757
Quick Reference Handbook

Quick Action Index

Intentionally
Blank

EICAS Messages — Chapter EICAS

Index — Section Index

A

B

C

E

P

R

U

W

Alphabetical Index

Chapter Alpha
Section Index

A

D

E

M

N

O

P

R

Y

PREFLIGHT

Oxygen. . . . . Tested, 100%

Flight instruments . . . . Heading___, Altimeter___

Parking brake . . . . .Set

Fuel control switches . . . . CUTOFF

BEFORE START

Flight deck door . . . . Closed and locked

Passenger signs . . . . ___

Windows . . . . Locked

MCP . . . . .V2___, HDG___, ALT___

Takeoff speeds . . . . V1___, VR___, V2___

CDU preflight. . . . . Completed

Trim . . . . ___ Units, 0, 0

Taxi and takeoff briefing . . . . Completed

Red anti collision light . . . . .ON

BEFORE TAXI

Anti-ice. . . . . ___

Isolation switch. . . . . .Off

Recall . . . . Checked

Autobrake . . . . .RTO

Flight controls. . . . . Checked

Ground equipment . . . . Clear

BEFORE TAKEOFF

Flaps . . . . ___

AFTER TAKEOFF

Landing gear . . . . UP and OFF

Flaps . . . . UP

DESCENT

Pressurization . . . . .LDG ALT___

Recall . . . . Checked

Autobrake . . . . ___

Landing data . . . . .VREF___, Minimums___

Approach briefing. . . . . Completed

APPROACH

Altimeters . . . . ___

LANDING

Speedbrake . . . . .ARMED

Landing gear . . . . .Down

Flaps . . . . ___

SHUTDOWN

Hydraulic panel . . . . Set
Fuel pumps . . . . Off
Flaps . . . . UP
Parking brake . . . . ___
Fuel control switches . . . . CUTOFF
Weather radar . . . . Off

SECURE

IRSs . . . . OFF
Emergency lights . . . . OFF
Window heat . . . . Off
Packs . . . . OFF

Intentionally
Blank

Non-Normal Checklists Chapter NNC
Miscellaneous Section 0

Table of Contents

Table of Contents

Intentionally
Blank

Ditching Preparation

Condition: Airplane ditching and evacuation are needed.

1 Transmit a distress signal.

2 Advise the cabin to prepare for ditching.

3 Do **not** use the autobrake.

4 Do **not** arm speedbrake lever.

5 Use flaps 30 and VREF 30 for landing.

6 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization. LDG ALT ____

Recall . . . . Checked

Autobrake **. . . . . .OFF**

Landing data **. . . . . VREF 30, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Continued on next page

▼ **Ditching Preparation continued** ▼

When below 5,000 feet

GND PROX GEAR OVRD switch . . . . .OVRD

GND PROX TERR OVRD switch . . . . .OVRD

PACK control selectors (both) . . . . OFF

Cabin altitude MODE SELECT . . . . .MAN

CABIN ALTITUDE
MANUAL control . . . . Hold in DESCEND until outflow valve is fully closed

PASS SIGNS selectors . . . . .ON

Do **not** accomplish the following checklists:

PACK OFF

CABIN AUTOMATIC INOPERATIVE

When on final approach

Advise crew of imminent touchdown.

Passenger cabin . . . . **Secure**

Maintain airspeed at VREF 30 to touchdown. Flare airplane to achieve minimum rate of descent at touchdown.

Landing Checklist

Speedbrake . . . . **DOWN**

Landing gear . . . . **UP**

Flaps **30**

■ ■ ■ ■

Tail Strike

Condition: The tail hits the runway.

Caution! Do not pressurize the airplane due to possible structural damage.

1 Cabin altitude MODE SELECT . . . . MAN

2 CABIN ALTITUDE
MANUAL control . . . . Hold in CLIMB until outflow valve is fully open

3 Level off at the lowest safe altitude.

4 Plan to land at the nearest suitable airport.

5 Do **not** accomplish the following checklist:

CABIN AUTOMATIC INOPERATIVE

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Intentionally
Blank

Table of Contents

Table of Contents

Intentionally
Blank

ACCESS DOORS

ACCESS DOOR(S)

Messages: ACCESS DOORS
E/E ACCESS DOOR   FWD ACCESS DOOR

Condition: One or more access doors are not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration as long as cabin pressurization is normal.

■ ■ ■ ■

◆ Pressurization is **not normal**:

►► **Go to step 2**

2 PASS SIGNS selectors . . . . ON

3 LDG ALT selector . . . . Set 9,500 feet

4 Choose one:

◆ Occurrence is on **takeoff or initial climb**:

Do **not** exceed 10,000 feet.

■ ■ ■ ■

◆ Occurrence is in **climb, cruise, or descent**:

Descend to lowest safe altitude **or** 14,000 feet, whichever is higher.

■ ■ ■ ■

AUTO
UNLK

AUTOMATIC UNLOCK

(SB Adds BC001, BC002 with Automatic Unlock checklist for the Enhanced Security Flight Deck Door.)

Condition:	The correct emergency access code is entered.
Objective:	To deny unauthorized access to the flight deck before the door automatically unlocks.

1 FLT DK DOOR lock selector . . . . . Rotate to DENY and hold for 1 second

■ ■ ■ ■

CARGO DOORS

CARGO DOOR(S)

Messages: CARGO DOORS
FWD CARGO DOOR AFT CARGO DOOR

Condition: One or more cargo doors are not closed and secure.

1 Choose one:

◆Pressurization is **normal**:

The door is in a safe configuration as long as cabin pressurization is normal.

■ ■ ■ ■

◆Pressurization is **not normal**:

▶▶**Go to step 2**

2 PASS SIGNS selectors . . . . ON

3 LDG ALT selector . . . . Set 9,500 feet

4 Choose one:

◆Occurrence is on **takeoff or initial climb**:

Do **not** exceed 10,000 feet.

■ ■ ■ ■

◆Occurrence is in **climb, cruise, or descent**:

Descend to lowest safe altitude **or** 14,000 feet, whichever is higher.

■ ■ ■ ■

EMER DOORS

EMERGENCY DOOR(S)

[Option : Aircraft equipped with emergency doors aft of the wing.]

Messages: EMER DOORS
L EMER DOOR R EMER DOOR

Condition: One or more emergency doors are not closed and secure.

1 Choose one:

◆Pressurization is **normal**:

The door is in a safe configuration as long as cabin pressurization is normal.

■ ■ ■ ■

◆Pressurization is **not normal**:

▶▶**Go to step 2**

2 PASS SIGNS selectors . . . . ON

3 LDG ALT selector . . . . Set 9,500 feet

4 Choose one:

◆Occurrence is on **takeoff or initial climb**:

Do not exceed 10,000 feet.

■ ■ ■ ■

◆Occurrence is in **climb, cruise, or descent**:

Descend to lowest safe altitude or 14,000 feet, whichever is higher.

■ ■ ■ ■

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EMER DOORS

EMERGENCY DOOR(S)

[Option : Aircraft equipped with emergency doors over the wing.]

Messages: EMER DOORS
L AFT EMER DOOR R AFT EMER DOOR
L FWD EMER DOOR R FWD EMER DOOR

Condition: One or more emergency doors are not closed and secure.

1 Choose one:

◆Pressurization is **normal**:

The door is in a safe configuration as long as cabin pressurization is normal.

■ ■ ■ ■

◆Pressurization is **not normal**:

►►**Go to step 2**

2 PASS SIGNS selectors .ON

3 LDG ALT selector . . . . .Set 9,500 feet

▼ **Continued on next page** ▼

▼ **EMERGENCY DOOR(S) continued** ▼

4 Choose one:

◆Occurrence is on **takeoff or initial climb**:

Do not exceed 10,000 feet.

▶▶**Go to step 5**

◆Occurrence is in **climb, cruise, or descent**:

Descend to lowest safe altitude or 14,000 feet, whichever is higher.

▶▶**Go to step 5**

5 **If** a wing slide deployment is suspected:

▶▶**Go to the WING SLIDE checklist on page 1.13**

■ ■ ■ ■

UNARMED

EMERGENCY LIGHTS

Message:	EMER LIGHTS
Condition:	The emergency lights switch is not ARMED.

■ ■ ■ ■

ENTRY DOORS

ENTRY DOOR(S)

Messages:	L ENTRY DOORS	R ENTRY DOORS
	L AFT ENT DOOR	R AFT ENT DOOR
	L CTR ENT DOOR	R CTR ENT DOOR
	L FWD ENT DOOR	R FWD ENT DOOR

Condition: One or more doors are not closed and secure.

1 Choose one:

◆Pressurization is **normal**:

The door is in a safe configuration as long as cabin pressurization is normal.

■ ■ ■ ■

◆Pressurization is **not normal**:

▶▶**Go to step 2**

2 PASS SIGNS selectors . . . . .ON

3 LDG ALT selector . . . . .Set 9,500 feet

4 Choose one:

◆Occurrence is on **takeoff or initial climb**:

Do not exceed 10,000 feet.

■ ■ ■ ■

◆Occurrence is in **climb, cruise, or descent**:

Descend to lowest safe altitude or 14,000 feet, whichever is higher.

■ ■ ■ ■

LOCK FAIL

LOCK FAIL

(SB Adds BC001, BC002 with LOCK FAIL checklist that applies Enhanced Security Flight Deck Door.)

Condition: One or more of these occur:
- The flight deck access system switch is off
- The lock is failed

Objective: To remove power from the lock to prevent a possible overheat.

1 **If** conditions allow:

FLIGHT DECK ACCESS SYSTEM switch . . . . OFF

Note: The door can be locked with the deadbolt.

■ ■ ■ ■

ON

PASSENGER OXYGEN ON

Message: PASS OXYGEN ON

Condition: The passenger oxygen system is on.

■ ■ ■ ■

Window Damage

Condition: A flight deck window has one or more of these:
- An electrical arc
- A delamination
- A crack
- Is shattered

1 Choose one:

◆ Window is **arcing, shattered, or cracked**:

WINDOW HEAT switch
(affected window) . . . . Off

Do **not** accomplish the following checklist:

WINDOW (HEAT)

►► **Go to step 2**

◆ Window is **not** arcing, shattered, or cracked:

►► **Go to step 2**

2 Choose one:

◆ Damaged window is **deformed or** an air leak is **observed**:

►► **Go to step 3**

◆ Damaged window is **not** deformed and an air leak is **not** observed:

■ ■ ■ ■

3 Plan to land at the nearest suitable airport.

▼ Continued on next page ▼

▼ **Window Damage continued** ▼

4 Choose one:

◆Airplane altitude is **above** 10,000 feet:

Descend to lowest safe altitude or 10,000 feet, whichever is higher. This minimizes forces on the window.

▶▶**Go to step 5**

◆Airplane altitude is **at or below** 10,000 feet:

▶▶**Go to step 5**

5 Sustained flight below 10,000 feet is not recommended due to greater risk of bird strike.

■ ■ ■ ■

Window Open

Condition: A side window opens during takeoff or in flight.

1 Maintain the maneuvering speed for existing flap setting until the window is closed.

2 The force needed to close the window increases with airspeed. It may **not** be possible to close the window at speeds above 250 knots.

3 Close and lock the window.

4 Choose one:

◆ Window **locks and** pressurization is **normal**:

Continue normal operation.

■ ■ ■ ■

◆ Window does **not lock or** pressurization is **not normal**:

Level off at the lowest safe altitude.

The airplane can fly unpressurized and land safely with the window open.

■ ■ ■ ■

EMER DOORS

WING SLIDE

Messages: EMER DOORS
L WING SLIDE R WING SLIDE

Condition: One or both wing slide doors are not closed and secure.

1 Choose one:

◆Visual or aural observation does **not confirm** that the overwing ramp slide is deployed and is still attached to the airplane:

■ ■ ■ ■

◆Visual or aural observation **confirms** that the overwing ramp slide is deployed and is still attached to the airplane:

▶▶**Go to step 2**

2 Minor damage to the trailing edge flap, aft fuselage, and empennage may occur.

3 **If** needed to minimize slide oscillations and subsequent airplane damage:

Operate at a reduced airspeed.

▼ **Continued on next page** ▼

▼ WING SLIDE continued ▼

4 Choose one:

◆Flaps 25 or Flaps 30 are **needed** for landing:

Use normal flaps and speeds for landing.

■ ■ ■ ■

◆Flaps 25 or Flaps 30 are **not** needed for landing:

GND PROX FLAP OVRD switch . . . . . .OVRD

Use flaps 20 and VREF 20 for landing.

►►**Go to step 5**

5 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . **VREF 20, Minimums ____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

▼ Continued on next page ▼

▼ **WING SLIDE continued** ▼

Landing gear . . . . Down

Flaps. **20**

■ ■ ■ ■

Intentionally
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Table of Contents

Table of Contents

Intentionally
Blank

CABIN ALT

CABIN ALTITUDE or Rapid Depressurization

CABIN ALTITUDE

Message: CABIN ALTITUDE

Condition: A cabin altitude exceedance occurs.

1 Don the oxygen masks.

2 Establish crew communications.

3 Check the cabin altitude and rate.

4 **If** the cabin altitude is uncontrollable:

PASS OXY switch . . . . Push and hold for 1 second

Without delay, descend to the lowest safe altitude or 10,000 feet, whichever is higher.

To descend:

Move the thrust levers to idle

Extend the speedbrakes

If structural integrity is in doubt, limit airspeed and avoid high maneuvering loads.

Descend at VMO/MMO

VALVE

APU BLEED VALVE

Message: APU BLEED VAL

Condition: The APU bleed valve is not in the commanded position.

■ ■ ■ ■

DUCT LEAK

BLEED DUCT LEAK

Messages: L BLD DUCT LEAK R BLD DUCT LEAK

Condition: A bleed air leak occurs in the wing area.

