attempt only one reset.

3  Associated GEN switch Reset, then ON

4 Choose one:

◆ Associated GEN OFF message **blanks**:

Monitor electrical system.



◆ Associated GEN OFF message **stays displayed**:

▶▶ **Go to step 5**

5 Associated GEN switch OFF

6 Use APU generator if available.



ELEC**APU AC PWR FAULT**

Messages: APU AC PWR FAULT

Condition: APU AC PWR FAULT message is displayed when a malfunction occurs in the APU generator system. Generator may or may not operate.

1 Choose one:

◆ On the **ground**:

APU GEN switch OFF

Maintenance or MEL action required.

◆ In **flight**:

▶▶ Go to step 2

2 Choose one:

◆ Associated APU GEN OFF message **blanks**:

Monitor electrical system.

◆ Associated APU GEN OFF message **stays displayed**:

▶▶ Go to step 3

Attempt only one reset.

3 APU GEN switch. Reset, then ON

▼ Continued on next page ▼

▼ **APU AC PWR FAULT continued** ▼

4 Choose one:

◆ Associated APU GEN OFF message **blanks**:

Monitor electrical system.



◆ Associated APU GEN OFF message **stays displayed**:

▶▶ **Go to step 5**

5 APU GEN switch OFF



ELEC

BATTERY BUS OFF

Messages: BATTERY BUS OFF

Condition: The battery bus is not energized.

- 1 BATT switch ON and LOCKED
- 2 ANNUN/DIGITAL LTS PRESS/HOLD

Note: Depress test button and hold while observing lights.

3 Choose one:

◆AC, DC EMER BUS OFF lights **illuminate**:

Note: AC, DC EMER BUS OFF lights are powered by battery bus.
BATT BUS OFF CB B21* Check/Reset

Note: If circuit breaker will not reset or is not tripped, consider sensing circuit faulty.



◆AC, DC EMER BUS OFF lights do not **illuminate**.

Note: Battery power is not available.
Consider emergency electrical power and APU are unavailable.



ELEC

BUS TIE LOCKOUT

Messages: L BUS TIE LOCKOUT R BUS TIE LOCKOUT

Condition: Indicates the respective bus tie is locked out from closing due to a fault in the distribution system.

1 Choose one:

◆ On the **ground**:

Maintenance action required.



◆ In **flight**:

▶▶ **Go to step 2**

2 BUS TIE switch (Affected Bus) OPEN

Note: Moving affected BUS TIE switch to OPEN will enable system to automatically attempt generator reset.

3 Choose one:

◆ AC BUS OFF message **blanks**:

Note: Associated generator has been restored.

Electrical backup from opposite engine or APU generator will not be available.



◆ AC BUS OFF message **stays displayed**:

▶▶ **Go to step 4**

▼ **Continued on next page** ▼

▼ **BUS TIE LOCKOUT continued** ▼

4 DC BUS X TIE switch. CLOSE

Note: Loss of power to a generator bus will cause affected IRS to operate on battery power. IRS battery power cannot be relied on for more than 30 minutes.

APU may be started to provide electrical backup to side not affected by lockout message. Above 20,000 feet, APU rotation will be delayed approximately 1 minute after APU start is initiated.

5 Choose one:

- ◆ **Zero fuel** remaining in center tank:
CTR Tank Pump switches OFF
■ ■ ■ ■
- ◆ **Fuel remains** in center tank:
▶▶ **Go to step 6**

6 CTR Tank Pump switches ON

7 Main Tank Pump switches (One At a Time) . . OFF

8 **When** CTR FUEL QTY indicates 500 pounds,

9 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, move tank pump switches in that tank to ON.



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 ▼

▼ **DC BUS OFF continued** ▼

2 Choose one:

◆ Affected transformer rectifier CBs **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** ▼

▼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.



ELEC

DC XFER BUS OFF

Messages: DC XFER BUS OFF

Condition: The emergency power system failed.

- 1 EMER PWR switchON
 - 2 DC XFER BUS StatusVerify
- Verify bus power status by observing standby horizon indicator.

▼ Continued on next page ▼

▼ DC XFER BUS OFF continued ▼

3 Choose one:

◆ Affected bus **is** powered:

DC TRANSFER BUS SENSING

CB X37 (Lower EPC) Check/Reset

EMER PWR switch OFF, then ARM

If circuit breaker will not reset or trips again or is not tripped, consider sensing circuit faulty. Rotate EMER PWR switch to OFF.



◆ Affected bus is **not** powered:

EMER PWR switch OFF

Note: Affected bus power will not be available.

If DC transfer bus is not powered, engines can only be shut down using respective engine fire handle. Land at nearest suitable airport.

Fire handle initiated engine shutdown will not be immediate when DC transfer bus is not powered.



ELEC FAULT

Condition: A discrete electrical system failure has occurred.

- 1 Maintenance action required before takeoff.



ELEC **EMER POWER ON**

Messages: EMER POWER ON

Condition: Indicates emergency power is in use.

Note: If EMER POWER ON message is displayed and L, R AC BUS OFF messages are also displayed:

►► Go to the Complete Loss Of AC Power checklist on page 6.1

- 1 EMER PWR switch OFF

▼ Continued on next page ▼

▼ **EMER POWER ON continued** ▼

2 Choose one:

- ◆ DC XFER BUS OFF message is displayed **or** AC/DC EMER BUS OFF light(s) **illuminate**:

EMER PWR switch ON

Note: Use emergency power as required.
Battery power cannot be relied upon
for more than 45 minutes.

**Caution! Do not reset EMER AC BUS
FEED circuit breaker (K7).**

When time and phase of flight permit,
Affected BUS FEED CB Check/Reset

ALTERNATE EMER AC BUS FEED CB
(L8).

EMERGENCY DC BUS FEED CB (N37
or D15*).

DC TRANSFER BUS FEED CB (N36).



- ◆ DC XFER BUS OFF message is not displayed **or**
AC/DC EMER BUS OFF light(s) **extinguish**:

►► **Go to step 3**

3 EMER PWR switch ARM

▼ **Continued on next page** ▼

▼ **EMER POWER ON continued** ▼

4 Choose one:

- ◆ EMER POWER ON message is **displayed**:
EMER PWR switch OFF

Note: When emergency power is required, rotate EMER PWR switch to ON.
Battery power cannot be relied upon for more than 45 minutes.

■ ■ ■ ■
- ◆ EMER POWER ON message is **not displayed**:
Monitor system.

■ ■ ■ ■

ELEC

EMER PWR AUTO FAULT

Messages: EMER PWR AUTO FAULT

Condition: Message will be displayed when EPCU commands emergency power system to ON and emergency power relay fails to close.

- 1 If emergency power is required:
EMER PWR switch ON

■ ■ ■ ■

GEN BRG FAIL

Messages: L GEN BRG FAIL APU GEN BRG FAIL
 R GEN BRG FAIL

Condition: A generator bearing has failed.

- 1 Maintenance and/or MEL action required before takeoff.



GEN DIODE FAIL

Messages: L GEN DIODE FAIL APU DIODE BRG FAIL
 R GEN DIODE FAIL

Condition: A generator diode has failed.

- 1 Maintenance and/or MEL action required before takeoff.



ELEC**GEN OFF**

Messages: L GEN OFF R GEN OFF
 APU GEN OFF

Condition: The generator control breaker is open.

Attempt only one reset.

1  Associated GEN switch Reset/ON

2 Choose one:

◆ Associated GEN OFF message **stays displayed**:

Associated GEN switch OFF

If affected generator is an engine generator,

APU (If Available) START

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



◆ Associated GEN OFF message **blanks**:

►► **Go to step 3**

3 Monitor electrical system.



ELEC

GEN OIL FILTER

Messages: L GEN OIL FILTER R GEN OIL FILTER

Condition: Indicates a differential pressure across the VSCF generator oil filter.

1 Choose one:

◆ On the **ground**:

▶▶ Go to step 2

◆ In **flight**:

Continue normal operation.

Monitor electrical system.



2 Allow engine to warm up for an additional 2 minutes.

Attempt only one reset.

3  Associated GEN switch Reset/ON

▼ Continued on next page ▼

▼ GEN OIL FILTER continued ▼

4 Choose one:

◆ Associated GEN OIL FILTER message **blanks**:

Continue normal operation.

Monitor electrical system.



◆ Associated GEN OIL FILTER message **stays displayed**:

Maintenance action required.



**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 Affected Generator Bus
Circuit Breakers (All) 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).

- 2 Affected Generator Bus
Circuit Breakers (All) Reset

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



ELEC

TIE BUS FEEDER FAULT

Messages: TIE BUS FEEDER FAULT

Condition: Indicates a feeder fault in the tie bus.

- 1 L and R BUS TIE switches OPEN
- 2 APU GEN switch OFF



Intentionally
Blank

Non-Normal Checklists
Engines, APU

Chapter NNC
Section 7

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Aborted Start - Manual

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

- 1 Fuel switch OFF
- 2 Ignition switch AUTO
- - - - -
- 3 **If START switch is still engaged:**
 Engine rotation Continue
 Continue rotation 30 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.

Note: At N2 rotation between 20% and max motoring, N1 could be just beginning to indicate in the 0 - 1% range. However, N1 must begin to indicate by 33% N2.

Note: After shutting down for engine vibrations above 4.0, a maximum of 3 restarts can be attempted.

▼ Continued on next page ▼

▼ Aborted Start - Manual continued ▼

4 If another start is to be attempted:

Engine Clear

Rotate engine at max motoring for 30 seconds with starter if not previously accomplished.

If start aborted due to no oil pressure:

Check CBs (S21, T21)

If start aborted due to rapid EGT rise toward limit, allow engine to cool between 250°C EGT prior to FUEL switch ON.

If start aborted due to no ignition:

Check CBs

Emergency Inverter (D13*)
Left Ignition (K26, B2*, C2*)
Right Ignition (L26, B3*, C3*)

Note: If no ignition on start with ignition switch in AUTO, attempt another start to force ignition switch to opposite side, or attempt a manual start with ignition ON.

If start aborted due to hung start:

▶▶ Go to the Hung Start During Manual Start checklist on page 7.27

Use normal start procedure.



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 the affected side, no rotation or dashes in engine displays, 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 switch
(Affected Engine) . . . Confirm OFF

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

- 4 Throttles Align
- 5 Autothrottles As desired
- 6 TRP MCT
Select 28K for ships 9201-9216
- 7 PNEU X-FEED VALVE Lever
(Affected Engine) CLOSE

▼ Continued on next page ▼

▼Engine Failure or Shutdown continued▼

8 AUX and TRANS HYD PUMP
switches As required

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: Starting APU (if available) will 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 7.28**



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

►► **Go to the One Engine Inoperative / Reduced Thrust Landing checklist on page 7.39**



Two Engine Flameout

Condition: Engine speed for both engines is below idle.