1 Determine the affected side:

If either duct pressure is abnormally low and/or corresponding pack has tripped, the low pressure indication determines the affected side.

If duct pressure and pack operation are normal on both sides, use the duct leak message to determine the affected side.

2 ENG BLEED AIR switch (affected side). . . . . . . .Off

3 ISOLATION switch . . . . .Off

4 **If** the left side is the affected side:

APU BLEED AIR switch . . . . .Off

▼ Continued on next page ▼

▼ BLEED DUCT LEAK continued ▼

5 WING ANTI–ICE switch . . . . Off

This prevents possible asymmetrical ice buildup on the wings.

6 Avoid icing conditions.

7 Engine anti–ice on effected side is not available.

8 Do **not** accomplish the following checklist:

ENGINE BLEED OFF

■ ■ ■ ■

VALVE **BLEED ISOLATION VALVE**

Message: BLEED ISLN VAL

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

■ ■ ■ ■

AUTO INOP

CABIN AUTOMATIC INOPERATIVE

Messages: CABIN AUTO INOP

Condition: One of these occurs:
- The automatic pressurization control is failed
- The cabin altitude mode selector is in manual

1 Cabin altitude MODE SELECT . . . . MAN

2 CABIN ALTITUDE MANUAL control . . . . CLIMB or DESCEND as needed to control desired cabin rate and altitude

Note: Recommended cabin rate is approximately 500 FPM for climbs and descents.

Recommended cabin altitude in cruise is:

FLIGHT LEVEL	CABIN ALTITUDE
Up to 230	Landing Field Elevation
260	2000
300	4000
350	6000
400 and above	8000

3 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

▼ Continued on next page ▼

▼ **CABIN AUTOMATIC INOPERATIVE continued** ▼

Autobrake . . . . ____

Landing data . . . . VREF____, Minimums___________

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ______

When at pattern altitude

CABIN ALTITUDE
MANUAL control . . . . Hold in CLIMB until outflow valve is fully open

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps . . . . ____

■ ■ ■ ■

INOP

CABIN TEMPERATURE

Messages: AFT CABIN TEMP FWD CABIN TEMP

Condition: One or more of these occur:
- A fault in the zone temperature controller
- The compartment temperature control is off
- The trim air switch is off

1 COMPT TEMP control (affected compartment) . . . . OFF

2 **If** affected compartment temperature continues to be too warm or too cold:

TRIM AIR switch. . . . . .Off

This schedules the operating pack(s) to a programmed temperature.

Do **not** accomplish the following checklist:

TRIM AIR

■ ■ ■ ■

OFF

ENGINE BLEED OFF

Messages: L ENG BLEED OFF R ENG BLEED OFF

Condition: The engine bleed valve closed because of a system fault.

1 ENG BLEED AIR switch (affected side) . . . . . . Off

2 **If** engine and wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When engine and wing anti–ice no longer needed:

ISOLATION switch . . . . Off

3 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

4 Do **not** accomplish the following checklist:

PACK OFF

■ ■ ■ ■

BLEED

ENGINE BLEED VALVE

Messages: L ENG BLEED VAL R ENG BLEED VAL

Condition: An engine bleed air overheat occurs.

1 ENG BLEED AIR switch
(affected side) . . . . Off, then On

2 **If** ENG BLEED VAL message reappears:

ENG BLEED AIR switch . . . . Off

3 **If** engine and wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When engine and wing anti–ice no longer needed:

ISOLATION switch . . . . Off

4 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

5 Do **not** accomplish the following checklists:

ENGINE BLEED OFF

PACK OFF

■ ■ ■ ■

HI STAGE

ENGINE HIGH STAGE

Messages: L ENG HI STAGE R ENG HI STAGE

Condition: Excessive engine bleed air pressure occurs.

1 ENG BLEED AIR switch (affected side) . . . . . . Off

2 **If** engine and wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When engine and wing anti–ice no longer needed:

ISOLATION switch . . . . Off

3 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

4 Do **not** accomplish the following checklists:

ENGINE BLEED OFF

PACK OFF

■ ■ ■ ■

OVHT

EQUIPMENT OVERHEAT

Message: EQPT OVHT

Condition: The forward equipment cooling system is inoperative.

Note: If accompanied by a FWD EQPT SMOKE message, delay action until the smoke message disappears.

1 EQUIP COOLING switch . . . . ALTN

2 Choose one:

◆OVHT light **extinguishes**:

■ ■ ■ ■

◆OVHT light **stays illuminated**:

Non–essential avionics and electrical equipment are subject to imminent failure

Cooling is being provided as required to essential avionics and electrical equipment

■ ■ ■ ■

INOP

FLIGHT DECK TEMPERATURE

Message: FLT DECK TEMP

Condition: One or more of these occur:
- A fault in the zone temperature controller
- The trim air switch is off

1 FLT DK COMPT TEMP control . . . . OFF

2 **If** affected compartment temperature continues to be too warm or too cold:

TRIM AIR switch. . . . . Off

This schedules the operating pack(s) to a programmed temperature.

Do **not** accomplish the following checklist:

TRIM AIR

■ ■ ■ ■

PACK OFF

PACK OFF

Messages: L PACK OFF R PACK OFF

Condition: A pack valve is closed.

1 Choose one:

◆A **single** PACK OFF light is **illuminated**:

Continue normal operation.

■ ■ ■ ■

◆**Both** PACK OFF lights are illuminated:

▶▶**Go to step 2**

2 **Without delay**, descend to the lowest safe altitude or 10,000 feet, whichever is higher

3 To descend:

Move the thrust levers to idle.

Extend the speedbrakes.

If structural integrity is in doubt, limit airspeed and avoid high maneuvering loads.

Descend at VMO/MMO.

4 Consider an alternate engine bleed air source, or if below 17,000 feet the APU bleed air source, if dual PACK OFF condition is a result of engine bleed air loss not caused by a duct leak or engine start valve failure.

5 **Wait** until level off.

▼ **Continued on next page** ▼

▼ PACK OFF continued ▼

6 Choose one:

◆**Either or both** PACK OFF lights **extinguish:**

■ ■ ■ ■

◆**Both** PACK OFF lights **stay illuminated**:

►►**Go to step 7**

7 Maintain airspeed at or greater than 290 knots to ensure fresh air circulation .

8 Choose one:

◆Airplane altitude is at or below 10,000 feet:

►►**Go to step 9**

◆Airplane altitude is above 10,000 feet:

Don the oxygen masks.

Establish crew communications.

►►**Go to step 9**

9 Cabin altitude MODE SELECT . . . . MAN

10 CABIN ALTITUDE MANUAL control . . . . Hold in CLIMB until outflow valve is fully open

11 UTILITY BUS switches (Both) . . . . Off

12 SHOULDER HEATERS and FOOT HEATERS switches (all). . . . . OFF

13 Minimize flight deck lighting intensity.

▼ Continued on next page ▼

▼ PACK OFF continued ▼

14 Open the flight deck door.

15 Install flight deck sunvisors during daylight operations.

16 Instruct flight attendants to:

Reduce cabin lighting to minimum needed.

Close cabin window shades during daylight operations.

17 Plan to land at nearest suitable airport.

18 Do **not** accomplish the following checklists:

CABIN AUTOMATIC INOPERATIVE

RECIRCULATION FAN

UTILITY BUS OFF

■ ■ ■ ■

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INOP

PACK TEMPERATURE

Messages: L PACK TEMP   R PACK TEMP

Condition: One or more of these occur:
- A pack controller fault
- A pack overheat

1 PACK control selector (affected side). . . . . STBY N

2 Choose one:

◆ INOP light **extinguishes**:

► ► **Go to step 3**

◆ INOP light **stays illuminated**:

Wait 5 minutes.

PACK RESET switch . . . . Push

► ► **Go to step 3**

3 **If** the compartment temperature becomes unacceptably warm or cool with STBY N selected:

PACK control selector
(affected side) . . . . STBY C or STBY W, as needed

▼ **Continued on next page** ▼

▼ **PACK TEMPERATURE continued** ▼

4 Choose one:

◆INOP light **stays extinguished**:

■ ■ ■ ■

◆INOP light **stays illuminated or illuminates again**:

PACK control selector (affected side) . OFF

Do **not** accomplish the following checklist:

PACK OFF

■ ■ ■ ■

INOP

RECIRCULATION FAN

Messages: L RECIR FAN R RECIR FAN

Condition: The recirculation fan is inoperative.

■ ■ ■ ■

OFF

TRIM AIR

Message: TRIM AIR

Condition: The trim air switch is OFF.

■ ■ ■ ■

Intentionally
Blank

Non-Normal Checklists — Chapter NNC

Anti-Ice, Rain — Section 3

Table of Contents

Table of Contents

Intentionally
Blank

AOA PROBE

L AOA | R AOA

Messages: L AOA PROBE R AOA PROBE

Condition: The AOA probe heat is failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

AUXILIARY PITOT

L AUX PITOT | R AUX PITOT

Messages: L AUX PITOT R AUX PITOT

Condition: The auxiliary pitot probe heat is failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

CAPTAIN PITOT

CAPT PITOT

Message: CAPT PITOT

Condition: The captain’s pitot probe heat is failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

VALVE

ENGINE ANTI-ICE

Messages: L ENG ANTI-ICE R ENG ANTI-ICE

Condition: The engine anti-ice valve is not in the commanded position.

1 Choose one:

◆ENGINE ANTI-ICE switch is **ON**:

Avoid icing conditions.

Leave the ENGINE ANTI-ICE switch ON.

■ ■ ■ ■

◆ENGINE ANTI-ICE switch is **off**:

▶▶**Go to step 2**

2 ENGINE ANTI–ICE switch (affected engine) . . .ON

3 **If** total air temperature (TAT) is above 10 degrees C:

Avoid high thrust settings.

■ ■ ■ ■

F O PITOT

FIRST/OFFICER PITOT

Message: F/O PITOT

Condition: The first officer’s pitot probe heat is failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

PROBE HEAT

Message:	PROBE HEAT
Condition:	Two or more probe heats are failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

TAT

TAT PROBE

Message:	TAT PROBE
Condition:	The TAT probe heat is failed.

1 Flight in icing conditions may result in some erroneous flight instrument indications.

■ ■ ■ ■

INOP

WINDOW (HEAT)

Messages: L FWD WINDOW, R FWD WINDOW, L SIDE WINDOW, R SIDE WINDOW, WINDOW HEAT

Condition: One or more window heats are off.

Objective: To attempt to reset the system.

1 WINDOW HEAT switch. . . . . Off 10 seconds, then ON

2 Choose one:

◆INOP light **extinguishes**:

■ ■ ■ ■

◆INOP light **stays illuminated**:

WINDOW HEAT switch . . . . Off

■ ■ ■ ■

Intentionally
Blank

VALVE

WING ANTI–ICE

Messages: L WING ANTI-ICE R WING ANTI-ICE

Condition: The wing anti–ice valve is not in the commanded position.

1 Choose one:

◆WING ANTI-ICE switch is **ON**:

WING ANTI–ICE switch . . . . .Off

Avoid icing conditions.

Do not use wing anti–ice

■ ■ ■ ■

◆WING ANTI-ICE switch is **Off**:

When equipped with Rolls Royce engines.

▶▶**Go to step 2**

When equipped with Pratt and Whitney engines.

▶▶**Go to step 3**

2 WING ANTI-ICE switch .ON

3 **If** left valve failed open:

APU BLEED AIR switch . . . . .Off

4 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ WING ANTI–ICE continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . VREF____, Minimums____________

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ______

Landing Checklist

Speedbrake . . . . Armed

Landing gear . . . . Down

Flaps . . . . ____

After landing

ENG BLEED AIR switch (affected side) . . . . Off

ISOLATION switch . . . . Off

This prevents possible structural damage due to overheat.

■ ■ ■ ■

Intentionally
Blank

Table of Contents

Table of Contents

Intentionally
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AUTO PILOT

AUTOPILOT

Message: AUTOPILOT

Condition: One or more of these occur:
- The autopilot operates in a degraded mode other than the selected mode
- The engaged roll mode fails
- The engaged pitch mode fails

1 Autopilot disengage switch . . . . .Push

■ ■ ■ ■

A/P DISC

AUTOPILOT DISCONNECT

Message: AUTOPILOT DISC

Condition: All autopilots are disconnected.

■ ■ ■ ■

A/T DISC

AUTOTHROTTLE DISCONNECT

Message: AUTOTHROT DISC

Condition: The autothrottle is disconnected.

■ ■ ■ ■

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Non-Normal Checklists — Chapter NNC

Communications — Section 5

Table of Contents

Table of Contents

Intentionally
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Radio Transmit Continuous (Stuck Microphone Switch)

Condition: A radio transmits continuously without crew input.

Objective: To identify and isolate the stuck microphone.

1 INT microphone selector switches (all) . . . . . . On

This deselects radios and stops radio transmissions.

2 The microphone/interphone with the stuck switch continuously transmits on interphone.

3 The associated audio control panel should remain on interphone. All other audio control panels may be used normally.

■ ■ ■ ■

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Table of Contents

Table of Contents

Intentionally
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AC BUS OFF

When equipped with the optional hydraulic driven generator.

BUS OFF	BUS OFF

Messages: L AC BUS OFF R AC BUS OFF

Condition: The AC bus is not powered.

Objective: To attempt to restore electrical power.

Attempt only one reset

1 GEN CONT switch (affected side) . . . . Off, then ON

2 Choose one:

◆ APU is **available**:

►►**Go to step 3**

◆ APU is **not** available:

►►**Go to step 5**

3 APU selector . . . . START, then ON

4 **When** the APU is running:

Attempt only one reset

L BUS TIE switch . . . . Off, then AUTO

Attempt only one reset

R BUS TIE switch . . . . Off, then AUTO

▼ Continued on next page ▼

AC BUS OFF continued

5 **If** both AC BUS OFF lights were illuminated **and** AC power is restored:

Activate the FMC route, if needed.

Enter the FMC performance data, if needed.

If an IRS ALIGN light is illuminated:

Action is **not** reversible. Do this step only for the affected IRS(s)

IRS MODE selector. . . . . ATT

Enter heading on IRS control panel or POS INIT page of FMC.

6 Choose one:

- **Both** BUS OFF lights are **extinguished**:

■ ■ ■ ■

- **Both** BUS OFF lights **stay illuminated**:

  ►►**Go to step 9**

- **Right** BUS OFF light **stays illuminated**:

  ►►**Go to step 8**

- **Left** BUS OFF light **stays illuminated**:

  ►►**Go to step 7**

Continued on next page

▼ AC BUS OFF continued ▼

7 Plan to land at the nearest suitable airport.

Left AC Bus Off

Inoperative Items

Some pitot heat probes inop Flight in icing conditions may result in some erroneous flight instrument indications.
Left and Center flight directors inop
Flap indicator inop
Left and Center autopilot inop

■ ■ ■ ■

8 Plan to land at the nearest suitable airport.

Right AC Bus Off

Inoperative Items

Some pitot heat probes inop Flight in icing conditions may result in some erroneous flight instrument indications.
Right flight director inop
Right autopilot inop

■ ■ ■ ■

9 Plan to land at the nearest suitable airport.

10 RAM AIR TURB switch . . . . .Push

Observe PRESS light illuminated

11 EQUIP COOLING switch. . . . . ALTN

▼ Continued on next page ▼

▼ AC BUS OFF continued ▼

12 TRIM AIR switch . . . . OFF

Both AC Buses Off

Inoperative Items

Some pitot heat probes inop
Flight in icing conditions may result in some erroneous flight instrument indications.

All flight directors inop

All autopilots inop

Automatic speedbrake system inop
Manual speedbrake extension after landing is needed.

Anti-skid for outboard wheels inop

Master caution system inop

13 Do not use the autobrake.

14 Do not arm the speedbrake for landing.

15 Do **not** accomplish the following checklists:

RAM AIR TURBINE UNLOCKED

TRIM AIR

16 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT____
Recall . . . . Checked
Autobrake **. . . . . .OFF**

▼ Continued on next page ▼

▼ **AC BUS OFF continued** ▼

Landing data . . . . VREF___, Minimums___

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . **DOWN**

Landing gear . . . . Down

Flaps . . . . ___

■ ■ ■ ■

OFF

APU GENERATOR OFF

Message: APU GEN OFF

Condition: The generator control breaker is open.

Attempt only one reset

1 APU GEN switch . . . . Off, then ON

■ ■ ■ ■

OFF

BATTERY OFF

Message: BATTERY OFF

Condition: The battery switch is OFF.

■ ■ ■ ■

ISLN

BUS ISOLATED

Messages: L BUS ISOLATED R BUS ISOLATED

Condition: The bus tie breaker is open.

■ ■ ■ ■

DRIVE

GENERATOR DRIVE

Messages: L GEN DRIVE R GEN DRIVE

Condition: A generator drive malfunction occurs.

Action is **not** reversible.

1 GEN DRIVE DISC switch (affected side). . . . . .Confirm . . . Push

2 Choose one:

◆APU is **available**:

APU selector . . . . START, then ON

▶▶**Go to step 3**

◆APU is **not available:**

Plan to land at the nearest suitable airport.

▶▶**Go to step 3**

3 Do **not** accomplish the following checklist:

GENERATOR OFF

■ ■ ■ ■

OFF

GENERATOR OFF

Messages: L GEN OFF R GEN OFF

Condition: The generator control breaker is open.

Attempt only one reset

1 GEN CONT switch (affected side) . . Off, then ON

2 Choose one:

◆GEN CONT OFF light **extinguishes**:

Continue normal operation.

■ ■ ■ ■

◆GEN CONT OFF light **stays illuminated**:

▶▶**Go to step 3**

3 Choose one:

◆APU is **available**:

APU selector . . . . START, then ON

■ ■ ■ ■

◆APU is **not available**:

Plan to land at the nearest suitable airport.

■ ■ ■ ■

D I S C H

MAIN BATTERY DISCHARGE

Message: MAIN BAT DISCH

Condition: A main battery discharge occurs.

■ ■ ■ ■

OFF

STANDBY BUS OFF

Message: STANDBY BUS OFF

Condition: One or more of these buses are not energized:
- AC standby bus
- DC standby bus
- Battery bus

1 STBY POWER selector . . . . BAT

2 Choose one:

◆Standby power bus OFF light is **illuminated:**

STBY POWER selector. . . . . AUTO

►►**Go to step 3**

◆Standby power bus OFF light is **not illuminated**:

STBY POWER selector. . . . . AUTO

►►**Go to step 9**

3 Autopilot disengage switch . . . . Push

4 Choose one:

◆Electric stabilizer trim is **not operative**:

►►**Go to step 5**

◆Electric stabilizer trim is **operative:**

Use electric stabilizer trim.

►►**Go to step 15**

▼ **Continued on next page** ▼

▼ **STANDBY BUS OFF continued** ▼

5 Choose one:

◆Alternate stabilizer trim is **not operative**:

▶▶**Go to step 6**

◆Alternate stabilizer trim is **operative:**

Use alternate stabilizer trim.

▶▶**Go to step 15**

6 Engage left or right autopilot and allow autopilot to remain engaged until landing configuration is established.

Automatic stabilizer trim is available with autopilot engaged.

7 Avoid icing conditions.

Inoperative Items

Wing and engine anti-ice inop
Passenger address, flight, and cabin interphone systems inop
Forward and aft fuel crossfeed valves inop Vary engine thrust as needed to maintain fuel balance as conditions allow.
Left VHF communication system inop
Rudder trim inop

8 Do the checklist for each consequential EICAS alert message as soon as practical.

■ ■ ■ ■

9 Autopilot disengage switch . . . . .Push

▼ **Continued on next page** ▼

▼ **STANDBY BUS OFF continued** ▼

10 Choose one:

◆Electric stabilizer trim is **not operative**:

►►**Go to step 11**

◆Electric stabilizer trim is **operative:**

Use electric stabilizer trim.

►►**Go to step 22**

11 Choose one:

◆Alternate stabilizer trim is **not operative**:

►►**Go to step 12**

◆Alternate stabilizer trim is **operative:**

Use alternate stabilizer trim.

►►**Go to step 22**

12 Plan to land with the standby buses powered normally.

13 Engage left or right autopilot and allow autopilot to remain engaged until landing configuration is established.

Automatic stabilizer trim is available with autopilot engaged.

14 Avoid icing conditions.

Inoperative Items

Wing and engine anti-ice inop

▼ **Continued on next page** ▼

▼ **STANDBY BUS OFF continued** ▼

Passenger address, flight, and cabin interphone systems inop

Forward and aft fuel crossfeed valves inop

Vary engine thrust as needed to maintain fuel balance as conditions allow.

Left VHF communication system inop

Rudder trim inop

▶▶**Go to step 28**

15 Passenger address, flight, and cabin interphone systems may be inoperative.

16 Wing and engine anti-ice may be inoperative.

17 Cabin altitude and differential pressure indicators may be inoperative.

Cabin altitude control AUTO 1 or AUTO 2 mode operates normally.

18 Left thrust reverser may be inoperative.

19 Left VHF communication system may be inoperative.

20 Rudder trim may be inoperative.

21 Do the checklist for each consequential EICAS alert message as soon as practical.

■ ■ ■ ■

22 Plan to land with the standby buses powered normally.

23 Passenger address, flight, and cabin interphone systems may be inoperative.

▼ **Continued on next page** ▼

▼ STANDBY BUS OFF continued ▼

24 Wing and engine anti-ice may be inoperative.

25 Cabin altitude and differential pressure indicators may be inoperative.

Cabin altitude control AUTO 1 or AUTO 2 mode operates normally.

26 Left VHF communication system may be inoperative.

27 Rudder trim may be inoperative.

28 **When** within approximately 30 minutes of landing:

STBY POWER selector . . . . BAT

►►**Go to step 29**

29 Choose one:

◆Standby power bus OFF light is **illuminated:**

Left thrust reverser may be inoperative.

Do the checklist for each consequential EICAS alert message prior to landing.

■ ■ ■ ■

◆Standby power bus OFF light is **not illuminated:**

Power to all equipment on the standby buses is available.

Continue normal operation.

■ ■ ■ ■

OFF

UTILITY BUS OFF

Messages: L UTIL BUS OFF R UTIL BUS OFF

Condition: The galley and utility buses are not energized.

1 Choose one:

◆Two generator sources are **available**:

UTILITY BUS switch . . . . Off, then ON

■ ■ ■ ■

◆Two generator sources are **not available**:

■ ■ ■ ■

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Table of Contents

Table of Contents

Table of Contents

Table of Contents

Intentionally
Blank

Aborted Engine Start
[PW]

Option: Pratt and Whitney Engines

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

1 FUEL CONTROL switch
(affected side) . . . . CUTOFF

2 Choose one:

◆ENG START selector in **GND**:

Motor the engine for 30 seconds.

ENG START selector
(affected side). . . . . AUTO

■ ■ ■ ■

◆ENG START selector in **AUTO**:

►►**Go to step 3**

3 **When** N2 decreases below 20%:

ENG START selector (affected side) . . . . . GND

Motor the engine for 30 seconds.

ENG START selector (affected side) . . . . AUTO

■ ■ ■ ■

Aborted Engine Start [RR]

Option: Rolls Royce Engines

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

1 FUEL CONTROL switch
(affected side) . . . . CUTOFF

---

2 Choose one:

◆ENG START selector in **GND**:

Motor the engine for a minimum of 30 seconds and until EGT is 100° C or less.

ENG START selector
(affected side). . . . . AUTO

■ ■ ■ ■

◆ENG START selector in **AUTO**:

▶▶**Go to step 3**

3 **When** N3 decreases below 20%:

ENG START selector (affected side) . . . . .GND

Motor the engine for a minimum of 30 seconds and until EGT is 100° C or less.

ENG START selector (affected side) . . . . AUTO

■ ■ ■ ■

Dual Engine Failure [PW]

Option: Pratt and Whitney Engines

Condition: One of these occurs on both engines:
- Engine flameout
- No response to thrust lever movement

1 ENG START selectors (both). . . . . .FLT

2 Thrust levers (both) . . . . Idle

3 FUEL CONTROL switches (both) . . . . CUTOFF, then RUN

4 **If** engine appears stalled **or** EGT approaches the Standby Engine Indicator placard limit:

Repeat above step as needed.

Note: SEI maximum EGT limit is inflight start EGT limit.

5 RAM AIR TURB switch .Push

6 Maintain airspeed as indicated below:

Above 35,000 feet use 240 knots.

35,000 feet or below use 250 knots minimum.

Note: OVSPD light and associated aural warning will indicate Vmo/Mmo exceedances.

Note: Cabin altitude warning may occur during descent.

▼ Continued on next page ▼

▼ **Dual Engine Failure [PW] continued** ▼

7 Choose one:

◆APU is **not available**:

▶▶**Go to step 9**

◆APU is **available**:

▶▶**Go to step 8**

Do **not** wait for successful engine start(s) prior to starting the APU

8 ⚠ APU selector . . . . .START, then ON

9 Choose one:

◆**Either or both** engines **started**:

▶▶**Go to step 13**

◆**Both** engines remain **failed**:

▶▶**Go to step 10**

10 Thrust levers (both) . . . . Idle

11 Engines may accelerate to idle very slowly, especially at high altitude. Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N2 is steadily increasing, and EGT remains within limits, the start is progressing normally.

12 FUEL CONTROL switches (both) . . . . . CUTOFF for approximately 30 seconds, then RUN for approximately 30 seconds. Repeat until engine start is achieved

▼ **Continued on next page** ▼

▼ **Dual Engine Failure [PW] continued** ▼

13 Activate the FMC route.

14 Enter the FMC performance data.

15 Choose one:

◆**All** ALIGN lights are **not** illuminated:

▶▶**Go to step 18**

◆**Any** ALIGN light is **illuminated**:

▶▶**Go to step 16**

Action is **not** reversible. Do this step only for the affected IRS(s)

16 ⚠ IRS MODE selector (affected IRS). . . . . .ATT

17 Enter heading on IRS control panel or POS INIT page of FMC.

Note: Cabin altitude warning may occur during descent.

18 Choose one:

◆**Both** engines are **started**:

■ ■ ■ ■

◆**An** engine **stays failed**:

▶▶**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Dual Engine Failure [RR]

Option: Rolls Royce Engines

Condition: One of these occurs on both engines:
- Engine flameout
- No response to thrust lever movement

1 ENG START selectors (both). . . . . FLT

2 Thrust levers (both) . . . . Idle

Do not advance thrust levers during engine recovery until above 50% N3

3 FUEL CONTROL switches (both) . . . . CUTOFF, then RUN

4 **If** engine appears stalled **or** EGT approaches the Standby Engine Indicator placard limit:

Repeat above step as needed.

Note: SEI maximum EGT limit is inflight start EGT limit.

5 RAM AIR TURB switch . . . . Push

6 Maintain airspeed as indicated below.

Above 30,000 feet use 240 knots.

30,000 feet or below use 300 knots minimum.

Note: OVSPD light and associated aural warning will indicate Vmo/Mmo exceedances.

Continued on next page

▼ Dual Engine Failure [RR] continued ▼

Note: Cabin altitude warning may occur during descent.