- 1 EMER PWR switch ON
- - - - -

Note: EEC will automatically attempt relight regardless of ignition switch position.

- 2 IGNITION switch ON
- 3 DC START PUMP switch ON
- 4 Minimum airspeed/N2 220 KIAS/10%
- 5 Throttles Idle
- 6 Fuel PUMPS switches (All) ON
- 7 FUEL X FEED Lever OFF

Note: If two engine flameout was caused by fuel starvation with fuel remaining in center wing tank, optimum attitude for scavenging fuel out of right main tank for starting APU or right engine is 0° pitch attitude and 1.5° right wing up.

▼ Continued on next page ▼

▼Two Engine Flameout continued▼

8 Choose one:

◆ **One or both engines start:**

DC START PUMP switch. OFF

FUEL X FEED Lever As required

EMER PWR Switch OFF then ARM



◆ **Neither engine starts:**

▶▶ **Go to step 9**

9 Continue engine start attempts.

10 If repeated start attempts are unsuccessful:

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



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 9**

▼ Continued on next page ▼

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

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**

- 4 APU MASTER switch OFF
- 5 APU CONTROL (B22*) and APU DOOR CONTROL
(U39) Circuit Breakers (If Tripped) Reset
- 6 BAT DIRECT BUS CB (D17*) 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.**

▼ **Continued on next page** ▼

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

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.

▶▶ **Go to step 10**

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

▶▶▶ **Go to step 8**

8 APU MASTER switch RUN

9 APU MASTER switch OFF

10 DC START/FUEL TANK PUMP switch. . . As required



MISC**APU FAULT
or
APU OIL PRESS LOW**

Messages: APU FAULT

APU OIL PRESS LOW

Condition:

- APU FAULT indicates an APU system fault is detected.
- APU OIL PRESS LOW indicates the APU oil system pressure is low.

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** ▼

▼ APU FAULT or APU OIL PRESS LOW 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 FIRE CONT switch. OFF and AGENT ARM

5 APU AIR switch OFF

6 APU MASTER switch OFF

7 FIRE CONT switch. NORM



EGT Reads High In Flight

Condition: EGT approaching or exceeding limit.

1 Thrust Reduce

2 Choose one:

◆ EGT exceeds 610°C but does **not go beyond 635°C** and thrust reduction decreases EGT below 610°C (other indications normal):

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



◆ EGT **exceeds 635°C**:

Accomplish precautionary engine shutdown
at Captain's discretion.

►► **Go to the Engine Failure or
Shutdown checklist on page 7.3**



ENG

ENG START ABORTED - Auto

Messages: L ENG START ABORTED R ENG START ABORTED

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

Note: Automatic engine start auto abort system will not abort for low oil pressure or high vibrations.

Engine start will be auto aborted when N2 is 50% or less and EEC detects a hot start, hung start, locked N1 rotor, ignition failure, or high EGT condition.

If start valve was open and fuel valve was commanded open, auto abort system will dry motor engine a minimum of 30 seconds or until EGT decreases to 250°C.

1 FUEL switch Confirm OFF

▼ Continued on next page ▼

▼ ENG START ABORTED - Auto continued ▼

2 Choose one:

◆ Starter **is** engaged:

Monitor auto abort sequence.

Note: Advise maintenance if any limitations were exceeded. **If** no limitations were exceeded during first start attempt, another start may be attempted at Captain's discretion.

For subsequent start attempt, motor engine for 50 seconds before moving FUEL switch to ON.



◆ Starter **not** engaged:

N2 Indicates rotation has stopped

Reengage starter for 30 seconds to clear engine of fuel.

Note: Advise maintenance if any limitations were exceeded. **If** no limitations were exceeded during first start attempt, another start may be attempted at Captain's discretion.

For subsequent start attempt, motor engine for 50 seconds before moving FUEL switch to ON.



ENG

ENG SURGE
or
Engine Surge / Compressor Stall
Indication

Messages: L ENG SURGE

R ENG SURGE

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

Note: ENG SURGE message may not be displayed with an engine surge condition.

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

▼ Continued on next page ▼

▼ **ENG SURGE or Engine Surge/
Compressor Stall Indication continued** ▼

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.

- 1 Autothrottles OFF
- 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 Anti-Ice switch (Affected Engine[s]) ON
- 4 AIR FOIL Anti-Ice switch ON

▼ **Continued on next page** ▼

**▼ ENG SURGE or Engine Surge/
Compressor Stall Indication continued ▼**

5 Choose one:

◆ EGT, N1, N2 indications **normal**:

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

ENG Anti-Ice switch
(Affected Engine[s]) As required

AIR FOIL Anti-Ice switch As required

Closely monitor engine parameters for remainder of flight.

▶▶ **Go to the One Engine Inoperative /
Reduced Thrust Landing checklist
on page 7.39**



◆ EGT, N1, N2 indications **abnormal**:

FUEL switch(es)
(Affected Engine[s])
(One At a time) . . Confirm . . OFF then ON

▶▶ **Go to step 6**

▼ Continued on next page ▼

**▼ ENG SURGE or Engine Surge/
 Compressor Stall Indication continued ▼**

6 Choose one:

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

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

ENG Anti-Ice switch
(Affected Engine[s]) As required

AIR FOIL Anti-Ice switch As required

Closely monitor engine parameters for remainder of flight.

►► **Go to the One Engine Inoperative /
 Reduced Thrust Landing checklist
 on page 7.39**



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

►►► **Go to step 7**

7 FUEL switch

(Affected Engine) . . . Confirm OFF

8 ENG Anti-Ice switch (Affected Engine) OFF

9 AIR FOIL Anti-Ice switch As required

▼ Continued on next page ▼

**▼ENG SURGE or Engine Surge/
Compressor Stall Indication continued▼**

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

10 Land at nearest suitable airport.

**►►Go to the Engine Failure or Shutdown
checklist on page 7.3**



ENG**ENG VIB HIGH**

Messages: L ENG VIB HIGH R ENG VIB HIGH

Condition: Indicates high respective engine vibration.

Note: If severe rain/ice/turbulence is present,

**▶▶ Go to the Severe
 Rain / Ice / Turbulence checklist on
 page 3.16**

1 Choose one:

◆ On the **ground**:

Maintenance action required before takeoff.



◆ In **flight**:

▶▶ Go to step 2

2 Autothrottles OFF

3 Throttle
 (Affected Engine) . . . Confirm Retard

Slowly retard throttle until VIB indication is
 below 4.0 or idle, whichever occurs first.

4 Continue flight with affected engine at reduced
 thrust. Monitor engine parameters.

Note: Thrust required for safe flight may be used at
 any time.

**▶▶ Go to the One Engine Inoperative / Reduced
 Thrust Landing checklist on page 7.39**



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 - Z36, B15*,
Right panel - X35, C15*) . . Pull and reset

SYSTEM DISPLAY PANEL CBs
(Left panel - S32,
Right panel - T32) Pull and reset



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

INSTRUMENT TRANSFORMER CBs
(Left - K09, Right - L09) . . . Pull and reset



ENG

ENGINE OVERSPEED

Messages: L ENGINE OVERSPEED R ENGINE OVERSPEED

Condition: Indicates the respective EEC detects engine compressor surge or starting stall.

1 Choose one:

◆ Affected engine **shuts down**:

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.3**



◆ Affected engine operating above **redline**:

FUEL switch Confirm OFF

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.3**



◆ Affected engine operating at **idle**:

▶▶▶ **Go to step 2**

2 Continue engine operation.

Note: If engine continues to operate, it will operate at idle only. Engine may shut down at lower altitudes.

▶▶ **Go to the One Engine Inoperative / Reduced Thrust Landing checklist on page 7.39**



ENG

**ENG SYNC ON
or
ENGINE SYNC FAULT**

Messages: ENGINE SYNC FAULT ENG SYNC ON

- Condition:
- ENGINE SYNC FAULT message is displayed any time an engine synchronizer malfunction is detected.
 - ENG SYNC ON message is displayed when ENG SYNC selector is positioned to N1 and EECs are in TOGA or approach idle mode.

1 ENG SYNC Selector OFF



ENGINE SYSTEM FAIL

Messages: L ENGINE SYSTEM FAIL R ENGINE SYSTEM FAIL

Condition: EEC has detected a non-dispatchable engine fault.

- 1 Maintenance action required before takeoff.



EPR Erratic or High

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

1 Choose one:

◆ Icing conditions **exist**:

ENG IGN Selector ON

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 ▼

▼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
(Upper EPC - C16 and X36) (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.



Hung Start During Manual Start

Condition: This procedure applies when a hung start occurs during a manual start. During an auto start, if the EEC detects a hung start, engine start will be automatically aborted.

- 1 Engine does not continue acceleration to idle and other indications are in normal range.
- 2 Engine hydraulic pump switch (affected engine) OFF
- 3 Choose one:

◆ Engine does **not** accelerate to IDLE rpm within 2 minutes after fuel on, or indications are abnormal:

Engine Shutdown

After rpm ceases,

Engine Motor (for 30 seconds)



◆ Engine **accelerates** to IDLE within 2 minutes of fuel on:

Continue normal operation.

Engine hydraulic pump ON



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 Main Tank Pump switches ON
- 4 Choose one:
 - ◆ N2 RPM is **below** 10%:
 - AIR FOIL Anti-Ice. OFF
 - PNEU X-FEED VALVE Levers OPEN
 - Pneumatic Pressure 25 PSI Minimum
 - APU air available up to 20,000 feet.
 - ENG START switch PULL
 - ▶▶ **Go to step 5**
 - ◆ N2 RPM is **above** 10%:
 - ▶▶ **Go to step 6**
- 5 Oil Pressure Indicating
 - Observe oil pressure indication and rise as N2 increases.
- 6 FUEL switch Confirm ON

Note: If EGT and RPM rise do not occur within 30 sec or if EGT exceeds 635C after FUEL switch was moved to ON, move FUEL switch to OFF.

▼ **Continued on next page** ▼

▼Inflight Start continued▼

7 Engine Indications Stabilized

Note: Allow engine to operate at idle for one minute and for another minute at 74% N2 before advancing throttle to higher power settings.

8 ENG and AIR FOIL Anti-Ice As required



**N1 MODE DEFAULT Light
Illuminated**

Condition: EEC is not able to measure or control engine to a valid EPR and has defaulted to N1 mode.

- 1 Affected N1 MODE switchlight Push
- 2 N1 MODE DEFAULT Light/
SELECT Light Extinguished/
Illuminated

Observe DEFAULT light extinguishes and
SELECT light illuminates.

- 3 Affected N1 MODE switchlight Push

▼ Continued on next page ▼

▼ **N1 MODE DEFAULT Light Illuminated continued** ▼

4 Choose one:

◆ All N1 MODE lights **extinguish**:

EPR thrust control mode will be restored.
Continue normal engine operation.