7 Choose one:

◆APU is **not available**:

▶▶**Go to step 9**

◆APU is **available**:

▶▶**Go to step 8**

Do **not** wait for successful engine start(s) prior to starting the APU

8 ⚠ APU selector . . . . .START, then ON

9 Choose one:

◆**Either or both** engines **started**:

▶▶**Go to step 13**

◆**Both** engines remain **failed**:

▶▶**Go to step 10**

10 Thrust levers (both) . . . . Idle

11 Engines may accelerate to idle very slowly, especially at high altitude. Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N3 is steadily increasing, and EGT remains within limits, the start is progressing normally.

▼ Continued on next page ▼

▼ **Dual Engine Failure [RR] continued** ▼

12 FUEL CONTROL
switches (both) . . . . . CUTOFF for approximately 30 seconds, then RUN for approximately 30 seconds. Repeat until engine start is achieved

13 Activate the FMC route.

14 Enter the FMC performance data.

15 Choose one:

◆**All** ALIGN lights are **not** illuminated:

►►**Go to step 18**

◆**Any** ALIGN light is **illuminated**:

►►**Go to step 16**

Action is **not** reversible. Do this step only for the affected IRS(s)

16 ⚠ IRS MODE selector (affected IRS) . . . . ATT

17 Enter heading on IRS control panel or POS INIT page of FMC.

Note: Cabin altitude warning may occur during descent.

▼ **Continued on next page** ▼

▼ Dual Engine Failure [RR] continued ▼

18 Choose one:

◆**Both** engines are **started**:

■ ■ ■ ■

◆**An** engine **stays failed**:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Engine Limit or Surge or Stall

Condition: One or more of these occur:
- Engine indications are unusual
- Engine indications are rapidly approaching or exceeding limits
- Unusual engine noises are heard
- There is no response to thrust lever movement or the response is abnormal.

1 A/T ARM switch . . . . OFF

2 Thrust lever (affected side) Confirm . . Retard until indications remain within normal limits or the thrust lever is at Idle

---

3 Choose one:

◆ Indications are **abnormal or** EGT continues to **increase**:

After shutdown, a restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

◆ Indications **stabilized and** EGT **stabilized or decreasing**:

▶▶ **Go to step 4**

▼ **Continued on next page** ▼

▼ Engine Limit or Surge or Stall continued ▼

4 Thrust lever (affected side) . . Advance slowly and check that RPM and EGT follow thrust lever movement

5 Choose one:

◆Engine acceleration is **normal**:

Operate engine normally or at a reduced thrust level which is surge and stall free.

■ ■ ■ ■

◆Engine acceleration is **not normal**:

►►**Go to step 6**

6 Choose one:

◆EGT is **normal**:

►►**Go to step 7**

◆EGT is **not normal**:

After shutdown, a restart may be attempted if there is N1 rotation and no abnormal airframe vibration.

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

7 ENG BLEED AIR switch (affected side) . . . . Off

▼ Continued on next page ▼

▼ **Engine Limit or Surge or Stall continued** ▼

8 Choose one:

◆Engine **responds**:

►►**Go to step 9**

◆Engine does **not respond**:

Continue engine operation at idle.

►►**Go to step 9**

9 ENG BLEED AIR switch (affected side). . . . . On

■ ■ ■ ■

FAULT

APU FAULT

Message:	APU FAULT
Condition:	An APU automatic shutdown occurs.

1 APU selector .OFF, then ON

2 Choose one:

◆FAULT light **stays illuminated**:

■ ■ ■ ■

◆FAULT light **extinguishes**:

►►**Go to step 3**

3 Descend to and maintain 35,000 feet or below.

4 APU selector . . . . START, then ON

■ ■ ■ ■

FAULT

APU FUEL VALVE

Message: APU FUEL VAL

Condition: The APU fuel valve is not in the commanded position.

1 APU selector . . . . OFF

2 Do **not** start the APU.

■ ■ ■ ■

INOP

EEC OFF

Messages: L EEC OFF R EEC OFF

Condition: The EEC switch is off.

■ ■ ■ ■

ENGINE CONTROLS

Option: Pratt and Whitney Engines

Message: ENGINE CONTROLS

Condition: An EEC system fault occurs.

■ ■ ■ ■

INOP

ENGINE EEC

Messages: L ENG EEC R ENG EEC

Condition: The EEC is inoperative.

Objective: To operate both engines in the same control mode.

1 A/T ARM switch . . . . OFF

2 Thrust levers (both) . . . . . Retard to mid position

This prevents exceeding thrust limits.

3 Choose one:

◆Corresponding ENG LIMITER INOP light is **illuminated**:

ENG LIMITER
switch (affected side) . . . . Off

This deactivates the limiter, re–establishes electronic engine control, and allows thrust to be set normally.

Observe engine limits.

Do **not** accomplish the following checklist:

ENGINE LIMITER

►►**Go to step 4**

◆Corresponding ENG LIMITER INOP light is **not** illuminated:

►►**Go to step 4**

▼ **Continued on next page** ▼

▼ ENGINE EEC continued ▼

4 Choose one:

◆ELEC ENG CONT INOP **stays illuminated**:

L ELEC ENG CONT switch . . . . Off

R ELEC ENG CONT switch . . . . Off

Observe thrust limits.

■ ■ ■ ■

◆ELEC ENG CONT INOP **extinguishes**:

■ ■ ■ ■

Engine Failure or Shutdown

Condition: One of these occurs:
- An engine failure
- An engine flameout
- Another checklist directs an engine shutdown

1 A/T ARM switch . . . . OFF

2 Thrust lever (affected side) . Confirm . . . . Idle

3 **If** engine conditions allow, operate at idle for two minutes to allow engine to cool and stabilize.

4 FUEL CONTROL switch (affected side) . . . . Confirm . . . CUTOFF

5 Choose one:

◆APU is **not available**:

▶▶**Go to step 7**

◆APU is **available**:

▶▶**Go to step 6**

6 APU selector . . . . START, then ON

7 GND PROX FLAP OVRD switch . . . . OVRD

8 Transponder mode selector . . . . TA

9 Plan to land at the nearest suitable airport.

10 **If** wing anti–ice required:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

▼ **Continued on next page** ▼

▼ Engine Failure or Shutdown continued ▼

When wing anti–ice no longer required:

ISOLATION switch . . . . Off

11 Use flaps 20 and VREF 20 for landing.

12 Use flaps 5 for go-around.

13 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

14 Do **not** accomplish the following checklists:

ENGINE SHUTDOWN

PACK OFF

15 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ Engine Failure or Shutdown continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____
Recall . . . . Checked
Autobrake . . . . ____
Landing data . . . . **VREF 20, Minimums**____
Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED
Landing gear . . . . Down
Flaps **20**

■ ■ ■ ■

ENGINE FUEL FILTER

Messages: L ENG FUEL FILT   R ENG FUEL FILT

Condition: Fuel contamination can cause fuel to bypass the fuel filter.

1 Erratic engine operation and flameout may occur due to fuel contamination.

■ ■ ■ ■

ENG VALVE

ENGINE FUEL VALVE

Messages: L ENG FUEL VAL R ENG FUEL VAL

Condition: The engine fuel valve is not in the commanded position.

1 Choose one:

◆FUEL CONTROL switch is **not** in CUTOFF:

■ ■ ■ ■

◆FUEL CONTROL switch is in **CUTOFF**:

The engine may continue to run for approximately 1 minute.

►►**Go to step 2**

2 Choose one:

◆In **flight**:

■ ■ ■ ■

◆On the **ground**:

Do **not** attempt engine start.

■ ■ ■ ■

Engine Indication Fluctuations

Option: Rolls Royce Engines

Condition: Engine EPR, N1,EGT, N2 and Fuel Flow fluctuations not approaching or exceeding limits indicate an engine probe has failed

1 A/T ARM switch . . . . OFF

2 Thrust lever
(affected side) . . . . RETARD TO MID POSITION

Prevents exceeding thrust limits when deactivating the electronic engine control

3 ELEC ENG CONTROL
switch (affected side) . . . . Off

4 Thrust lever
(affected side) . . . . SET 75% N1 MINIMUM

Sets thrust to determine if fluctuations are associated with EEC

5 Choose one:

◆ **N1, EGT, N2 and Fuel Flow** indications continue to fluctuate or approach a limit:

►►**Go to the Engine Limit or Surge or Stall checklist on page 7.10**

■ ■ ■ ■

◆ All indications **except EPR** stabilize:

►►**Go to step 6**

▼ **Continued on next page** ▼

▼ **Engine Indication Fluctuations continued** ▼

6 Thrust lever
(other side) . . . . RETARD TO MID POSITION

Prevents exceeding thrust limits when deactivating the electronic engine control.

7 ELEC ENG CONTROL
switch (other side) . . . . OFF

8 Continue normal operations with both engines

9 Do not use autothrottle.

10 Observe thrust limits.

11 Do **not** accomplish the following checklist:

EEC OFF

■ ■ ■ ■

Engine In–flight Start [PW]

Option: Pratt and Whitney Engines.

Condition: An engine start is needed after a shutdown and there is:
- N1 rotation
- No fire
- No abnormal airframe vibration

1 Check altitude and airspeed. Starts are not assured outside the EICAS envelope.

2 Engine may accelerate to idle very slowly, especially at high altitude. Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N2 is steadily increasing, and EGT remains within limits, the start is progressing normally.

3 Choose one:

◆X-BLD is **shown**:

▶▶**Go to step 7**

◆X-BLD is **not shown**:

▶▶**Go to step 4**

4 ENG START selector (affected side). . . . . FLT

5 FUEL CONTROL switch. . . . . .RUN

▼ Continued on next page ▼

▼ Engine In–flight Start [PW] continued ▼

6 Choose one:

◆ EGT does **not increase** in 30 seconds **or** another abort start condition as listed in normal procedures **occurs**:

FUEL CONTROL switch (affected side). . . . . . Confirm. . CUTOFF

▶▶**Go to step 17**

◆ EGT **increases** in 30 seconds **and** another abort start condition as listed in normal procedures does **not occur**:

▶▶**Go to step 11**

7 PACK control selector (affected side) . . . . OFF

8 ISOLATION switch . . . . On

9 Ignition selector . . . . BOTH

10 ENG START selector (affected side) . . . . GND

▼ Continued on next page ▼

When N2 exceeds minimum fuel on command bug:

FUEL CONTROL switch . . . . RUN

Choose one:

◆ EGT does **not increase** in 30 seconds **or** another abort start condition as listed in normal procedures **occurs**:

FUEL CONTROL switch (affected side)Confirm . . . . CUTOFF

ENG START selector (affected side) . . . . AUTO

▶▶**Go to step 17**

◆ EGT **increases** in 30 seconds **and** another abort start condition as listed in normal procedures does **not occur**:

▶▶**Go to step 11**

▼ Continued on next page ▼

▼ Engine In–flight Start [PW] continued ▼

11 Choose one:

◆Engine does **not start**:

FUEL CONTROL switch
(affected side). . . Confirm . . . . . CUTOFF

ENG START selector
(affected side). . . . . AUTO

▶▶Go to step 17

◆Engine **starts**:

▶▶Go to step 12

12 ENG START selector (affected side) . . . . . . AUTO

13 PACK control selectors (both). . . . . AUTO

14 ISOLATION switch . . . . Off

15 Transponder mode selector . . . . .TA/RA

16 GND PROX FLAP OVRD switch . . . . Off

■ ■ ■ ■

17 Plan to land at the nearest suitable airport.

18 **If** wing anti–ice required:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer required:

ISOLATION switch . . . . Off

▼ Continued on next page ▼

▼ Engine In–flight Start [PW] continued ▼

19 Use flaps 20 and VREF 20 for landing.

20 Use flaps 5 for go-around.

21 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

22 Do **not** accomplish the following checklists:

ENGINE SHUTDOWN

PACK OFF

23 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . **VREF 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

▼ Continued on next page ▼

▼ Engine In–flight Start [PW] continued ▼

Flaps. **20**

■ ■ ■ ■

Engine In–flight Start [RR]

Option: Rolls Royce Engines.

Condition: An engine start is needed after a shutdown and there is:
- N1 rotation
- No fire
- No abnormal airframe vibration

1 Check altitude and airspeed. Starts are not assured outside the EICAS envelope.

2 Engine may accelerate to idle very slowly, especially at high altitude. The time from fuel control switch to RUN to stabilized idle may be as long as 2 minutes. Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N3 is steadily increasing, and EGT remains within limits, the start is progressing normally.