◆ N1 MODE DEFAULT light **illuminates**:

EPR thrust control mode will not be
available on affected engine.

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

When an engine is in N1 mode, left
and right throttle positions may be
staggered when N1 settings are
aligned.

At pilot's discretion, N1 mode may
be selected on opposite engine to
eliminate throttle stagger.



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.



ENG

**OIL PRESS LOW
or
OIL PRESS Low Indication**

Messages: L OIL PRESS LOW R OIL PRESS LOW

Condition: Engine oil pressure is low or indicates low.

1 Choose one:

◆ L, R OIL PRESS LOW message is **displayed**:

▶▶ **Go to step 2**

◆ L, R OIL PRESS LOW message is **blank**:

▶▶ **Go to step 4**

2 Choose one:

◆ L, R OIL PRESS LOW message stays displayed
and L, R OIL PRESS indication is **below** 60 PSI:

Shutdown engine.

▶▶ **Go to the Engine Failure or
Shutdown checklist on page 7.3**



◆ L, R OIL PRESS LOW message stays displayed
and L, R OIL PRESS indication is **greater than or
equal to** 60 PSI:

▶▶ **Go to step 3**

▼ **Continued on next page** ▼

▼ OIL PRESS LOW or OIL PRESS Low Indication continued ▼

3 Choose one:

- ◆ L, R OIL PRESS LOW message stays displayed and oil press, oil temp, and oil qty indications are **normal**:

Continue normal engine operation.



- ◆ L, R OIL PRESS LOW message stays displayed and oil press, oil temp, and oil qty indications are **abnormal**:

▶▶ Go to step 4

4 Choose one:

- ◆ OIL QTY/OIL TEMP indications **normal**:

Continue normal engine operation.



- ◆ OIL QTY/OIL TEMP indications **abnormal**:

Shut down engine.

▶▶ Go to the Engine Failure or
Shutdown checklist on page 7.3



Oil Quantity Decreasing

Condition: Engine oil quantity is decreasing.

1 Choose one:

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

Monitor engine operation.



- ◆ Oil pressure/oil temperature indications **abnormal**:

Refer to Oil Temperature High or L, R Oil Pressure Low, as appropriate.



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**:

Continue normal engine operation.

Monitor oil system.

◆ On the **ground**:▶▶ **Go to step 2**

2 Choose one:

◆ Engine OIL TEMP indication is **above** 32°C:

Shut down engine.

◆ Engine OIL TEMP indication is **less than or equal to** 32°C:

Allow engine to warm up.

After five minutes,▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ OIL STRAINER CLOG continued ▼

3 Choose one:

◆ OIL STRAINER CLOG message **extinguishes**:

Continue normal engine operation.



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

Shut down engine.



Oil Temperature High

Condition: Engine oil temperature is high.

1 Throttle IDLE

Note: Operations between 155°C and 165°C are permissible for 15 minutes.

2 Choose one:

◆ Oil temperature indication **exceeds** 155°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 7.3**



◆ Oil temperature is **within limits**:

Continue engine operation.

Monitor oil temperature.



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 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.

▼ Continued on next page ▼

▼ One Engine Inoperative/Reduced Thrust Landing continued ▼

9 Transponder Function selector TA

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

10 Landing Flap Configuration 28/Land

Note: PRIMARY RUD LIM FAULT message may result from speed changes after maximum rudder is applied due to asymmetric thrust. Momentarily centering rudder pedals and rudder trim may allow rudder throw limiter to return to speed scheduled position and extinguish message.

11 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 ▼

▼ 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.

▼ Continued on next page ▼

▼ One Engine Inoperative/Reduced Thrust Landing continued ▼

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



ENG

REV PRESSURIZED

Messages: L REV PRESSURIZED R REV PRESSURIZED

Condition: The respective EEC auto restow commanded or EEC detection of isolation valve failure.

1 Choose one:

◆ On the **ground**:

Maintenance action required.



◆ In **flight**:

▶▶ **Go to step 2**

2 Autothrottles OFF

3 Throttle
(Affected Engine) . . . Confirm IDLE

4 Land at nearest suitable airport.

▶▶ **Go to the One Engine Inoperative /
Reduced Thrust Landing checklist on
page 7.39**



**Reverser Deployed
or
REVERSE THRUST / UNLOCK Lights
Illuminated In Flight**

Condition: A fault occurs in the thrust reverser system.

Note: EEC will reduce engine power to idle whenever throttle position disagrees with reverser position.

- 1 Autothrottles OFF
- 2 Throttle
(Affected Engine) . . . Confirm IDLE
- 3 Reverser Lever (Affected Engine) Full down
- 4 Choose one:

◆ Airplane **is** buffeting or yawing:

FUEL switch
(Affected Engine). Confirm OFF

Land at nearest suitable airport.

▶▶ **Go to the Engine Failure or
Shutdown checklist on page 7.3**



◆ Airplane is **not** buffeting or yawing:

Operate engine at idle.

Land at nearest suitable airport.

▶▶▶ **Go to the One Engine
Inoperative / Reduced Thrust
Landing checklist on page 7.39**



ENG

REVERSER FAULT

Messages: L REVERSER FAULT R REVERSER FAULT

Condition: A fault occurs in the thrust reverser system.

- 1 Anticipate asymmetrical reverse on landing rollout.
Affected reverser may not deploy.



Start Valve Fails to Open

Condition: The start valve is not in the commanded position.

- 1 Locate and reset (if tripped) the following circuit breakers:

Associated ENGINE START SW CBs (U34, X39).
Associated EEC CBs (W32, X32) and
(B14*, B15*).
- 2 **If** unable to electrically open start valve,
Maintenance action required.



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**:

PNEU X-FEED VALVE Lever
 (Affected Side) CLOSE

AIR CONDITIONING SUPPLY switch
 (Affected Side) OFF

FUEL switch
 (Affected Side) . . Confirm OFF

Maintenance action required.



◆ In **flight**:

▶▶ **Go to step 2**

- 2 PNEU X-FEED VALVE Lever
 (Affected Side) CLOSE
- 3 AIR CONDITIONING SUPPLY switch
 (Affected Side) OFF

Note: Start valve will now be isolated.

- 4 Continue flight with L, R START VALVE OPEN message displayed.



ENG

STATOR VANE FAIL

Messages: L STATOR VANE FAIL R STATOR VANE FAIL

Condition: The respective stator vane actuator has been fail-safed and cannot be controlled.

1 Choose one:

◆ **On the ground:**

Shut down engine.



◆ **In flight:**

▶▶ **Go to step 2**

2 Autothrottles OFF

Move throttle slowly. Keep engine out of idle range.

Note: Engine may shut down if allowed to idle.



Intentionally
Blank

Non-Normal Checklists
Fire Protection

Chapter NNC
Section 8

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Intentionally
Blank

APU FIRE

Condition: Fire is detected in the APU.

1 APU FIRE CONT switch OFF & AGENT ARM

2 Choose one:

◆ APU FIRE light is **illuminated**:

APU FIRE AGENT NO 1 or NO 2 . . . DISCH

After 30 seconds,

▶▶ **Go to step 3**

◆ APU FIRE light is **extinguished**:

▶▶ **Go to step 4**

3 Choose one:

◆ APU FIRE light is **illuminated**:

Remaining APU FIRE AGENT DISCH

Land at nearest suitable airport.

▶▶ **Go to step 4**

◆ APU FIRE light is **extinguished**:

▶▶ **Go to step 4**

4 APU MASTER switch OFF



**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 the affected side, no rotation or dashes in engine displays, rapid loss of hydraulic pressure and sudden loss of generator power.

- 1 Autothrottles OFF
- 2 Throttle
(Affected Engine) . . . Confirm Idle
- - - - -

▼ Continued on next page ▼

▼ Engine Fire or Engine Severe Damage or Separation continued ▼

3 Choose one:

◆ ENG FIRE handle light is illuminated

or

severe engine damage/separation is suspected:

FUEL switch

(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 ▼

▼ 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 ▼

▼ Engine Fire or Engine Severe Damage or Separation continued ▼

Note: Starting APU (if available) will reduce electrical load on operating generator.

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

11 When takeoff thrust is no longer required,

**►► Go to the One Engine Inoperative /
Reduced Thrust Landing checklist on
page 7.39**



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 ▼

▼ 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 ▼

▼ 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 ▼

▼ 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 ▼

▼ 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 BUS TIE switches OPEN
- 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 45 minutes.

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

28 Choose one:

◆ **Flaps 28 or 40** and airplane is on speed and trimmed:

Land with selected flaps.



◆ Flaps are at any setting **other than** flaps 28 or 40, or if the airplane is **not** trimmed:

▶▶ Go to step 29

29 Landing flaps 15/EXT

30 Compute landing threshold speeds.

VREF is flaps 15 speedbook minimum maneuver speed, plus add knot value from takeoff C.G. from chart below.

Interpolate as necessary.

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

Stab Angle	MD-90 Takeoff C.G.				
	0	5	10	15	20
-2	39	33	27	20	12
0	29	22	16	10	3
2	20	13	7	1	0

▶▶ Go to the Smoke or Fumes Removal checklist on page 8.25



ENG

APU FIRE DET FAULT

Messages: APU FIRE DET FAULT

Condition: APU fire detection is inoperative.

Note: APU FIRE DET FAULT message displayed indicates loss of fire detection on APU.

1 Choose one:

◆ On the **ground**:

Maintenance action required.

■ ■ ■ ■

◆ In **flight**:

▶▶ Go to step 2

2 Choose one:

◆ APU **is** required:

Land at nearest suitable airport.

■ ■ ■ ■

◆ APU is **not** required:

▶▶ Go to step 3

3 APU OFF

■ ■ ■ ■

**Cargo Fire FAULT Light Illuminated
(9201-9217)**

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** ▼

**▼Cargo Fire FAULT Light is Illuminated
(9201-9217) continued▼**

4 Choose one:

◆On the **ground**:

Maintenance or MEL action required.



◆In **flight**:

Land at nearest suitable airport.



**CARGO FIRE
(9201-9217)**

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 switchPush

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 ▼

▼CARGO FIRE (9201-9217) 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. [AFM]**



CARGO FIRE
(9218-9265)

Condition: The following are illuminated or alerting:

- CARGO FIRE light
- Fire aural alerter
- Amber SMOKE DET LOOP light
- CARGO SMOKE light (annunciator panel)
- MASTER WARNING light
- MASTER CAUTION light
- Several lights on the overhead Cargo Detection Suppression Control Panel (CDSCP)

1 The PUSH DSCH Switch. Push

Note the time. Second Halon bottle will discharge automatically 15 minutes after the release of the 'PUSH' DSCH switch. Verify BTL ARMED 1 and appropriate FWD/MID/AFT green squib LED'S extinguish, indicating they have fired. Verify 'PUSH' DSCH light illuminates after 30 seconds, indicating BTL 1 has discharged. Verify the red FIRE LED on the CARGO DETECTION SUPPRESSION CONTROL PANEL (CDSCP) is flashing and BTL ARMED 2 green squib LED is illuminated indicating the auto fire sequence for BTL 2 is operating.

▼ Continued on next page ▼

▼ CARGO FIRE (9218-9265) continued ▼

2 After approximately 15 minutes:

If BTL 2 did not discharge automatically:

ARM Switch Rotate to affected cargo
compartment

3 The AUTO/MAN DSCH Switch Push

Verify the BTL ARMED 2 green squib LED
extinguishes and the red FIRE LED on the
CDSCP remains illuminated but is not flashing,
indicating BTL 2 has fired. The DSCH light in the
'AUTO/MAN' DSCH switch will illuminate after
approximately 45 minutes, indicating BTL 2 has
emptied.

4 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. [AFM]**



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 ▼

▼ 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.



ENG

ENG FIRE DET FAULT

Messages: L ENG FIRE DET FAULT R ENG FIRE DET FAULT

Condition: Engine fire and overheat detection is inoperative.

Note: L, R ENG FIRE DET FAULT message displayed indicates loss of fire detection on affected engine.

1 Choose one:

◆ On the **ground**:

Maintenance action required.



◆ In **flight**:

▶▶ **Go to step 2**

2 Land at nearest suitable airport.

3 Monitor affected engine parameters for any abnormal indications.



Fire Detect LOOP Light With No Fire Warning

Messages: FIRE LOOP INOP

Condition: One or more fire detector loop lights are illuminated with no fire warning.

Note: Do not move loop switch on the overhead fire loop light panel.

1 Choose one:

◆ In **flight**:

System is in single loop operation.



◆ On the **ground**:

Maintenance and/or MEL action required before takeoff.



LAVATORY SMOKE

Condition: Smoke in the lavatory.

1 Contact cabin crew and verify status.



**SMK DET LOOP Light
(9218-9265)**

Condition: A fault is detected in the cargo detection system.

1 LAMP TEST Press and hold

Depress the ANNUN/DIGITAL LTS TEST switch on the Overhead Panel. Observe the following:

All CDSCP lights and LED's are ON.

2 CDSCP TEST SWITCH Press and hold

Depress the TEST switch until AURAL Warning sounds and the test sequence is complete, then release.

3 Choose one:

◆ **On the ground:**

Contact Maintenance if one DET "A" or one DET "B" LED remains on or if TEST is abnormal.



◆ **In flight:**

▶▶ **Go to step 4**

▼ **Continued on next page** ▼

▼ **SMK DET LOOP Light (9218-9265) continued** ▼

4 Choose one:

◆ **At Least One Loop In Each Cargo Compartment Is Operative:**

CDSCP. Observe

Depress the TEST switch until AURAL Warning sounds and the test sequence is complete, then release.

If One FAIL 'A' or 'B' LED is ON:

The system has automatically switched to single loop mode.

If One DET 'A' or 'B' LED is ON:

The system has malfunctioned.

Continue flight and write up in logbook.



◆ **Both Loops In a Cargo Compartment Are Inoperative:**

Fire detection for associated compartment is inoperative.

Land at nearest suitable airport.

If Discharge of a Halon Bottle Into Compartment Is Desired:

ARM Switch. . . . Rotate to affected cargo compartment

Complete CARGO FIRE Procedure



Smoke or Fumes Removal

Condition: Smoke or fumes removal is needed.

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

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

5 Choose one:

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



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

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

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 ▼

▼ 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**



Tailpipe Fire or Torching

Condition: An engine tailpipe fire occurs on the ground with no engine fire warning.

1 FUEL switch Confirm OFF

2 Choose one:

◆ **Starter disengaged:**

Allow N2 to decrease to 20% or less then,
ENG START switch Pull

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

▶▶ Go to step 3

◆ **Starter engaged:**

▶▶ Go to step 3

▼ Continued on next page ▼

▼Tailpipe Fire or Torching continued▼

- 3 **After** fire is extinguished,
ENG START switchPush
Call maintenance.



Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Flight Controls

Section 9

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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 ▼

▼ 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 ▼

▼ 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.



CONT**10 DEG RUD RESTRICT**

Messages: 10 DEG RUD RESTRICT

Condition: Indicates 10 degree limiter is engaged at low
airspeed.

1 Choose one:

◆ On the **ground**:

Maintenance action required.

◆ In **flight**:▶▶ **Go to step 2**

2 Observe crosswind restriction of 24 knots.

Note: During an engine-out missed approach, as much as 7° of bank in the direction of the operating engine may be required to maintain a constant heading.3 Do **not** execute an autoland.▼ **Continued on next page** ▼

▼ 10 DEG RUD RESTRICT continued ▼

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. If unrestricted rudder is still not attained, perform the appropriate abnormal procedure in this section.



ACS FAULT

Condition: Indicates a fault in the Flight Control Auxiliary Control System.

- 1 Maintenance action required before takeoff.



Aileron Controls Jammed or Restricted

Condition: The aileron controls have become 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 Autothrottles 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.

▼ Continued on next page ▼

▼ Aileron Controls Jammed or Restricted continued ▼

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



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**

3 RUD HYD CONT Lever MAN

Observe RUD CONTROL MAN message stays displayed.

▼ Continued on next page ▼

▼ Airplane Oscillations or Yaw Displacement continued ▼

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



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 displayed 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]



▼ Continued on next page ▼

▼ **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.



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 Check/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** ▼

▼ AUTO SPOILER FAIL or Auto Spoilers - Unable To Arm 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 ▼

▼ **AUTO SPOILER FAIL or Auto Spoilers - Unable To Arm continued** ▼

Landing Considerations

Spoilers must be extended manually for landing. Add 550 feet to landing distance on dry runway (650 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.



CONT

ELEV CONTROLS MANUAL

Messages: ELEV CONTROLS MANUAL

Condition: Indicates no hydraulic power to the elevator.

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:

◆ **On the ground:**

If HYD CONT ELEV switch light is extinguished and left or right hydraulic pressure is normal, maintenance action is required.



◆ **In flight:**

Note: Autopilot will not be available.

Anticipate reduced pitch response and increased column forces.



CONT**ELEV LD FEEL INOP**

Messages: ELEV LD FEEL INOP

Condition: Indicates failure of both channels of the auxiliary control unit.

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:

◆ On the **ground**:

Maintenance action required.

◆ In **flight**:**Note:** Autopilot will not be available.▶▶ **Go to step 2**

2 Choose one:

◆ Airspeed **is** above 250 KIAS:

Expect heavier than normal control column forces during landing.

◆ Airspeed is **not** above 250 KIAS:▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ELEV LD FEEL INOP continued▼

3 Do not exceed 250 KIAS.

**Caution! Airplane structural damage may occur
with large control inputs above 250
KIAS.**

4 Anticipate near-normal control forces.



CONT

ELEVATOR SPLIT

Messages: ELEVATOR SPLIT

Condition: Indicates left and right elevator position differs.

1 Choose one:

◆ On the **ground**:

Maintenance action required.

◆ In **flight**:

Caution! Avoid abrupt elevator inputs. Stabilizer trim may be used to relieve column forces.

If ELEVATOR SPLIT message is displayed during rotation or shortly after takeoff, do not exceed 225 KIAS. [AFM]

If ELEVATOR SPLIT message is displayed above 225 KIAS, do not exceed 270 KIAS. [AFM]

Land at nearest suitable airport.

Note: Autoland will not be available.



Elevator Controls Jammed or Restricted

Condition: The elevator controls have become jammed or restricted.

Warning! Do not attempt troubleshooting to free jammed flight controls beyond the scope of this checklist, 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 separating the captain's and first officer's control column axis.

Note: Perform the following steps 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

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

▼ Continued on next page ▼

▼ Elevator Controls Jammed or Restricted continued ▼

- 4 Autothrottles DISCONNECT
- 5 Control Columns. DISCONNECT

Additional Information

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

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

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



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 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.



**NO BKUP RUD LIM
or
PRIMRY RUD LIM FAULT**

Condition:

- PRIMRY RUD LIM FAULT indicates the primary rudder limiter is not in proper position.
- NO BKUP RUD LIM indicates failure of backup system only.

- 1 Use light rudder inputs.

Note: PRIMRY RUD LIM FAULT message may result from speed changes after maximum rudder is applied due to asymmetric thrust. Momentarily centering rudder pedals and rudder trim may allow rudder travel limiter to return to speed schedule and blank message.

▼ Continued on next page ▼

▼ NO BKUP LIM or PRIMARY RUD LIM FAULT continued ▼

2 Choose one:

◆ NO BKUP RUD LIM message **displayed**:

Warning! Do not exceed 210 KIAS.
Airplane structural damage
may occur with large rudder
inputs above 210 KIAS.

Airspeed. 210 KIAS MAXIMUM

▶▶ **Go to step 3**

◆ NO BKUP RUD LIM message **blank**:

Use light rudder forces above 190 KIAS.

▶▶ **Go to step 3**

3 Prior to approach, when below 190 KIAS, apply rudder inputs.

Note: Application of rudder inputs may allow rudder to return to speed schedule and blank PRIMRY RUD LIM FAULT message.

▼ Continued on next page ▼

▼ NO BKUP LIM or PRIMARY RUD LIM FAULT continued ▼

4 Choose one:

- ◆ Rudder feels restricted and/or PRIMRY RUD LIM FAULT message **stays displayed**:

Approach Speed Determine

Maintain normal approach speed, but not less than 135 KIAS until landing is assured.

Observe crosswind limitation of 12 knots.

Note: During engine-out missed approach, approximately 9° of bank in the direction of the operating engine may be required to maintain a constant heading at V2 or 135 KIAS, whichever is higher.



- ◆ Rudder feels unrestricted and/or PRIMRY RUD LIM FAULT message **blanks**:

No further crew action required.



CONT

MACH TRIM FAULT

Messages: MACH TRIM FAULT

Condition: DFGC detects Mach trim is inoperative with MACH TRIM COMP switch in NORM.

1 Autopilot ON

2 Choose one:

◆ MACH TRIM FAULT message **blanks**:

No further crew action required.



◆ MACH TRIM FAULT message **stays displayed**:

▶▶ **Go to step 3**

3 DFGC switch Select other position

4 Autopilot ON

5 Choose one:

◆ MACH TRIM FAULT message **blanks**:

No further crew action required.



◆ MACH TRIM FAULT message **stays displayed**:

▶▶ **Go to step 6**

6 MACH TRIM COMP switch OFF

7 Do not exceed 0.80M. [AFM]



**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 ▼

**▼ 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 ▼

**▼ 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
- Autospoilers As required
- 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 ▼

**▼ 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.



CONT**PYLON FLAP FAULT**

Messages: PYLON FLAP FAULT

Condition: Indicates one or both pylon flaps are not in commanded position.