3 Choose one:

◆X-BLD is **shown**:

▶▶**Go to step 7**

◆X-BLD is **not shown**:

▶▶**Go to step 4**

4 ENG START selector (affected side). . . . . FLT

▼ **Continued on next page** ▼

▼ **Engine In-flight Start [RR] continued** ▼

5 Choose one:

◆EGT is **0 degrees C:**

FUEL CONTROL switch
(affected side). . . . . RICH

▶▶**Go to step 12**

◆EGT is **above 0 degrees C**:

FUEL CONTROL switch
(affected side). . . . . RUN

▶▶**Go to step 6**

▼ **Continued on next page** ▼

▼ Engine In–flight Start [RR] continued ▼

6 Choose one:

◆ Light up is obtained, but EGT and N3 stay low, with no increase for approximately 10 seconds:

FUEL CONTROL switch
(affected side) . . . . RICH

►►Go to step 12

◆ EGT **increases** in 30 seconds **and** another abort start condition as listed in normal procedures does **not occur**:

►►Go to step 14

◆ EGT does **not increase** in 30 seconds **or** another abort start condition as listed in normal procedures **occurs**:

FUEL CONTROL switch
(affected side) . . Confirm . . . . . CUTOFF

ENG START selector
(affected side) . . . . AUTO

►►Go to step 19

7 PACK control selector (affected side). . . . . OFF

8 ISOLATION switch . . . . On

9 Ignition selector . . . . BOTH

10 ENG START selector (affected side). . . . . .GND

When N3 is at a minimum of 20%:

FUEL CONTROL switch . . . . RUN

▼ Continued on next page ▼

▼ Engine In–flight Start [RR] continued ▼

11 Choose one:

- EGT **increases** in 30 seconds **and** another abort start condition as listed in normal procedures does **not occur**:

  ►►Go to step 14

- EGT does **not increase** in 30 seconds **or** another abort start condition as listed in normal procedures **occurs**:

  FUEL CONTROL switch
  (affected side). . . . . . Confirm. . CUTOFF

  ENG START selector
  (affected side). . . . . AUTO

  ►►Go to step 19

▼ Continued on next page ▼

▼ Engine In–flight Start [RR] continued ▼

12 Choose one:

◆ EGT **increases** in 30 seconds **and** another abort start condition as listed in normal procedures does **not occur**:

▶▶**Go to step 13**

◆ EGT does **not increase** in 30 seconds **or** another abort start condition as listed in normal procedures **occurs**:

FUEL CONTROL switch (affected side) . . . . . . Confirm . . CUTOFF

ENG START selector (affected side) . . . . AUTO

▶▶**Go to step 19**

13 FUEL CONTROL switch (affected side) . . . . RUN

14 ENG START selector (affected side) . . . . AUTO

15 PACK control selectors (both) . . . . AUTO

16 ISOLATION switch . . . . Off

17 Transponder mode selector . . . . TA/RA

18 GND PROX FLAP OVRD switch . . . . Off

■ ■ ■ ■

19 Plan to land at the nearest suitable airport.

20 **If** wing anti–ice required:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

▼ Continued on next page ▼

▼ Engine In–flight Start [RR] continued ▼

When wing anti–ice no longer required:

ISOLATION switch . . . . Off

21 Use flaps 20 and VREF 20 for landing.

22 Use flaps 5 for go-around.

23 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

24 Do **not** accomplish the following checklists:

ENGINE SHUTDOWN

PACK OFF

25 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **Engine In–flight Start [RR] continued** ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ___

Recall . . . . Checked

Autobrake . . . . ___

Landing data . . . . **VREF 20, Minimums___**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. 20**

■ ■ ■ ■

ENG LIM PROT

ENGINE LIMIT PROTECTION

Option: Pratt and Whitney Engines

Messages:	L ENG LIM PROT	R ENG LIM PROT
Condition:	The EEC is operating in N2 mode.	

1 Observe thrust limits

2 Engine response may not be synchronized with rapid thrust lever movement

3 Anticipate increased thrust lever stagger at high power at low altitude

4 Autothrottle is inoperative

■ ■ ■ ■

INOP

ENGINE LIMITER

Option: Rolls Royce Engines

Messages:	L ENG LIMITER	R ENG LIMITER
Condition:	The engine limiter has failed.	

1 Autothrottle disconnect switch . . . . .Push

2 Thrust lever (affected side) . . . . Retard to mid position

3 ENG LIMITER switch (affected side) . . . . Off

Observe engine limits

4 Autothrottle . . . . Engage

Select desired mode

■ ■ ■ ■

ENGINE OIL PRESSURE [PW]

Option: Pratt and Whitney Engines

L ENG OIL PRESS	R ENG OIL PRESS

Messages: L ENG OIL PRESS R ENG OIL PRESS

Condition: The oil pressure is low.

1 Choose one:

◆Oil pressure indication **normal**:

Operate engine normally.

■ ■ ■ ■

◆Oil pressure indication in **amber band**:

Autothrottle disconnect switch. . . . . Push

Reduce thrust to minimum required.

■ ■ ■ ■

◆Oil pressure indication **at or below red line limit**:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Intentionally
Blank

ENGINE OIL PRESSURE [RR]

Option: Rolls Royce Engines

L ENG OIL PRESS	R ENG OIL PRESS

Messages: L ENG OIL PRESS R ENG OIL PRESS

Condition: The oil pressure is low.

1 Choose one:

◆ Oil pressure indication **normal**:

Operate engine normally.

■ ■ ■ ■

◆ Oil pressure indication in **amber band**:

Autothrottle disconnect switch . . . . . Push

Thrust lever (affected side) . . . . . Confirm . . . Move to mid position

▶▶**Go to step 2**

◆ Oil pressure indication **at or below red line limit**:

▶▶**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

▼ Continued on next page ▼

▼ **ENGINE OIL PRESSURE [RR] continued** ▼

2 Choose one:

◆ Oil pressure **can** be maintained above amber band:

■ ■ ■ ■

◆ Oil pressure **cannot** be maintained above amber band:

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Engine Oil Temperature [PW]

Option: Pratt and Whitney Engines

Condition: The oil temperature is high.

1 A/T ARM switch . . . . OFF

2 Thrust lever (affected side) . . . . Confirm. . . Retard slowly until the temperature decreases

3 **If** temperature is in the amber band 20 minutes **or** above upper red line limit:

▶▶ **Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Engine Oil Temperature [RR]

Option: Rolls Royce Engines

Condition: The oil temperature is high.

1 A/T ARM switch . . . . OFF

2 Thrust lever (affected side) . . . . Confirm . . . . Move to mid position

3 **If** temperature is above red line limit:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

ENGINE SHUTDOWN

Messages: L ENG SHUTDOWN   R ENG SHUTDOWN

Condition: The engine was shutdown by the fuel control switch or the engine fire switch.

■ ■ ■ ■

VALVE

ENGINE STARTER

Messages: L ENG STARTER R ENG STARTER

Condition: The start valve is not open.

1 ENG START selector (affected side) . . . . AUTO

This prevents bleed air from entering starter if valve subsequently opens.

2 Choose one:

◆On the **ground**:

■ ■ ■ ■

◆In **flight**:

Increase airspeed until X–BLD no longer displayed.

■ ■ ■ ■

ENGINE STATOR

Option: Pratt and Whitney Engines

Messages:	L ENG STATOR	R ENG STATOR
Condition:	The EEC is not capable of controlling the stator vane actuator	

1 A/T ARM Switch . . . . OFF

2 Changing the position of any of the following for the affected side may cause engine flameout:

Thrust lever

Engine anti–ice switch

Wing anti–ice switch

Pack control selector

Recirculation fan switch

3 Choose one:

◆APU is **not available**:

▶▶**Go to step 5**

◆APU is **available**:

▶▶**Go to step 4**

4 APU selector . . . . .START, then ON

5 **If** engine fails or flames out:

Do **not** attempt an engine in-flight start.

▶▶**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

Engine Vibration

Option: Rolls Royce Engines

Condition: Vibration indication is in the amber band

1 Choose one:

◆In icing conditions:

ENGINE ANTI–ICE switches (both) . . . ON

Note: Vibration levels in amber band on either or both engines not accompanied by other failure indications are considered normal.

■ ■ ■ ■

◆**Not** in icing conditions:

▶▶**Go to step 2**

2 A/T ARM switch . . . . OFF

3 Thrust lever
(affected side) . . . . Confirm . . . . RETARD

Operate at a thrust level which will maintain vibration below amber band

If vibration remains in amber band with the thrust lever at idle:

▶▶**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

SPAR VALVE

FUEL SPAR VALVE

Messages: L FUEL SPAR VAL R FUEL SPAR VAL

Condition: The spar fuel valve is not in the commanded position.

1 Choose one:

◆In **flight**:

■ ■ ■ ■

◆On the **ground**:

Do **not** attempt engine start.

■ ■ ■ ■

Intentionally
Blank

OIL FILTER
[PW]

Option: Pratt and Whitney Engines

Messages:	L OIL FILTER	R OIL FILTER
Condition:	Oil filter contamination can cause oil to bypass the oil filter.	

1 Choose one:

◆On the **ground**:

Allow oil temp. to increase above 35° C

If Oil Filter message stays shown:

FUEL CONTROL switch
(affected side). . . . . . . Confirm. . CUTOFF

■ ■ ■ ■

◆In **flight**:

▶▶**Go to step 2**

2 A/T ARM switch . . . . OFF

3 Thrust lever
(affected side) . . . . . .Confirm . Retard slowly until the message blanks **or** the thrust lever is at idle

▼ **Continued on next page** ▼

▼ OIL FILTER [PW] continued ▼

4 Choose one:

◆OIL FILTER message **not displayed**:

Continue operating at reduced thrust.

■ ■ ■ ■

◆OIL FILTER message **remains displayed**:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

OIL FILTER [RR]

Option: Rolls Royce Engines

Messages:	L OIL FILTER	R OIL FILTER
Condition:	Oil filter contamination can cause oil to bypass the oil filter.	

■ ■ ■ ■

REVERSER ISOLATION VALVE

Messages:	L REV ISLN VAL	R REV ISLN VAL
Condition:	A fault occurs in the thrust reverser system.	

1 Additional system failures may cause inflight deployment.

2 Expect normal reverser operation after landing.

■ ■ ■ ■

REVERSER UNLOCKED

Condition: The REV indication shows with reverse thrust not intentionally commanded.

1 Reverse thrust lever . . . . Verify in the full down position

2 Choose one:

◆With **no yaw, loss of airspeed, or buffet**:

Operate engine normally.

■ ■ ■ ■

◆With **yaw, loss of airspeed, or buffet**:

▶▶**Go to step 3**

3 A/T ARM switch . . . . OFF

4 Thrust lever (affected side) . Confirm . . . . . . Idle

5 FUEL CONTROL switch (affected side) . . . . Confirm . . . CUTOFF

6 Choose one:

◆APU is **not available**:

▶▶**Go to step 8**

◆APU is **available**:

▶▶**Go to step 7**

7 APU selector . . . . START, then ON

8 GND PROX FLAP OVRD switch . . . . OVRD

9 Transponder mode selector . . . . TA

▼ Continued on next page ▼

▼ **REVERSER UNLOCKED continued** ▼

10 Plan to land at the nearest suitable airport.

11 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

12 Use flaps 20 and VREF 30 + 30 for landing.

13 Use flaps 5 for go-around.

14 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

15 Do **not** accomplish the following checklists:

ENGINE SHUTDOWN

PACK OFF

16 **Checklist Complete Except Deferred Items**

▼ **Continued on next page** ▼

▼ **REVERSER UNLOCKED continued** ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . . **VREF 30+30, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. 20**

■ ■ ■ ■

Intentionally
Blank

VALVE

STARTER CUTOUT

Messages: L STARTER CUTOUT R STARTER CUTOUT

Condition: The start valve is not closed.

1 ENG START selector (affected side). . . . . AUTO

2 Choose one:

◆VALVE light **extinguishes**:

■ ■ ■ ■

◆VALVE light **stays illuminated**:

►►**Go to step 3**

3 ENG BLEED AIR switch (affected side). . . . . . . .Off

4 ISOLATION switch . . . . .Off

5 APU BLEED AIR Switch . . . . .Off

6 Choose one:

◆Ground air source **not** in use:

►►**Go to step 8**

◆Ground air source **in use**:

►►**Go to step 7**

7 Disconnect the ground air source.

8 WING ANTI–ICE switch . . . . .Off

This prevents possible asymmetrical ice buildup on the wings.

▼ **Continued on next page** ▼

▼ STARTER CUTOUT continued ▼

9 Avoid icing conditions.

Option: Pratt and Whitney Engines

10 PW Engines:

Engine and wing anti–ice on affected side is not available

11 Do **not** accomplish the following checklists:

ENGINE BLEED OFF

PACK OFF

■ ■ ■ ■

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

Caution! Exit volcanic ash as quickly as possible. Consider a 180 degree turn.

1 Don oxygen masks, as needed.

2 Establish crew communications (if needed).

3 A/T ARM switch . . . . OFF

If conditions allow, run the engines at idle

4 ⚠ Thrust levers (both) . . . . Idle

5 ENG START selectors (both) . . . . FLT

6 RECIRC FAN switches (both) . . . . Off

7 ENGINE ANTI–ICE switches (both) . . . . ON

8 WING ANTI–ICE switch . . . . ON

9 Choose one:

◆ APU is **not available**:

►► **Go to step 11**

◆ APU is **available**:

►► **Go to step 10**

10 APU selector . . . . START, then ON

▼ **Continued on next page** ▼

Volcanic Ash continued

11 Engines may accelerate to idle very slowly, especially at high altitude.

Note: Volcanic ash can cause non–normal system reactions such as:

- engine malfunctions, increasing EGT, engine stall or flameout
- decrease or loss of airspeed indications
- equipment overheat or smoke indications
- cargo fire indications

Option: Pratt and Whitney Engines

12 Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N2 is steadily increasing, and EGT remains within limits, the start is progressing normally.

Option: Rolls Royce Engines

13 Slow acceleration may be incorrectly interpreted as a hung start or an engine malfunction. If N3 is steadily increasing, and EGT remains within limits, the start is progressing normally.

Continued on next page

▼ Volcanic Ash continued ▼

14 Choose one:

◆Engines **not** flamed out or stalled **and** EGT **stabilized or decreasing**:

►►**Go to step 15**

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

►►**Go to the Dual Engine Failure [PW] checklist on page 7.3**

►►**Go to the Dual Engine Failure [RR] checklist on page 7.6**

■ ■ ■ ■

15 Plan to land at the nearest suitable airport.

16 Do **not** accomplish the following checklist:

RECIRCULATION FAN

■ ■ ■ ■

Table of Contents

Table of Contents

Intentionally
Blank

APU FIRE

Message:	APU FIRE
Condition:	Fire is detected in the APU.

1 APU fire switch . . . . . Confirm . . . . Pull, rotate to the stop, and hold for 1 second

2 Choose one:

◆ APU fire warning light **stays illuminated**:

Plan to land at the nearest suitable airport.