1 Choose one:

◆ On the **ground**:

Pressurize left hydraulic system.

If message remains displayed:

Maintenance action is required.

◆ In **flight**:

Monitor fuel consumption.



HYD

RUD CONTROL MANUAL

Messages: RUD CONTROL MANUAL

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.



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 AirspeedMax 240 KIAS/.57 M [AFM]
 - 2 Autothrottles OFF
-

Caution! Do not use autothrottles or speed command system as speed schedules may not be valid.

▼ Continued on next page ▼

▼ **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 9.26**

or

▶▶ **Go to the Flap Abnormal Configuration checklist on page 9.21**

If return to departure station is not desired, consider fuel requirements.



◆ Flap asymmetry does **not** exist:

▶▶ **Go to step 4**

▼ **Continued on next page** ▼

▼ **SLAT DISAG Light Illuminated continued** ▼

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**

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.



CONT

SNGL ELEV FEEL FAULT

Messages: SNGL ELEV FEEL FAULT

Condition: Indicates the failure of a single channel of the auxiliary control unit.

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:

◆ **On the ground:**

Maintenance action required.



◆ **In flight:**

Note: Autopilot may not engage.

Control column forces will be lighter than normal at high speed, and heavier than normal at low speed. Autopilot should be monitored for performance and disconnected as required.



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 Handle28/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 ▼

▼ 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



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 ▼

▼ Spoiler Stuck In Extended Position continued ▼

2 Choose one:

◆ Spoiler panel remains extended or time is **limited**:

Trim airplane as required.

Note: Full aileron trim and up to 70° of control wheel input may be required to counteract stuck spoiler panel.

Use rudder trim as required.

Use FLAPS 28 for landing and add 10 knots to Vref. Spoilers may be armed for landing.

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 ▼

▼ **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** ▼

▼ 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: Full aileron trim and up to 70° of control wheel input may be required to counteract stuck spoiler panel.

Use rudder trim as required.

Use FLAPS 28 for landing and add 10 knots to Vref. Spoilers may be armed for landing.

Do **not** execute an autoland.



◆ Spoiler panel **retracts**:

▶▶ **Go to step 5**

5 Affected Hydraulic System Depressurized

▼ Continued on next page ▼

▼ 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.

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

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
- 8 Choose one:

◆ **Right** hydraulic system affected:

Note: Maintain a minimum of 135 KIAS until landing is assured.

►► **Go to step 9**

◆ **Left** hydraulic system affected:

Note: Nosewheel steering to right will be restricted.

After landing rollout, repressurize hydraulic system.



▼ Continued on next page ▼

▼ Spoiler Stuck In Extended Position continued ▼

9 Gear Handle DOWN

10 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.

11 Gear Lights 3 Green

Note: GEAR DOOR OPEN light will remain illuminated.

Nosewheel steering to left will be restricted.

12 **After** landing rollout, repressurize hydraulic system.

13 Stop the airplane on the runway.

14 Close and latch the main gear doors manually.

15 Install landing gear pins prior to taxi in or tow.



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 550 feet to landing distance on dry runway (650 feet on wet runway).



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 (EPC GEN Bus Panel) and AUTOPILOT & ALTERNATE LONGITUDINAL TRIM CBs D9, D10, D11 (Upper EPC) (If Tripped) Reset
- 3 Autopilot OFF

▼ Continued on next page ▼

▼ 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

6 Choose one:

◆ **Flaps 28 or 40**, aircraft on speed and **trimmed**:

Land with selected flaps.



◆ **Flaps less than 28**, aircraft **not** trimmed:

▶▶ Go to step 7

▼ Continued on next page ▼

▼ Stabilizer Inoperative In Flight continued ▼

7 Landing flaps 15/EXT

8 Compute landing threshold speeds.
VREF is flaps 15 speedbook minimum maneuver speed, plus add knot value from takeoff C.G. from chart below.
Interpolate as necessary.

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-90 Takeoff C.G.				
	0	5	10	15	20
-2	39	33	27	20	12
0	29	22	16	10	3
2	20	13	7	1	0

9 Overhead Panel
GND PROX WARN switch OVRD

10 Autothrottle Disconnect before 50 feet AGL

Note: Autothrottle will not retard if flaps are set less than landing range.

11 Autobrakes must **not** be armed as they will not actuate.

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



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 ▼

▼ **STALL IND FAILURE continued** ▼

1 Choose one:

◆ **STALL IND FAILURE** message displayed **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 displayed **without** stall warnings or recognition signal:

▶▶ **Go to step 2**

▼ **Continued on next page** ▼

▼ **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.



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 0°/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 ▼

▼ 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).



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

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 ▼

▼ 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 and 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 ▼

▼ **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** ▼

▼ **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** ▼

▼ Airspeed Unreliable continued ▼

Additional Information

One of 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

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
- 2 Choose one:
 - ◆OFF flags **disappear**:


 - ◆OFF flags **remain in view**:

▶▶Go to step 3

▼ Continued on next page ▼

▼ CADC Failure continued ▼

3 Choose one:

◆ CADC 1 is inoperative:

CADC Selector. Both on 2



◆ CADC 2 is inoperative:

CADC Selector. Both on 1



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 abnormalities. 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 ▼

▼ 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 (B4*)

F/O (F3)



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/AIRSPPEED	A5 *	B3
TA/VSI (TCAS)	A7 *	J16
TAS/SAT	B6	B6
PFD	B6 *	F11
ND	B5 *	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



Suspected Electronic Interference

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

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

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

4 Choose one:

◆ Interference does **not continue**:

Continue normal EFB operation.

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



◆ Interference **continues**:

EFBs (all) Off

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ Suspected Electronic Interference continued ▼

5 Choose one:

◆ Interference does **not continue**:

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

▶▶ Go to step 6

◆ Interference **continues**:

EFBs (all) On
Resume normal flight using EFBs.

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



6 Choose one:

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

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



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

All EFBs Off

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



Non-Normal Checklists
Flight Management, Navigation

Chapter NNC
Section 11

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FMC Failure

Condition: The following will be observed when the FMC has failed:

- NAV FAIL is displayed on the Captain's PFD and the First Officer's PFD
- 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 ND will display TRK FAIL, MAP FAIL, and VNAV FAIL.

- 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 1, 2L Position Prompt.
- 5 Notify ATC of loss of navigational capabilities as appropriate.



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**

◆ FMS is regained:

▶▶ **Go to step 5**

3 Choose one:

◆ FMS is **not** regained:

FMS Computer CB (D21). . . Pull and reset

▶▶ **Go to step 4**

◆ FMS **is** regained:

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ FMS Locked/Timeout continued ▼

4 Choose one:

◆ FMS is **not** regained:

The FMS is inop for the remainder of the flight.

EGPWS Terrain feature is unavailable.



◆ 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.



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 PanelARC 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 ▼

▼ 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 11.10**



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.

Note: IRS 1 BAT FAIL light may illuminate if aircraft BATTERY switch is OFF.

1 If affected IRS BATTERY CBs are tripped:
1 (B19*) and 2 (E14) 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.



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 switchlight OVRD

Pilot must verify aircraft position using other navigation systems if available.



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.



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.



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 IRUSelect

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.



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 ▼

▼ 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 ▼

▼ 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: If magnetic heading is not entered by the flight crew, heading data will not be displayed on the EFIS Navigation Display (ND). The field will remain blank until manual heading entry is made.

A valid IRU heading consists of three numeric characters with a value between 000 and 360 inclusive; however, 360 is displayed as 000.

- 10 Center Instrument Panel
GPWS TERRAIN switchlight OVRD

- 11 Update heading periodically.

▼ Continued on next page ▼

▼ 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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Non-Normal Checklists

Chapter NNC

Fuel

Section 12

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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.

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

- 1 Fuel Pump switches (All) ON
- 2 FUEL X FEED Lever ON
- 3 IGNITION switch ON

Note: A go-around is **not** recommended with less than 550 lb in each main tank or if both main tank aft pumps are inoperative.



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 3000 pounds or fails to feed when either main tank reaches 3800 pounds and CTR TANK PUMP switches are in AUTO.

1 CTR TANK PUMP switchesON

Caution! Do no reset any tripped fuel pump circuit breakers.

2 Choose one:

- ◆CENTER FUEL PRESS LO message **blanks** and center tank fuel feed **normal**:
Continue normal fuel management.
■ ■ ■ ■
- ◆CENTER FUEL PRESS LO message **stays displayed** and center tank fuel feed **abnormal**:
▶▶Go to step 3

3 Main TANK PUMP switches
(In One Tank) OFF

▼ Continued on next page ▼

**▼ CENTER FUEL PRESS LO or Center Tank Fails To Feed In Flight
continued ▼**

4 Choose one:

◆ L, R INLET FUEL PRESS LO message **is shown**: |

Main TANK PUMP switches ON

Note: Center tank pumps will be
inoperative.

Plan remainder of flight using main tank
fuel only.



◆ L, R INLET FUEL PRESS LO message **blanks**:

▶▶ **Go to step 5**

5 Main TANK PUMP switches
(In other Tank) OFF

6 **When** CTR FUEL QTY indicates 500 pounds:
Main TANK PUMP switches 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.



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.

1 Choose one:

◆ On the **ground**:

Maintenance action required.

◆ In **flight**:

Caution! If both L, R FUEL FIL PRES DROP messages are displayed, consider possibility of fuel contamination and land at nearest suitable airport.

Monitor engine operation.



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
(X36, C16*) (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 ▼

▼ **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 12.7**



◆ Fuel consumption is normal:

Continue engine operation.



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 Main TANK PUMP switches (All) ON
- 2 CTR TANK PUMP switches Verify OFF
- 3 FUEL X FEED lever OFF

▼ Continued on next page ▼

▼ **Fuel Leak continued** ▼

4 Choose one:

◆ Either main tank quantity decreasing at **abnormal** rate:

- Throttle (Affected Engine)
(Tank Decreasing at
Abnormal Rate) . . . Confirm Idle
- FUEL Switch
(Affected Engine). Confirm OFF
- ENG FIRE Handle
(Affected Engine). Confirm PULL
(Do **not** rotate)
- FUEL X FEED Lever As required
- Main TANK PUMP switches
(Affected Engine). As required
- CTR TANK PUMP switches
(If Applicable) ON
- Land at nearest suitable airport.

▶▶ **Go to the Engine Failure or
Shutdown checklist on page 7.3**

■ ■ ■ ■

◆ Either main tank quantity decreasing at **normal** rate:

▶▶ **Go to step 5**

▼ **Continued on next page** ▼

▼ **Fuel Leak continued** ▼

5 Choose one:

◆ **Center tank quantity is decreasing:**

Center fuel tank leak is indicated.