▶▶**Go to step 3**

◆ APU fire warning light **extinguishes**:

▶▶**Go to step 3**

3 Do **not** accomplish the following checklists:

APU BOTTLE

APU FAULT

■ ■ ■ ■

ENGINE FIRE or Engine Severe Damage or Separation

Messages: L ENGINE FIRE R ENGINE FIRE

Condition: One or more of these occur:
- Engine fire warning
- Airframe vibrations with unusual engine indications
- Engine separation

1 A/T ARM switch . . . . OFF

2 Thrust lever
(affected side) . . . . .Confirm . . . . Idle

3 FUEL CONTROL switch
(affected side) . . . . .Confirm . . . CUTOFF

4 Engine fire switch
(affected side) . . . . .Confirm . . . . Pull

5 **If** the engine fire warning light stays illuminated:

Engine fire switch . . . . . Rotate to the stop and hold for 1 second

If after 30 seconds the engine fire warning light stays illuminated:

Engine fire switch. . . . . Rotate to the other stop and hold for 1 second

▼ Continued on next page ▼

▼ **ENGINE FIRE or Severe Damage or Separation continued** ▼

6 **If** high airframe vibration occurs and continues after engine shutdown:

Without delay, reduce airspeed and descend to a safe altitude which results in an acceptable vibration level.

If high airframe vibration returns and further airspeed reduction and descent are not practical, increasing the airspeed may reduce the vibration.

7 Choose one:

◆APU is **not available**:

▶▶**Go to step 9**

◆APU is **available**:

▶▶**Go to step 8**

8 APU selector . . . . START, then ON

9 GND PROX FLAP OVRD switch . . . . OVRD

10 Transponder mode selector . . . . TA

11 Plan to land at the nearest suitable airport.

12 **If** wing anti–ice required:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer required:

ISOLATION switch . . . . Off

▼ **Continued on next page** ▼

▼ **ENGINE FIRE or Severe Damage or Separation continued** ▼

13 Use flaps 20 and VREF 20 for landing.

14 Use flaps 5 for go-around.

15 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

16 Do **not** accomplish the following checklists:

ENGINE BOTTLE

ENGINE SHUTDOWN

PACK OFF

17 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . **VREF 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

▼ Continued on next page ▼

▼ ENGINE FIRE or Severe Damage or Separation continued ▼

Landing gear . . . . Down

Flaps. **20**

■ ■ ■ ■

Engine Tailpipe Fire

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

1 FUEL CONTROL switch (affected side) . . . . CUTOFF

2 Advise the cabin.

3 Choose one:

◆Bleed air is **not** available:

Advise the tower.

■ ■ ■ ■

◆Bleed air is **available**:

►►**Go to step 4**

4 PACK control selectors (both). . . . . OFF

5 ISOLATION switch . . . . On

6 Choose one:

◆Affected ENG START selector is in **GND**:

►►**Go to step 10**

◆Affected ENG START selector is **not** in GND:

►►**Go to step 7**

►►**Go to step 8**

Option: Pratt and Whitney Engines

7 **Wait** for N2 to decrease to 30%.

Option: Rolls Royce Engines

8 **Wait** for N3 to decrease to 30%.

▼ Continued on next page ▼

▼ Engine Tailpipe Fire continued ▼

9 ENG START selector (affected side) . . . . .GND

10 Advise the tower.

11 **When** the Tailpipe Fire is extinguished:

ENG START selector
(affected side) . . . . AUTO

■ ■ ■ ■

Smoke, Fire or Fumes

Condition: Smoke, fire or fumes occurs.

1 Diversion may be needed.

2 Don oxygen masks, as needed.

3 Establish crew and cabin communications.

4 Advise the cabin crew to turn off main IFE power switches.

5 Advise cabin crew that main cabin lighting will be turned off.

6 UTILITY BUS switches (both) . . . . Off

7 L RECIRC FAN . . . . Off

8 APU BLEED AIR switch . . . . Off

9 **Anytime** the smoke or fumes becomes the greatest threat:

▶▶**Go to the Smoke or Fumes Removal checklist on page 8.20**

▼ **Continued on next page** ▼

▼ Smoke, Fire or Fumes continued ▼

10 Choose one:

◆Source of the smoke, fire or fumes is both **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 11**

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

►►**Go to step 12**

11 Choose one:

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

Continue flight at the Captain's discretion.

Restore unpowered items at the Captain's discretion.

►►**Go to the Smoke or Fumes Removal checklist on page 8.20, if needed**

■ ■ ■ ■

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

►►**Go to step 12**

12 EQUIP COOLING switch . . . . ALTN

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

13 Initiate a diversion to the nearest suitable airport while continuing the checklist.

14 Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.

15 Do **not** delay landing in an attempt to complete all of the following steps.

16 ISOLATION switch . . . . Off

17 R PACK control selector . . . . OFF

18 **Wait** 2 minutes unless the smoke or fumes are increasing.

19 Choose one:

◆Smoke or fumes do **not continue** or are **not increasing**:

►►**Go to step 26**

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

►►**Go to step 20**

20 R PACK control selector . . . . AUTO

21 L PACK control selector . . . . OFF

22 **Wait** 2 minutes unless the smoke or fumes are increasing.

▼ Continued on next page ▼

▼ **Smoke, Fire or Fumes continued** ▼

23 Choose one:

◆Smoke or fumes do **not continue** or are **not increasing**:

►►**Go to step 26**

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

►►**Go to step 24**

24 L PACK control selector . . . . AUTO

25 Consider an immediate landing.

26 Do **not** accomplish the following checklists:

UTILITY BUS OFF

PACK OFF

RECIRCULATION FAN

►►**Go to the Smoke or Fumes Removal checklist on page 8.20, if needed**

■ ■ ■ ■

APU BTL DISCH

APU BOTTLE

Message:	APU BTL
Condition:	The fire bottle pressure is low.

■ ■ ■ ■

DISCH

CARGO BOTTLE

Messages: CARGO BTL 1 CARGO BTL 2

Condition: A fire bottle pressure is low.

■ ■ ■ ■

CARGO FIRE

FWD | AFT

Messages: FWD CARGO FIRE AFT CARGO FIRE

Condition: Smoke is detected in the cargo compartment.

1 CARGO FIRE ARM switch (FWD or AFT). . . . . Confirm . . . . ARMED

2 CARGO FIRE BTL 1 DISCH switch . . . . . Push and hold for 1 second

Note: DISCH light may require approximately 30 seconds to illuminate.

3 PACK control selector (either) . . . . Off

4 Plan to land at the nearest suitable airport.

5 Do **not** accomplish the following checklists:

CARGO BOTTLE

PACK OFF

RECIRCULATION FAN

6 **Wait** 80 minutes or during approach, whichever occurs first:

CARGO FIRE BTL 2 DISCH switch . . . Push and hold for 1 second

7 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ CARGO FIRE continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . VREF____, Minimums____

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

During approach

If second fire bottle has not been discharged:

CARGO FIRE BTL 2 DISCH switch . . . Push and hold for 1 second

Warning! Inform ground personnel NOT to open any cargo door after landing until all passengers and crew have exited the airplane and fire fighting equipment is nearby.

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

▼ Continued on next page ▼

▼ CARGO FIRE continued ▼

Flaps . . . . ____

■ ■ ■ ■

ENGINE BOTTLE

ENG BTL 1 DISCH | ENG BTL 2 DISCH

Messages:	ENG BTL 1	ENG BTL 2
Condition:	The fire bottle pressure is low.	

■ ■ ■ ■

ENGINE OVERHEAT [PW]

Option: Pratt and Whitney Engines

L ENG OVHT   R ENG OVHT

Messages: L ENG OVHT   R ENG OVHT

Condition: An engine overheat is detected.

1 ENG BLEED AIR switch (affected side). . . . . . . .Off

2 ISOLATION switch . . . . .Off

3 **If** the L ENG OVHT light is illuminated:

APU BLEED AIR switch . . . . .Off

4 WING ANTI-ICE switch . . . . .Off

5 Avoid icing conditions. Engine and wing anti–ice on the affected side are not available.

6 Choose one:

◆ENG OVHT light **extinguishes**:

►►**Go to step 7**

◆ENG OVHT light **stays illuminated**:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

7 Do **not** accomplish the following checklists:

ENGINE BLEED OFF

▼ **Continued on next page** ▼

▼ ENGINE OVERHEAT [PW] continued ▼

PACK OFF

■ ■ ■ ■

ENGINE OVERHEAT [RR]

Option: Rolls Royce Engines

L ENG OVHT   R ENG OVHT

Messages: L ENG OVHT   R ENG OVHT

Condition: An engine overheat is detected.

1 ENG BLEED AIR switch (affected side) . . . . Off

2 A/T ARM switch . . . . OFF

3 Thrust lever (affected side) . . . Confirm . . . Retard slowly until ENG OVHT light extinguishes **or** thrust lever is at idle

4 Choose one:

◆ENG OVHT light **extinguishes**:

Operate engine at reduced thrust level for the remainder of flight.

►►**Go to step 5**

◆ENG OVHT light **stays illuminated**:

►►**Go to the Engine Failure or Shutdown checklist on page 7.16**

■ ■ ■ ■

5 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

▼ Continued on next page ▼

▼ ENGINE OVERHEAT [RR] continued ▼

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

6 Do **not** accomplish the following checklists:

ENGINE BLEED OFF

PACK OFF

■ ■ ■ ■

SMOKE

EQUIPMENT SMOKE

Messages: FWD EQPT SMOKE

Condition: Smoke is sensed in the equipment cooling system.

■ ■ ■ ■

FAIL P-RESET

FIRE/OVERHEAT SYSTEM

Message: FIRE/OVHT SYS

Condition: One or more of these occur:
- Engine fire and overheat detection is inoperative
- APU fire detection is inoperative
- Cargo fire detection is inoperative

1 FIRE/OVHT TEST SYS FAIL switch. . . . . .Push

■ ■ ■ ■

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.

Warning! Do not turn an operating pack OFF. Selecting PACKS OFF will result in increased smoke concentrations.

3 Close the flight deck door.

4 LDG ALT selector . . . . .Set 9,500 feet

5 CABIN ALTITUDE AUTO RATE control. . . . . . . .MAX

6 Choose one:

◆Smoke or fumes is **not persistent**:

▶▶**Go to step 9**

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

▶▶**Go to step 7**

7 Descend to 9,500 feet or below as soon as conditions permit.

8 **When** at 9,500 feet:

Cabin Altitude MODE SELECT . . . . .MAN

CABIN ALTITUDE MANUAL control . . . . Hold to CLIMB until outflow valve fully open

▼ Continued on next page ▼

▼ **Smoke or Fumes Removal continued** ▼

9 Do **not** accomplish the following checklist:

CABIN AUTOMATIC INOPERATIVE

►►**Go to the Smoke, Fire or Fumes checklist on page 8.8 and do the remaining steps**

■ ■ ■ ■

WHL WELL FIRE

WHEEL WELL FIRE

Message: WHEEL WELL FIRE

Condition: Fire is detected in a main wheel well.

Maximum 270K/.82M

1 Landing gear lever . . . . .DN

This attempts to extinguish the fire.

2 Plan to land at the nearest suitable airport.

Note: Do not use FMC fuel predictions with gear extended.

3 Flight with gear down increases fuel consumption and decreases climb performance. Refer to Gear Down performance tables in Performance Inflight chapter for flight planning.

4 Choose one:

◆Landing gear retraction is **not needed** for airplane performance:

■ ■ ■ ■

◆Landing gear retraction is **needed** for airplane performance:

►►**Go to step 5**

5 **When** WHL WELL FIRE light extinguishes:

Wait 20 minutes. This attempts to ensure the fire remains extinguished.

Landing gear lever . . . . UP, then OFF

■ ■ ■ ■

Table of Contents

Table of Contents

Intentionally
Blank

All Flaps and Slats Up Landing

Condition: The leading edge slats and trailing edge flaps fail to extend.

1 Accomplish this checklist **only** when directed by the LEADING EDGE SLAT ASYMMETRY checklist or the TRAILING EDGE FLAP ASYMMETRY checklist

2 Do **not** slow below VREF 30 + 80 until established on final approach.

3 Limit bank angle to 15 degrees below VREF 30 + 80.

Note: Tail clearance is reduced on landing.

4 ENG START selectors (both). . . . . CONT

5 Use VREF 30 + 50 for landing.

6 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

7 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **All Flaps and Slats Up Landing continued** ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing Data **. . . . .VREF 30 + 50, Minimums____**

Approach Briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. . . . . UP**

■ ■ ■ ■

AUTO SPDBRK

AUTO SPEEDBRAKE

Message: AUTO SPEEDBRAKE

Condition: An automatic speedbrake fault occurs.

1 Do **not** arm the speedbrake lever.

2 Manually extend speedbrakes after landing.

3 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . VREF____, Minimums____

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake **. . . . . .DOWN**

Landing gear . . . . Down

Flaps . . . . ____

■ ■ ■ ■

TRAILING EDGE

FLAP LOAD RELIEF

Message: FLAP LD RELIEF

Condition: The flap load relief system is failed.

1 Check flap position and maintain the appropriate speed.

■ ■ ■ ■

OFF

FLIGHT CONTROL HYDRAULIC

Messages: C FLT CONT HYD L FLT CONT HYD
R FLT CONT HYD

Condition: A flight control valve is closed.

1 All switches must be ON for flight.

■ ■ ■ ■

OFF

FLIGHT CONTROL VALVES

OFF

Message: FLT CONT VALS

Condition: Two or more flight control shutoff valves are closed.

1 L, C, and R FLT CONTROL SHUTOFF switches must be ON for flight.

■ ■ ■ ■

Jammed or Restricted Flight Controls

Condition: A flight control is jammed or restricted in roll, pitch, or yaw.

1 Overpower the jammed or restricted system. Use maximum force, including a combined effort of both pilots, if needed.

2 **If** the failure could be due to freezing water and conditions allow, consider descent to a warmer temperature and attempt to overpower the jammed or restricted system again.

3 Choose one:

◆Faulty system can be **overpowered**:

Continue to overpower the jammed or restricted system as needed.