CTR TANK PUMP switches
(If Applicable) ON

Land at nearest suitable airport.



◆ **Unable** to determine fuel leak location:

▶▶ **Go to step 6**

6 CTR TANK PUMP switches
(If Applicable) ON

7 Continue to closely monitor fuel quantity
indications for possible verification of leak location.

8 Land at nearest suitable airport.



▼ **Continued on next page** ▼

▼ Fuel Leak continued ▼**Additional Information**

A fuel leak may be confirmed 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 within a 30-minute time frame of the last fuel check
- Fuel used plus fuel onboard does **not** equal dispatch fuel within 500 pounds

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 displayed 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 ▼

▼ **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:
FUEL LEVEL LO CB S41
(lower EPC) Pull/Reset
▶▶ **Go to step 3**

▼ **Continued on next page** ▼

▼ **FUEL LEVEL LOW continued** ▼

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.**



4 CTR TANK PUMP switches ON

5 Verify fuel feed from center tank is normal.

If fuel feed is abnormal:

▶▶ **Go to the Center Tank Fails To
Feed In Flight 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).



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: If tank pumps in a main tank are inoperative, suction feed capability will be 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 ▼

▼ 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 12.7



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 indicatorCheck
- 2 Choose one:

◆ **Nines** are displayed:

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

■ ■ ■ ■

◆ Indications are **erroneous**:

Quantities/Totalizer Disregard

Fuel remaining should be calculated
by using fuel consumed indications.

Do **not** use the AFB system.

■ ■ ■ ■



Non-Normal Checklists
Hydraulics

Chapter NNC
Section 13

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Intentionally
Blank

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 ▼

▼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 displayed:

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 ▼

▼ **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** ▼

▼ **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** ▼

▼ **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** ▼

▼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 ▼

▼ **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** ▼

▼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



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 displayed:
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 ▼

▼ **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 in 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** ▼

▼ **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** ▼

▼ **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

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 ▼**

▼ **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 switchON

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

▼ **Continued on next page** ▼

**▼ 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 ▼

**▼ 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 ▼

**▼ 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 ▼

**▼ 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**

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
- Pylon flaps

▼ Continued on next page ▼

▼ 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 PUMPS	ON	PM
TRANS HYD PUMPS	OFF	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 ▼

▼ 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

▼ Continued on next page ▼

▼ 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.



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 ▼

▼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 PUMPS	OFF	PM
TRANS HYD PUMPS	OFF	PM

▼ Continued on next page ▼

▼ 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.

▼ Continued on next page ▼

▼ **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.

▼ **Continued on next page** ▼

▼Hydraulic System Failure (Right System) continued▼

EMERG GEAR EXT 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.



**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), pylon flaps, 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

▼ Continued on next page ▼

▼ 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 PUMPS	OFF	PM
TRANS HYD PUMPS	OFF	PM

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°.

▼ Continued on next page ▼

▼ Landing with No Hydraulic Pressure or Loss of Both Hydraulic Systems continued ▼

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:

- Overhead Panel
- 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.

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

▼ Continued on next page ▼

▼ Landing with No Hydraulic Pressure or Loss of Both Hydraulic Systems continued ▼

AutothrottlesAs desired

Autothrottles must be disconnected to allow aircraft to slow to final approach speed unless flaps/slats are at least 28/EXT.

IASEstablish

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.

Anticipate slower than normal pitch rate for landing.

BrakingMaximum 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.

▼ Continued on next page ▼

▼ 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 ▼

▼ 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.



Intentionally
Blank

Non-Normal Checklists**Chapter NNC****Landing Gear****Section 14****Table of Contents**

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Intentionally
Blank

Air / Ground Sensor Failure

Condition: When ground shift mechanism does not shift to flight mode, some systems will not be in normal mode.

Note: -Autopilot cannot be engaged while flight guidance is in takeoff mode.

-Takeoff warning will sound when flaps or slats are retracted.

-Cabin will fail to pressurize.

- 1 GROUND CONTROL RELAYS CBs K-33 and L-33 (Upper EPC). PULL
- 2 During approach and just prior to final fix, CABIN ALT Control Lever/Wheel . . .MANUAL/VALVE OPEN
- 3 Do not arm auto spoilers.
- 4 Upon touchdown, manually deploy ground spoilers.
- 5 During taxi, reset GROUND CONTROL RELAY CBs K-33 and L-33. If air foil anti-ice was used, move PNEU X-FEED valve levers to CLOSE.

Caution! Do not use APU air if "AIRFL ICE PRES ABNML" message is displayed after landing.



ANTI-SKID FAULT

Condition: Fault detected which could result in a reduction in or a loss of system redundancy.

- 1 Maintenance action required before takeoff.



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



Brake Overheat

Condition: The brake overheat light is illuminated.

Note: OVHT light will illuminate when any one brake temperature exceeds 540°C and will extinguish when brakes cool to 425°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.



**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, forcibly 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.



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, forcibly 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 ▼

▼ 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.



**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 Do **not** retract gear.

Caution! 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 ▼

▼ 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 ▼

▼Landing Gear Handle - Unable to Raise After Takeoff continued▼

Additional Deferred Items

CABIN ALT Control Lever/Wheel
MANUAL/
Valve Open

Note: With SPD BRK lever disarmed, ground spoilers must be extended manually during landing. Add 550 feet to landing distance on dry runway (650 feet on wet runway).

Landing Checklist

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

Additional Deferred Items

After touchdown,

Ground Spoilers
Manually extend

During taxi,

GROUND CONTROL RELAY
CBs (K33, L33)
Reset

■ ■ ■ ■

**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. For periscope operation, refer to Additional Information at the end of this checklist. Nose gear is down and locked when the pedestal indicator pin 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**

2 Choose one:

- ◆ Lamp test **is** normal:
 - ▶▶ **Go to step 4**
- ◆ Lamp test is **not** normal:
 - Bulbs Replace
 - ▶▶▶ **Go to step 3**

▼ **Continued on next page** ▼

▼ **Landing Gear Unsafe – Gear Handle Down continued** ▼

3 Choose one:

◆ Landing gear indications **normal**:

Make Logbook Entry.



◆ Landing gear indications **not normal**:

▶▶ **Go to step 4**

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 14.22**



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** ▼

▼ 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.

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 ▼

▼ 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 ▼

▼ Landing Gear Unsafe – Gear Handle Down continued ▼

►► **Go to the Landing With Abnormal Landing Gear Configuration checklist on page 14.22**



Additional Information

Main Landing Gear Periscope Operation

AircraftDepressurize

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 marksAlign 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 ▼

▼ **Landing Gear Unsafe – Gear Handle Down continued** ▼

Landing gear downlock indicatorView

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.

Landing Gear Unsafe - 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 Hydraulic Pumps (All) ON
4 Gear Handle DOWN

▼ Continued on next page ▼

▼ Landing Gear Unsafe - 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 14.10**

◆ GEAR DOOR OPEN light **illuminated**:

▶▶ **Go to the GEAR DOOR OPEN Light (LEFT, NOSE, RIGHT Gear Lights Green) - In Flight checklist on page 14.4**

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 ▼

▼ **Landing Gear Unsafe - Gear Handle Up continued** ▼

7 Gear Handle. Up

8 Choose one:

- ◆ All gear lights and GEAR DOOR OPEN light **extinguished**:
AUX and TRANS HYD
PUMPS switches. As required


- ◆ 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**

12 GROUND CONTROL RELAY
CBs K33, L33 (Upper EPC) Pull

▼ **Continued on next page** ▼

▼ Landing Gear Unsafe - Gear Handle Up continued ▼

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 ▼

▼ Landing Gear Unsafe - 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/Wheel MANUAL/
Valve Open
- SPD BRK Lever Verify disarmed

Note: With SPD BRK lever disarmed, ground spoilers must be extended manually during landing. Add 550 feet to landing distance on a dry runway (650 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

▼ Continued on next page ▼

▼ Landing Gear Unsafe - Gear Handle Up continued ▼

Additional Deferred Item

After touchdown,

Ground Spoilers Manually extend

During taxi,

GROUND CONTROL RELAY

CBs (K33, L33) Reset



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 ▼

▼ 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

▼ Continued on next page ▼

▼ 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 ▼

▼ 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.

While elevator control is still effective, lower nosewheel gently to runway.

Upon nose contact, use maximum braking (within limits of directional control) to stop airplane.

After stopping, do the Evacuation checklist, if needed.

▼ Continued on next page ▼

▼ Landing With Abnormal Landing Gear Configuration continued ▼**▶▶ 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 ▼**

▼ **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** ▼

▼Landing With Abnormal Landing Gear Configuration continued▼

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



HYD

**INBD ANTI-SKID
or
OUTBD ANTI-SKID**

Messages: L OUTBD ANTI-SKID L INBD ANTI-SKID

Messages: R OUTBD ANTI-SKID R INBD ANTI-SKID

Condition: Malfunction of anti-skid protection for specific wheel.

- 1 ANTI-SKID switch. OFF, then ARM
- 2 ANTI-SKID CBs (P40, T38),
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 ▼

▼ **OUTBD ANTI-SKID or INBD 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** ▼

▼OUTBD ANTI-SKID or INBD 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

▼OUTBD ANTI-SKID or INBD 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 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



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.



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 advise 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 14.3**

Contact flight dispatch.



▼ Continued on next page ▼

▼ 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 the Landing Considerations:
checklist on page 14.36**

▼ Continued on next page ▼

▼ 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 operation 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 ▼

▼ 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 shown, aural warnings will be either unreliable or inoperative.



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.



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.



MISC

OAP / BUS FAULT

Messages: OAP/BUS FAULT

Condition: Indicates a fault preventing dual channel inputs to the EOAP.

Maintenance action required before takeoff.

■ ■ ■ ■

**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]



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 shown**:

▶▶ **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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ILS Approach Equipment Requirements (Not for Dispatch)	NNOI.1.1
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Non-Normal Ops Info Ops Info

Chapter NNOI Section 1

ILS Approach Equipment Requirements (Not for Dispatch)

If operable, both the autopilot and flight director will be utilized for all ILS approaches when the reported weather is below 4,000 RVR or 3/4 mile.

Equipment Required 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.

RNAV Approach Equipment Requirements (Not for Dispatch)

To Be Developed

RNAV Enroute Equipment Requirements (Not for Dispatch)

To Be Developed

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Non-Normal Checklist Instructions	Chapter NNCI
Non-Normal Checklists	Section 1

Introduction

The non-normal checklists chapter contains checklists used by the flight crew to manage non-normal situations. The checklists are grouped in sections which match the system description chapters in Volume 2.

Most checklists correspond to a light, alert or other indication. In most cases, the MASTER CAUTION and system annunciator lights also illuminate to indicate the non-normal condition. These lights, alerts and other indications are the cues to select and do the associated checklist.

Checklists without a light, alert or other indication are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, 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.

Some checklists have additional information at the end of the checklist. The additional information provides data the crew may wish to consider. The additional information does not need to be read.

Checklists that need a quick response are listed in the Quick Action Index. In each system section, Quick Action Index checklists are listed first, followed by checklist that are not in the Quick Action Index. The titles of Quick Action Index checklists are printed in **bold** type. Checklist titles in upper case (such as AIRFLICE PRES ABNML) are annunciated by a message, light, alert, or other indication. Checklist titles in upper and lower case (such as Windshield Arcing) are not annunciated. Some checklist titles are shown in a larger font (such as Evacuation) to make them easier to read under conditions where crewmembers may be wearing an oxygen mask or under conditions of reduced visibility.

Non-Normal Checklist Operation

General

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. When special items are needed to configure the airplane for landing, the items are included in the Deferred Items section of the checklist. Flight patterns for some non-normal situations are located in the Flight Crew Training Manual (FCTM) and show the sequence of configuration changes.

If a checklist or a step in a checklist is not applicable to all airplanes, airplane effectivity information is included in the checklist. Airplane effectivity can be listed by ship number or airplane model. If a checklist is applicable to some but not all airplanes, airplane effectivity is centered below the checklist title. If a step in a checklist is applicable to some but not all airplanes, airplane effectivity is included above the step. If a checklist or a step in a checklist is applicable to all airplanes, airplane effectivity information is not included.

After engine start and before takeoff, illumination of a red warning light, an amber caution light, an alert or other indication requires completion of the associated checklist.

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. In some smoke, fire or fumes situations, the flight crew may need to move between the Smoke, Fire or Fumes checklist and the Smoke or Fumes Removal checklist. In some multiple failure situations, the flight crew may need to combine the elements of more than one checklist. In all situations, the captain must assess the situation and use good judgment to determine the safest course of action.

Landing at the Nearest Suitable Airport

There are some situations where the flight crew must land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- the non-normal checklist includes the item “Plan to land at the nearest suitable airport.”
- fire or smoke continues
- only one AC power source remains (engine or APU generator)
- any other situation determined by the flight crew to have a significant adverse effect on safety if the flight is continued.

Land Immediately

It must be stressed that for smoke that continues or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes situation becomes uncontrollable, the flight crew should consider an immediate landing. Immediate landing implies immediate diversion to a runway. However, in a severe situation, the flight crew should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

Checklists Directing Engine Shutdown

Checklists directing an engine shutdown must be evaluated by the captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

There are no non-normal checklists for the loss of an engine indication or automatic display of the secondary engine indications. Continue normal engine operation unless a limit is exceeded.

Non-Normal Checklist Assumptions

Non-normal checklists assume:

- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, consult the Minimum Equipment List (MEL) to determine if dispatch relief is available.
- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- If the MASTER CAUTION and system annunciator lights illuminate, all related amber lights are reviewed to assist in recognizing the cause(s) of the alert.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. Normal boom microphone operation is restored when oxygen is no longer in use.
- Indicator lights are tested to verify suspected faults.

Circuit Breaker Reset

WARNING: Do not reset any tripped fuel pump or hydraulic auxiliary pump circuit breakers.

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 desirable for the conduct of the flight and one of the following conditions exists:

- the circuit breaker had not previously tripped, and there is no specific non-normal procedure in the checklist prohibiting reset, or
- maintenance has determined cycling the CB is safe.

If a circuit breaker is cycled during flight, notify maintenance. A logbook entry shall be made to document the occurrence.

Non-Normal Checklist Use

General

Non-normal checklist use starts when the airplane flight path and configuration are correctly established. Usually, time is available to assess the situation before corrective action is started. All actions must then be coordinated under the captain's supervision and done in a deliberate, systematic manner. Flight path control must never be compromised. As a general rule, use the following as guidelines:

- Fly the aircraft
- Cancel the warning
- Identify the emergency or non-normal
- Accomplish recall items from memory (if applicable)
- Read the checklist
- Do not hurry

Calling for the Checklist

When a non-normal situation occurs, at the direction of the Captain both crewmembers systematically and without delay accomplish all memory items in their areas of responsibility.

The Captain may also direct reference checklists to be done by memory if no hazard is created by such action, or if the situation does not allow reference to the checklist.

The pilot flying calls for the checklist when:

- the flight path is under control
- the airplane is not in a critical phase of flight (such as takeoff or landing)
- all memory items are complete

Reading the Checklist

The pilot monitoring reads aloud:

- the checklist title
- as much of the condition statement as needed to verify that the correct checklist has been selected
- as much of the objective statement (if applicable) as needed to understand the expected result of doing the checklist.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

For checklists with memory items, the pilot monitoring first verifies that each memory item has been done. The checklist is normally read aloud during this verification. The pilot flying does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Non-memory items are called reference items. The pilot monitoring reads aloud the reference items, including:

- the precaution (if any)
- the response or action
- any amplifying information.

The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood. The item numbers do not need to be read.

After moving any control, the crewmember taking the action also states the checklist response.

Checklists include an Inoperative Items table only when the condition of the items is needed for planning the rest of the flight. The inoperative items, including the consequences (if any), are read aloud by the pilot monitoring. The pilot flying does not need to repeat this information but must acknowledge that the information was heard and understood.

Dual Verification of Critical Controls

The word “Confirm” is added to checklist items when both crewmembers must verbally agree before action is taken. During an inflight non-normal situation, verbal confirmation is required prior to the movement of the following critical controls:

- throttle reduction of a failed engine
- FUEL switch
- ENG FIRE handle
- IRS mode selector

After determination that a critical control must be actuated in flight, the following steps must be taken:

- Both pilots must verbally and visually identify the affected control.
- The pilot performing the action will place his hand on the affected control.
- The pilot monitoring the action will verbally and visually confirm the proper control has been selected.
- The pilot performing the action then actuates the affected control.

Deferred Items

When there are deferred items, the non-normal checklist will include the item “**Checklist Complete Except Deferred Items.**” The pilot flying is to be made aware when there are deferred items. These items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach or landing.

The deferred items are read aloud by the pilot monitoring. The crewmember taking the action states the response.

When there are deferred items, the Deferred Items section of the non-normal checklist will include the Descent, Approach and Landing normal checklists. These checklists should be used instead of the usual DESCENT, APPROACH and LANDING normal checklists. If a normal checklist item is changed as a result of the non-normal situation, the changed response is printed in **bold** type.

When there are no deferred items, the DESCENT, APPROACH and LANDING normal checklists are used to verify that the configuration is correct for each phase of flight.

A ■ indicates items that should be considered for re-accomplishment in the event of an approach change or go-around.

Checklist Completion

Each checklist has a checklist complete symbol at the end. The following symbol indicates that the checklist is complete:



The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non-normal checklist, the pilot monitoring states “___ CHECKLIST COMPLETE.”

Additional information at the end of the checklist is not required to be read.

Checklist Limitations

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the captain’s discretion, deviation from a checklist may be needed.

Non-Normal Checklist Legend

Redirection Symbol



The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word “Go to”, to direct the flight crew to a different checklist or to a different step in the current checklist.

Separator Symbol



The separator symbol is used in two ways:

- In certain system section tables of contents, to separate the titles of QAI checklists from non-QAI checklists.
- In a non-normal checklist, to separate the memory items from the reference items.

Task Divider Symbol



The task divider symbol is used to indicate the end of one task and the beginning of another task.

Decision Symbol

Choose one:



The decision symbol is used to identify possible choices.

Precaution Symbol



The precaution symbol is used to identify information the flight crew must consider before taking the action.

Emergency Evacuation Flow/Philosophy

Evacuation flow items listed below are not included within the Passenger Evacuation checklist. They are meant to refresh the logical pattern of procedures that must occur for a successful evacuation. In the unlikely event that the checklist cannot be read due to smoke/fire, darkness, injury or incapacitation, this simple flow or philosophy should lead the pilot to completion of all critical tasks contributing to the safest possible evacuation. The checklist follows the flow pattern of:

STOP
CONFIGURE
SHUTDOWN
EVACUATE



Revision Record

Chapter RR

Revision Record

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Model Identification

Chapter RR

Section ModID

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.

Ship number is supplied by the operator. Registry number is supplied by the national regulatory agency. Serial number is supplied by Boeing.

The procedures and information contained in this manual also apply to aircraft acquired by Delta Air Lines subsequent to the current revision; however, this document may not address all pertinent information for these airplanes. In such instances, specific operating procedures and systems information can be found in appropriate Differences Chapter(s) and/or Fleet Bulletin(s) prior to their incorporation in the next scheduled revision.

Ship Number	Registry Number	Serial Number	Model
9201	N901DA	53381	MD-90-30
9202	N902DA	53382	MD-90-30
9203	N903DA	53383	MD-90-30
9204	N904DA	53384	MD-90-30
9205	N905DA	53385	MD-90-30
9206	N906DA	53386	MD-90-30
9207	N907DA	53387	MD-90-30
9208	N908DA	53388	MD-90-30
9209	N909DA	53389	MD-90-30
9210	N910DN	53390	MD-90-30
9211	N911DA	53391	MD-90-30
9212	N912DN	53392	MD-90-30
9213	N913DN	53393	MD-90-30
9214	N914DN	53394	MD-90-30
9215	N915DN	53395	MD-90-30
9216	N916DN	53396	MD-90-30

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Ship Number	Registry Number	Serial Number	Model
9217	N917DN	53552	MD-90-30
9218	N918DH	53553	MD-90-30
9219	N919DN	53576	MD-90-30
9220	N920DN	53582	MD-90-30
9221	N921DN	53583	MD-90-30
9222	N922DX	53584	MD-90-30
9223	N923DN	53585	MD-90-30
9224	N924DN	53586	MD-90-30
9225	N925DN	53587	MD-90-30
9226	N926DH	53588	MD-90-30
9227	N927DN	53589	MD-90-30
9228	N928DN	53590	MD-90-30
9229	N929DN	53459	MD-90-30
9230	N930DN	53458	MD-90-30
9231	N931DN	53544	MD-90-30
9232	N932DN	53457	MD-90-30
9233	N933DN	53543	MD-90-30
9234	N934DN	53462	MD-90-30
9235	N935DN	53460	MD-90-30
9236	N936DN	53461	MD-90-30
9237	N937DN	53352	MD-90-30
9238	N938DN	53353	MD-90-30
9239	N939DN	53356	MD-90-30
9240	N940DN	53359	MD-90-30
9241	N941DN	53555	MD-90-30
9242	N942DN	53556	MD-90-30
9243	N943DN	53557	MD-90-30

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Model Identification**

Ship Number	Registry Number	Serial Number	Model
9244	N944DN	53558	MD-90-30
9245	N945DN	53559	MD-90-30
9246	N946DN	53354	MD-90-30
9247	N947DN	53355	MD-90-30
9248	N948DN	53357	MD-90-30
9249	N949DN	53358	MD-90-30
9250	N950DN	53360	MD-90-30
9251	N951DN	53361	MD-90-30
9252	N952DN	53560	MD-90-30
9253	N953DN	53523	MD-90-30
9254	N954DN	53524	MD-90-30
9255	N955DN	53525	MD-90-30
9256	N956DN	53526	MD-90-30
9257	N957DN	53527	MD-90-30
9258	N958DN	53528	MD-90-30
9259	N959DN	53529	MD-90-30
9260	N960DN	53530	MD-90-30
9261	N961DN	53531	MD-90-30
9262	N962DN	53532	MD-90-30
9263	N963DN	53533	MD-90-30
9264	N964DN	60001	MD-90-30
9265	N965DN	60002	MD-90-30

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Revision Record

Introduction

Chapter RR

Section Intro

General

The manufacturer has developed normal and non-normal procedures for the MD-90 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

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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.