■ ■ ■ ■

◆Faulty system **cannot** be overpowered:

Use operative flight controls, trim, and thrust as needed for airplane control.

■ ■ ■ ■

LEADING EDGE

LEADING EDGE SLAT ASYMMETRY

Message: LE SLAT ASYM

Condition: The leading edge slats are not symmetrically extended.

Caution! Limit airspeed to 240 knots maximum

Note: Do **not** use FMC fuel predictions with flaps extended.

1 GND PROX FLAP OVRD switch . . . . .OVRD

2 Choose one:

◆Indicated flap position is **greater than** 20:

Use current flaps and VREF 20 for landing.

►►**Go to step 10**

◆Indicated flap position is **20 or less**:

►►**Go to step 3**

3 Use trailing edge flaps 20 and VREF 30 + 30 for landing.

4 ENG START selectors (both). . . . . CONT

5 ALTN FLAPS selector . . . . Position to agree with FLAP lever

Do **not** arm the **LE** ALTN FLAPS switch

6 ⚠ TE ALTN FLAPS switch . . . . ALTN

7 ALTN FLAPS selector . . . .Extend or retract trailing edge flaps as needed

▼ **Continued on next page** ▼

▼ LEADING EDGE SLAT ASYMMETRY continued ▼

Note: Flap indicator may not move until flaps 5 or greater is selected.

8 Choose one:

◆ TE FLAP DISAGREE message is **not** shown:

▶▶**Go to step 10**

◆ TE FLAP DISAGREE message is **shown**:

▶▶**Go to step 9**

▼ Continued on next page ▼

▼ LEADING EDGE SLAT ASYMMETRY continued ▼

9 Choose one:

◆Indicated flap position is **less than 5:**

Do **not** accomplish the following checklist:

TRAILING EDGE FLAP ASYMMETRY

TRAILING EDGE FLAP DISAGREE

►►**Go to the All Flaps and Slats Up Landing checklist on page 9.1**

■ ■ ■ ■

◆Indicated flap position is **at or greater than 5 and less than 20:**

Use current flaps and VREF 30 + 40 for landing.

►►**Go to step 10**

◆Indicated flap position is **20**:

Use current flaps and VREF 30 + 30 for landing.

►►**Go to step 10**

10 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

11 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ LEADING EDGE SLAT ASYMMETRY continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ___

Recall . . . . Checked

Autobrake . . . . ___

Landing data **. . . . . VREF 20, or VREF 30+30, or VREF 30+40, Minimums___**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps**. . . . . .As directed**

■ ■ ■ ■

LEADING EDGE

LEADING EDGE SLAT DISAGREE

Message: LE SLAT DISAGREE

Condition: The leading edge slats are not in the commanded position.

Caution! Limit airspeed to 240 knots maximum.

1 GND PROX FLAP OVRD switch . . . . .OVRD

2 Choose one:

◆Indicated flap position **greater than** 20:

Use current flaps and VREF 20 for landing.

▶▶**Go to step 10**

◆Indicated flap position **20 or less**:

▶▶**Go to step 3**

3 Use flaps 20 and VREF 20 for landing.

4 Choose one:

◆FLAP lever position **greater than** 20:

ALTN FLAPS selector. 20

▶▶**Go to step 6**

◆FLAP lever position **20 or less**:

▶▶**Go to step 5**

5 ALTN FLAPS selector . . . . Position to agree with FLAP lever

▼ Continued on next page ▼

▼ LEADING EDGE SLAT DISAGREE continued ▼

6 LE ALTN FLAPS switch . . . . ALTN

7 TE ALTN FLAPS switch . . . . ALTN

8 Choose one:

◆LEADING EDGE light is **illuminated**:

LE ALTN FLAPS switch . . . . Off

►►**Go to the LEADING EDGE SLAT ASYMMETRY checklist on page 9.6**

■ ■ ■ ■

◆LEADING EDGE light **extinguishes**:

►►**Go to step 9**

9 ALTN FLAPS selector . . . Extend or retract leading edge slats and trailing edge flaps as needed

10 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

11 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **LEADING EDGE SLAT DISAGREE continued** ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data **. . . . . .VREF 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. . . . . .As directed**

■ ■ ■ ■

MACH SPD TRIM

MACH/SPEED TRIM

Message: MACH/SPEED TRIM

Condition: The Mach/speed system is failed.

■ ■ ■ ■

RUDDER RATIO

RUDDER RATIO

Message: RUDDER RATIO

Condition: The rudder ratio system is failed.

1 Above 160 knots, avoid large or abrupt rudder inputs.

2 Choose one:

◆Left hydraulic system pressure is **not normal**:

■ ■ ■ ■

◆Left hydraulic system pressure is **normal**:

►►**Go to step 3**

3 Crosswind limit is 15 knots.

4 Do **not** autoland.

■ ■ ■ ■

SPEED BRAKES

SPEEDBRAKES EXTENDED

Message: SPEEDBRAKES EXT

Condition: The speedbrakes are extended and one or more of these occur:
- The radio altitude is between 15 and 800 feet
- The flap lever is in a landing setting

■ ■ ■ ■

SPOILERS

SPOILERS
[Advisory]

Message: SPOILERS

Condition: One or more spoiler pairs are failed.

1 Roll rate may be reduced inflight.

2 Speedbrake effectiveness may be reduced in flight and during landing.

■ ■ ■ ■

STAB TRIM

STABILIZER TRIM

Message: STAB TRIM

Condition: The stabilizer trim operates at a decreased rate.

1 **If** a normal stabilizer trim rate is desired:

ALTN STAB TRIM
switches (both) . . . . Push and hold when trim is desired

■ ■ ■ ■

TRAILING EDGE

TRAILING EDGE FLAP ASYMMETRY

Message: TE FLAP ASYM

Condition: The trailing edge flaps are not symmetrically extended.

Caution! Do not arm the TRAILING EDGE (TE) ALTERNATE FLAPS switch.

Note: Do not use FMC fuel predictions with flaps extended.

1 GND PROX FLAP OVRD switch . . . . OVRD

2 Choose one:

◆ Indicated flap position **at or greater than 20**:

Use current flaps and VREF 20 for landing.

▶▶**Go to step 7**

◆ Indicated flap position **between 5 and 20**:

Use current flaps and VREF 30 + 30 for landing.

▶▶**Go to step 7**

◆ Indicated flap position at or between **1 and 5**:

▶▶**Go to step 5**

◆ Indicated flap position **less than 1**:

▶▶**Go to step 3**

3 ALTN FLAPS selector 1

▼ **Continued on next page** ▼

▼ TRAILING EDGE FLAP ASYMMETRY continued ▼

4 LE ALTN FLAPS switch . . . . ALTN

Note: Flap indicator may remain less than 1.

5 Use VREF 30 + 40 for landing.

6 Choose one:

◆ LE SLAT ASYM or LE SLAT DISAGREE message **is shown:**

▶▶**Go to the All Flaps and Slats Up Landing checklist on page 9.1**

■ ■ ■ ■

◆ LE SLAT ASYM and LE SLAT DISAGREE messages are **not** shown:

Note: Tail clearance is reduced on landing.

▶▶**Go to step 7**

7 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

8 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

▼ Continued on next page ▼

▼ **TRAILING EDGE FLAP ASYMMETRY continued** ▼

Landing data . . . . **VREF 20, or VREF 30 + 30, or VREF 30 + 40, as directed**
Minimums___

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps. . . . . **As directed**

■ ■ ■ ■

TRAILING EDGE

TRAILING EDGE FLAP DISAGREE

Message: TE FLAP DISAGREE

Condition: The trailing edge flaps are not in the commanded position.

1 GND PROX FLAP OVRD switch . . . . .OVRD

2 Choose one:

◆Indicated flap position **greater than** 20:

Use current flaps and VREF 20 for landing.

►►**Go to step 8**

◆Indicated flap position **20 or less**:

Use flaps 20 and VREF 20 for landing.

►►**Go to step 3**

3 Choose one:

◆FLAP lever position **greater than** 20:

ALTN FLAPS selector. 20

►►**Go to step 4**

◆FLAP lever position **20 or less**:

ALTN FLAPS selector. . . . Position to agree with FLAP lever

►►**Go to step 4**

4 LE ALTN FLAPS switch . . . . ALTN

5 TE ALTN FLAPS switch . . . . ALTN

▼ Continued on next page ▼

▼ TRAILING EDGE FLAP DISAGREE continued ▼

6 Choose one:

◆ TRAILING EDGE light **is illuminated**:

TE ALTN FLAPS switch . . . . Off

▶▶**Go to the TRAILING EDGE FLAP ASYMMETRY checklist on page 9.15**

■ ■ ■ ■

◆ TRAILING EDGE light **extinguishes**:

▶▶**Go to step 7**

7 ALTN FLAPS selector . . . . Extend or retract flaps as needed

8 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

9 **Checklist Complete Except Deferred Items**

▼ **Continued on next page** ▼

▼ TRAILING EDGE FLAP DISAGREE continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data **. . . . . VREF 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. . . . . As directed**

■ ■ ■ ■

Intentionally
Blank

UNSCHED STAB TRIM

UNSCHEDULED STABILIZER TRIM

Message: UNSCHD STAB TRIM

Condition: Stabilizer movement occurs without a signal to trim.

1 STAB TRIM CUT OUT switches (both) . . . . CUT OUT

Higher than normal control column force may be needed to prevent unwanted pitch change

2 Autopilot disengage switch . . . . Push

3 C STAB TRIM CUT OUT switch . . . . .NORM

4 Choose one:

◆Unscheduled trim **does not occur**:

▶▶**Go to step 8**

◆Unscheduled trim **occurs**:

▶▶**Go to step 5**

5 C STAB TRIM CUT OUT switch . . . . CUT OUT

6 R STAB TRIM CUT OUT switch . . . . .NORM

7 Choose one:

◆Unscheduled trim **does not occur**:

▶▶**Go to step 8**

◆Unscheduled trim **occurs**:

R STAB TRIM CUT OUT switch . . CUT OUT

▶▶**Go to step 8**

▼ Continued on next page ▼

▼ **UNSCHEDULED STABILIZER TRIM continued** ▼

8 Do **not** accomplish the following checklist:

STABILIZER TRIM

■ ■ ■ ■

INOP

YAW DAMPER

Messages: L YAW DAMPER R YAW DAMPER

Condition: A yaw damper is inoperative because one of these occurs:
- A yaw damper system is failed
- An IRS is not aligned

1 YAW DAMPER switch . . . . Off

■ ■ ■ ■

Intentionally
Blank

Table of Contents

Table of Contents

Intentionally
Blank

Airspeed Unreliable

Condition: The airspeed or Mach indications are suspected to be unreliable. (Items which may indicate Airspeed Unreliable are listed in the Additional Information section.)

Objective: Maintain control using manual pitch and thrust.

1 Check the pitch attitude and thrust.

2 **If** pitch attitude or thrust is **not** normal for phase of flight:

Autopilot disengage switch . . . . .Push

Autothrottle disconnect switch . . . . .Push

F/D switches (both) . . . . OFF

Establish normal pitch attitude and thrust setting for phase of flight.

Note: Normal pitch attitude and thrust settings are available in the FLIGHT WITH UNRELIABLE AIRSPEED table in the Performance Inflight-QRH chapter.

3 Altitude information, vertical speed information, limit EPR, Reference EPR, and EPR bug may be unreliable.

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

4 Cross check captain and first officer airspeed indications and standby airspeed indicator. An airspeed display differing by more than 15 knots from the standby indicator should be considered unreliable.

5 Choose one:

◆ Reliable airspeed data source **can** be determined:

AIR DATA switch (unreliable side) . . ALTN

Invalid overspeed warning and invalid input to AFDS and autothrottle may occur or continue.

■ ■ ■ ■

◆ Reliable airspeed data source can **not** be determined:

▶▶ **Go to step 6**

6 Maintain normal pitch attitude and thrust setting for phase of flight. Refer to the FLIGHT WITH UNRELIABLE AIRSPEED table in the Performance Inflight chapter.

7 Maintain visual conditions if possible.

8 **Checklist Complete Except Deferred Items**

Deferred Items

Review before descent:

Establish landing configuration early.

Use electronic and visual glideslope indicators, where available, for approach and landing.

▼ Continued on next page ▼

Refer to IRS ground speed on the CDU POS REF page and reported wind on approach.

■ ■ ■ ■

Additional Information

One or more of the following may be evidence of unreliable airspeed/Mach indication:

- speed/altitude information not consistent with pitch attitude and thrust setting
- speed/airspeed/Mach failure flags
- blank or fluctuating airspeed displays
- variation between captain and first officer airspeed displays
- amber line through one or more ADI flight mode annunciations
- overspeed indications
- radome damage or loss
- simultaneous overspeed and stall warnings

Display of one or more of the following EICAS messages may be evidence of unreliable airspeed/Mach indication:

- CAPT PITOT
- F/O PITOT
- L AUX PITOT
- MACH/SPEED TRIM
- OVERSPEED
- PROBE HEAT
- R AUX PITOT
- RUDDER RATIO

ALTITUDE DISAGREE

Message: ALT DISAGREE

Condition: The captain's and the first officer's altitude indications disagree by more than 200 feet.

1 Airplane does not meet RVSM airspace requirements.

2 Transponder altitude received by ATC may be unreliable.

3 Maintain visual conditions if possible.

4 **Checklist Complete Except Deferred Items**

Deferred Items

Review before descent:

Establish landing configuration early.

Radio altitude reference is available below 2500 feet.

Use electronic and visual glideslope indicators, where available, for approach and landing.

■ ■ ■ ■

ATTITUDE DISAGREE

Message: ATT DISAGREE

Condition: The captain's and the first officer's attitude indications disagree.

■ ■ ■ ■

IAS DISAGREE

Message:	IAS DISAGREE
Condition:	The captain's and the first officer's airspeed indications disagree.

▶▶**Go to the Airspeed Unreliable checklist on page 10.1**

■ ■ ■ ■

INSTRUMENT SWITCH

Message:	INSTR SWITCH
Condition:	Both pilots' ADI and HSI use the same symbol generator source.

1 Both ADIs and HSIs are displaying information from the center symbol generator.

■ ■ ■ ■

Intentionally
Blank

Table of Contents

Table of Contents

Intentionally
Blank

ATC FAULT

Messages: ATC FAULT

Condition: A transponder fault occurs.

■ ■ ■ ■

FMC FAIL

Messages: L FMC FAIL R FMC FAIL

Condition: An FMC is failed.

1 Choose one:

◆A **single** FMC is failed:

▶▶**Go to step 2**

◆**Both** FMCs are failed:

▶▶**Go to step 4**

2 NAV SOURCE selector . . . . .FMC-L or FMC-R

Select the operative FMC

3 During VOR approaches, one pilot must have raw data from the VOR associated with the approach displayed on the RDMI (RMI) or HSI in a VOR mode, no later than the final approach fix.

■ ■ ■ ■

4 Select autopilot roll and pitch modes appropriate for the desired flight path. LNAV and VNAV are not available.

5 Captain's NAV SOURCE selector . . . . CDU–L

6 First Officer's NAV SOURCE selector . . . . . CDU–R

7 Route modifications must be entered into both CDUs. Enter any new waypoints by latitude and longitude.

8 Manually tune navigation radios.

▼ **Continued on next page** ▼

▼ FMC FAIL continued ▼

9 Refer to Performance Inflight chapter for VREF speed and other applicable performance information.

■ ■ ■ ■

FMC — FMC MESSAGE

Messages: FMC MESSAGE

Condition: An alert message is in the FMC scratchpad.

1 Choose one:

◆CDU message **is** FUEL QTY ERROR–PROG 2, FUEL DISAGREE–PROG 2, or INSUFFICIENT FUEL

►►**Go to the Engine Fuel Leak checklist on page 12.1**

■ ■ ■ ■

◆CDU message is **not** FUEL QTY ERROR–PROG 2, FUEL DISAGREE–PROG 2, or INSUFFICIENT FUEL:

Take action as needed per the message.

■ ■ ■ ■

GPS

Messages:	L GPS GPS	R GPS
Condition:	One or both GPS receivers are failed.	

1 Choose one:

◆**L GPS or R GPS** message is shown:

The indicated GPS has failed.

■ ■ ■ ■

◆**GPS** message is shown:

Both GPSs have failed.

■ ■ ■ ■

DC FAIL

IRS DC FAIL

Messages:	L IRS DC FAIL C IRS DC FAIL	R IRS DC FAIL
Condition:	IRS backup DC power is failed.	

■ ■ ■ ■

FAULT

IRS FAULT

Messages: L IRS FAULT R IRS FAULT
C IRS FAULT

Condition: An IRS fault occurs.

1 Choose one:

◆**Left** IRS FAULT light is **illuminated**:

Captain's IRS switch . . . . ALTN

■ ■ ■ ■

◆**Right** IRS FAULT light is **illuminated**:

First Officer's IRS switch. . . . . ALTN

■ ■ ■ ■

◆**Center** IRS FAULT light is **illuminated**:

■ ■ ■ ■

ON DC

IRS ON DC

Messages: L IRS ON DC R IRS ON DC
C IRS ON DC

Condition: IRS AC power is failed.

■ ■ ■ ■

UNABLE RNP

Messages: UNABLE RNP

Condition: The actual navigation performance is not sufficient.

1 **If** on a procedure or airway that has an RNP alerting requirement:

Select alternate procedure or airway, or initiate a go–around.

■ ■ ■ ■

2 **If** on a procedure or airway without RNP:

Verify position.

■ ■ ■ ■

Table of Contents

Table of Contents

Intentionally
Blank

Engine Fuel Leak

Condition: An in flight engine fuel leak is suspected or confirmed.(Items which may indicate an engine fuel leak are listed in the Additional Information section at the end of this procedure.)

1 C L and C R PUMP switches . . . . Off

2 Do **not** accomplish the following checklist:

FUEL CONFIGURATION

3 FWD and AFT FUEL XFEED switches . . . . Off

4 Identify an engine fuel leak by observing a left or right main tank fuel quantity decreasing faster than the other.

5 An increase in fuel imbalance of approximately 1000 pounds or more in 30 minutes should be considered an engine fuel leak.

6 **If** conditions allow:

Visually check for engine fuel leak.

7 Choose one:

◆ Engine fuel leak **confirmed**:

► ► **Go to step 17**

◆ Left and right main tank quantities **decrease at the same rate**:

► ► **Go to step 8**

▼ Continued on next page ▼

▼ Engine Fuel Leak continued ▼

8 Resume normal fuel management procedures.

9 Choose one:

◆ FUEL DISAGREE-PROG 2 **and** FUEL QTY ERROR-PROG 2 messages are **not** shown on the CDU scratchpad:

▶▶**Go to step 12**

◆ FUEL DISAGREE-PROG 2 **or** FUEL QTY ERROR-PROG 2 message is **shown** on the CDU scratchpad:

▶▶**Go to step 10**

10 PROGRESS PAGE 2 . . . . SELECT

11 TOTALIZER or CALCULATED . . . . Select USE for the most accurate indication

■ ■ ■ ■

12 Choose one:

◆ LOW FUEL message **not** shown:

■ ■ ■ ■

◆ LOW FUEL message is **shown**:

FWD and AFT FUEL XFEED switches . . . On

This ensures all fuel is available if the low tank empties.

▶▶**Go to step 13**

▼ Continued on next page ▼

▼ **Engine Fuel Leak continued** ▼

13 PUMP switches (all) . . . . ON

This ensures all fuel is available.

14 Plan to land at nearest suitable airport.

15 Avoid high nose up attitude and excessive acceleration and deceleration.

16 Do **not** accomplish the following checklist:

LOW FUEL

■ ■ ■ ■

17 A/T ARM switch . . . . OFF

18 Thrust lever
(affected side) . . . . Confirm . . . . Idle

19 FUEL CONTROL switch
(affected side) . . . . Confirm . . . CUTOFF

20 Choose one:

◆APU is **available**:

►►**Go to step 21**

◆APU is **not available**:

►►**Go to step 22**

21 APU selector . . . . START, then ON

22 GND PROX FLAP OVRD switch . . . . OVRD

23 Transponder mode selector . . . . TA

24 Plan to land at the nearest suitable airport.

▼ **Continued on next page** ▼

▼ Engine Fuel Leak continued ▼

25 **If** wing anti–ice needed:

PACK control selector (affected side) . . . . OFF

ISOLATION switch . . . . On

When wing anti–ice no longer needed:

ISOLATION switch . . . . Off

26 Choose one:

◆FUEL DISAGREE-PROG 2 **and** FUEL QTY ERROR-PROG 2 messages are **not** shown on the CDU scratchpad:

►►**Go to step 29**

◆FUEL DISAGREE-PROG 2 **or** FUEL QTY ERROR-PROG 2 message is **shown** on the CDU scratchpad:

►►**Go to step 27**

27 PROGRESS PAGE 2 . . . . SELECT

28 TOTALIZER . . . . Select USE for TOTALIZER to determine fuel remaining

29 **After** engine shutdown, all remaining fuel can be used for the operating engine. Resume normal fuel management procedures.

30 Use Flaps 20 and VREF 20 for landing

31 Use Flaps 5 for go-around

▼ Continued on next page ▼

▼ **Engine Fuel Leak continued** ▼

32 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

33 Do **not** accomplish the following checklists:

ENGINE SHUTDOWN

PACK OFF

34 Choose one:

◆ LOW FUEL message **not** shown:

►► **Go to step 39**

◆ LOW FUEL message is **shown**:

FWD and AFT FUEL XFEED switches . . . On

This ensures all fuel is available if the low tank empties.

►► **Go to step 35**

35 PUMP switches (all) . . . . ON

This ensures all fuel is available.

36 Plan to land at nearest suitable airport.

37 Avoid high nose up attitude and excessive acceleration and deceleration.

38 Do **not** accomplish the following checklist:

LOW FUEL

39 **Checklist Complete Except Deferred Items**

▼ **Continued on next page** ▼

▼ Engine Fuel Leak continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . **VREF 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **20**

■ ■ ■ ■

▼ Continued on next page ▼

▼ Engine Fuel Leak continued ▼

Additional Information

One or more of the following may be evidence of an engine fuel leak:

- Visual observation of fuel spray from strut or engine
- Excessive engine fuel flow
- Total fuel quantity decreasing at an abnormal rate
- FUEL CONFIG message on EICAS.
- LOW FUEL message on EICAS
- FUEL DISAGREE–PROG 2 or FUEL QTY ERROR–PROG 2 message on the CDU scratchpad
- INSUFFICIENT FUEL message on the CDU scratchpad

FUEL CONFIG

FUEL CONFIGURATION

Messages: FUEL CONFIG

Condition: One or more of these occur:
- Both center pump switches are off with fuel in the center tank
- A fuel imbalance between main tanks
- The fuel quantity is low in a main tank

1 The FUEL CONFIG message may be caused by an engine fuel leak. For indications of an engine fuel leak, check:

Total fuel quantity remaining compared to planned fuel remaining.

Fuel flow indications, for an engine with excessive fuel flow.

Individual tank quantities.

Totalizer compared to calculated quantities (PROGRESS page 2). The TOTALIZER value is the sum of the individual tank quantities. The CALCULATED value is the totalizer value at engine start minus fuel used (calculated using fuel flow rates and time).

▼ Continued on next page ▼

▼ **FUEL CONFIGURATION continued** ▼

2 Choose one:

◆Engine fuel leak **indicated**:

▶▶**Go to the Engine Fuel Leak checklist on page 12.1**

■ ■ ■ ■

◆Engine fuel leak **not indicated**:

FWD and AFT FUEL XFEED switches . . On

▶▶**Go to step 3**

3 FWD and AFT PUMP switches (low tank) . . . . . Off

This ensures fuel from the high tank feeds both engines.

4 **When** fuel balancing complete:

All FWD and AFT PUMP switches. . . . . ON

FWD and AFT FUEL XFEED switches . . . . . . Off

5 Choose one:

◆Fuel quantity is **low** in either main tank:

▶▶**Go to the LOW FUEL checklist on page 12.14**

■ ■ ■ ■

◆Fuel quantity is **not low** in either main tank:

■ ■ ■ ■

VALVE

FUEL CROSSFEED

Messages: AFT FUEL X-FEED FWD FUEL X-FEED

Condition: The fuel crossfeed valve is not in the commanded position.

1 **If** both crossfeed switches are ON and one valve is open, fuel will crossfeed.

■ ■ ■ ■

PRESS

FUEL PUMP

Messages: CTR L FUEL PUMP CTR R FUEL PUMP
L AFT FUEL PUMP R AFT FUEL PUMP
L FWD FUEL PUMP R FWD FUEL PUMP

Condition: The pump pressure is low.

1 Do not reset any tripped fuel pump circuit breaker.

▼ **Continued on next page** ▼

▼ **FUEL PUMP continued** ▼

2 Choose one:

◆ Left **or** right pump PRESS light is illuminated:

PUMP switch (affected pump) . . . . Off

■ ■ ■ ■

◆ Center left **or** center right pump PRESS light is illuminated:

►►**Go to step 3**

◆ Center left **and** center right pump PRESS lights are illuminated:

C L and C R PUMP switches . . . . Off

FWD and AFT FUEL
XFEED switches . . . . Off

►►**Go to step 6**

3 PUMP switch (affected pump). . . . . Off

4 FWD and AFT FUEL XFEED switches . . . . On

5 **When** center tank fuel depleted:

FWD and AFT FUEL XFEED switches . . . . Off

■ ■ ■ ■

6 Check available left and right main tank quantity is sufficient for the planned flight. Center tank fuel is not available.

■ ■ ■ ■

PRESS

FUEL SYSTEM PRESSURE

Messages: L FUEL SYS PRESS   R FUEL SYS PRESS

Condition: The engine is on suction feed.

Note: At high altitude, thrust deterioration or engine flameout may occur.

1 Choose one:

◆**Able** to maintain needed thrust on affected engine:

■ ■ ■ ■

◆**Unable** to maintain needed thrust on affected engine:

FWD and AFT FUEL XFEED switches . . On

Note: Continued operation with the crossfeed valve open will result in a progressive fuel imbalance when both engines are feeding from the same main tank.

2 Do **not** balance fuel.

3 Do **not** accomplish the following checklist:

FUEL CONFIGURATION

4 **When** the FUEL CONFIG light illuminates due to main tank imbalance:

FWD and AFT FUEL XFEED switches . . . . . . Off

▼ Continued on next page ▼

▼ **FUEL SYSTEM PRESSURE continued** ▼

Continue suction feed operation. Sufficient roll control is available to compensate for any main tank fuel imbalance.

If unable to maintain needed thrust on affected engine:

Operate at a lower altitude.

■ ■ ■ ■

FUEL CONFIG

LOW FUEL

Messages: LOW FUEL

Condition: The fuel quantity is low in a main tank.

1 The LOW FUEL message may be caused by an engine fuel leak. For indications of an engine fuel leak, check:

Total fuel quantity remaining compared to planned fuel remaining.

Fuel flow indications, for an engine with excessive fuel flow.

Individual tank quantities.

Totalizer compared to calculated quantities (PROGRESS page 2). The TOTALIZER value is the sum of the individual tank quantities. The CALCULATED value is the totalizer value at engine start minus fuel used (calculated using fuel flow rates and time).

▼ Continued on next page ▼

▼ LOW FUEL continued ▼

2 Choose one:

◆**Indication** of engine fuel leak:

▶▶Go to the Engine Fuel Leak checklist on page 12.1

■