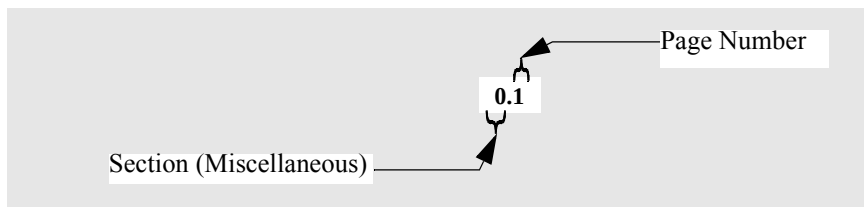
FCTM

- 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.

Page Numbering

This manual uses a decimal page numbering system. The page number is divided into two fields; section and page. An example of a page number follows:

Example Page Number



Warnings, Cautions, and Notes

The following levels of written advisories are used throughout the manual.

Warning - A warning is an instruction about a hazard that if ignored could result in injury, loss of aircraft control, or loss of life. A warning will appear prior to the applicable step or item.

Warning! Do not pressurize any hydraulic or pneumatic system until clearance is obtained from Maintenance.

Caution - A caution is an instruction concerning a hazard that if ignored could result in damage to equipment. A caution will appear prior to the applicable step or item.

Caution! Do not set takeoff thrust until oil temperature is above 50°C.

Note - A note provides amplified information, instruction, or emphasis. A note will appear after the applicable step or item.

Note: The checklist must not be modified in any way.

Aircraft Effectivities

Differences in aircraft configuration are shown by use of aircraft effectivities throughout Volumes 1 and 2, QRH, and the FCTM. The following rules are used to express aircraft effectivities:

- Aircraft effectivities are listed by model and/or ship number. A range of aircraft is defined by a dash, e.g. 9901 - 9910. A comma in the effectivity range indicates a break in the range, e.g. 9901 - 9910, 9912 - 9925; aircraft 9911 is excluded from the range. Aircraft introduced to the fleet following manual publication are effective as subsequent ships, e.g. 9901 & Subsequent.
- Aircraft effectivities are listed in bold text throughout the manual.
- Aircraft effectivities apply only to the paragraph, illustration, operational note, procedural step, etc. and to subordinate items (if any). Refer to the examples below.

Example (with subordinate items):

9951 – 9961
CTR TK PUMP (affected).....OFF
 Do not open the WING X FEED valve.
OUTR TK XFR.....ON

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP.....) and the further indented/subordinate step (Do not...). The effectivity does not apply to the next equivalently indented step (OUTR TK XFR.....).

Example (without subordinate items):

Using ship number:

9951 – 9961
CTR TK PUMP (affected).....ON
OUTR TK XFR.....OFF

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP) only. The effectivity does not apply to the next procedural step (OUTR TK XFR).

When airplane effectivities are centered immediately below a checklist title, the entire checklist applies to the listed airplanes. In the following example, the FUEL L + R CTR PUMPS LO PR checklist is applicable to 9951-9961 only:

FUEL L + R CTR PUMPS LO PR
9951-9961

Revision Record

Abbreviations

Chapter RR

Section Abbrev

General

The following abbreviations may be found throughout the manual. Some abbreviations may also appear in lowercase letters. Abbreviations having very limited use are explained in the chapter where they are used. Since this list is compiled across several fleets, there may be some abbreviations that do not apply to this specific fleet.

A	
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
APL	Airplane
APB	All Pilots Bulletin
APP	Approach
APU	Auxiliary Power Unit
AR	Authorization Required
ARINC	Aeronautical Radio, Incorporated
ARM	Aircraft Restrictions Manual
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)

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BTMS	Brake Temperature Monitoring System
C	
C	Captain or Celsius or Center or Cool
CAA	Civil Aviation Authority
CADC	Central Air Data Computer
CALSEL	Call Select
CANC/RCL	Cancel/Recall
CANPA	Constant Angle Non-Precision Approach
CAP	Capture
CAPT	Captain
CAWS	Central Aural Warning System
CB	Circuit Breaker
CCD	Cursor Control Device
CDS	Common Display System
CDU	Control Display Unit
CFIT	Controlled Flight Into Terrain
CG	Center of Gravity
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

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DEP ARR	Departure Arrival
DEPR	Depressurize
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

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ETP	Equal Time Point
EVAC	Evacuation
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
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

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ISFD	Integrated Standby Flight Display
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)

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MDM	Mechanical Dispatch Manual
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)
O	

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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
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
RVSM	Reduced Vertical Separation Minimum
S	
SAAAR	Special Aircraft and Aircrew Authorization Required

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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
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

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VREF	Reference Speed
VRNP	Vertical Required Navigation Performance
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

Intentionally
Blank

Revision Record

Revision Record

Chapter RR

Section RR

Revision Transmittal Letter

To: All holders of Delta Air Lines, Inc. Operations Manuals.

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	August 1, 2009		4	October 1, 2009	
5	January 1, 2010		6	June 17, 2010	
7	June 22, 2010		8	July 13, 2010	
9	February 17, 2011		10	April 14, 2011	
11	November 10, 2011		12	January 19, 2012	
13	March 15, 2012		14	April 23, 2012	
15	August 30, 2012		16	November 7, 2012	
17	February 14, 2013		18	June 6, 2013	
19	September 26, 2013		20	May 8, 2014	
21	October 23, 2014		22	July 30, 2015	
23	October 7, 2016				

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 - Revised step to "Center Instrument Panel GPWS TERRAIN switchlight.....OVRD" for clarity.

Section 1 - Engines, APU

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."

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."

MID CARGO DOOR

1.14 - 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

2.6 - Revised title "Air Conditioning/Pack - Dual System Failure During or Immediately After Takeoff."

Cabin Differential Pressure Uncontrollable, Off Schedule or Oscillates

2.9 - Reformatted step for clarity.

Air Conditioning/Pack - Single System Failure

2.10 - Revised title "Air Conditioning/Pack - Single System Failure."

Section 3 - Anti-Ice, Rain

ICE PROT TEMP LOW

3.10 - Reformatted step for clarity.

Severe Rain/Ice/Turbulence

3.16 - Revised reference to the Airway Manual.

Windshield Cracked

3.24 - Revised title to "Windshield Cracked" for better indexing.

Section 5 - Communications

ACARS Touchscreen/Printer Inop or Reset

5.4 - Revised listings of circuit breakers which is effective for all MD-90s.

Section 6 - Electrical

ELEC FAULT

6.22 - Removed "ELEC SYS BIT FAIL" NNC, as that message is no longer displayed.

Section 8 - Fire Protection

Engine Severe Damage or Separation

8.3 - Added to step "Continue idle engine operation at captain's discretion."

8.4 - Removed effectivity for 28K.

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.

9.2 - Added note: Use primary trim system to position longitudinal trim indicator to desired position.

9.3 - Revised location of circuit breakers.

ELEV CONTROLS MANUAL

9.15 - Revised reference to the Airway Manual.

ELEV LD FEEL INOP

9.16 - Revised reference to the Airway Manual.

Flap Abnormal Configuration

9.21 - Revised title to "Flap Abnormal Configuration" for improved indexing.

9.21 - Revised step to "Overhead Panel GND PROX WARN switch.....OVRD" to avoid confusion with other GPWS switch.

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

9.26 - Revised step to "Overhead Panel GND PROX WARN switch.....OVRD" to avoid confusion with other GPWS switch.

SNGL ELEV FEEL FAULT

9.35 - Revised reference to the Airway Manual.

Stabilizer Inoperative In Flight

9.45 - Revised reference to the Airway Manual.

9.47 - Added note about control force needed.

9.47 - Revised step "GPWS (overhead panel).....ORVD."

Section 10 - Flight Instruments, Displays

Airspeed Unreliable

10.1 - Changed OFF to DISCONNECT, for consistency.

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

FMC Failure

11.1 - Revised procedure to reflect MD-90 all now have a single FMC.

11.1 - Revised statement, "NAV FAIL is displayed on the Captain's PFD and the First Officer's PFD."

11.1 - Revised statement, "Captain's and First Officer's ND will display TRK FAIL, MAP FAIL, and VNAV FAIL."

11.1 - Revised steps as the MD-90 only has a single FMC

IRS NAV Only

11.7 - Revised step to "Center Instrument Panel GPWS TERRAIN
switchlight.....OVRD" for clarity.

IRU FAULT Light - In flight

11.10-11 - Added "Confirm" to the step to match the Non-Normal Checklist Instructions.

11.12 - Revised step to "Center Instrument Panel GPWS TERRAIN
switchlight.....OVRD" for clarity.

Section 12 - Fuel

Center Tank Fails To Feed In Flight

12.3 - Revised step to read "L, R INLET FUEL PRESS LO message is shown."

12.3 - Reformatted step for clarity.

12.3 - Revised 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.

Section 13 - Hydraulics

Hydraulic System Failure (Left System)

13.20 - Revised and split steps for clarity.

Hydraulic System Failure (Right System)

13.24 - Revised and split steps for clarity.

Loss of Both Hydraulic Systems

13.29 - Revised and split steps for clarity.

13.30 - Revised step to "Overhead Panel GND PROX WARN switch.....OVRD" to avoid confusion with other GPWS switch.

Section 14 - Landing Gear

Landing Gear Handle Jammed in UP Position

14.6 - Added instruction on how to stow the Emergency Gear Extension Lever.

Landing Gear Unsafe – Gear Handle Down

14.12-13 - Added instruction on how to stow the Emergency Gear Extension Lever.

Section 15 - Warning Systems

OAP/BUS FAULT

15.4 - 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.1.4 - 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 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.

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 - Revised for standardization.

Revision Record

List of Effective Pages

Chapter RR

Section LEP

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Evacuation	
* Back Cover.1-2	October 7, 2016

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**Evacuation Checklist is on the
reverse side of this page.**

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 switches 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

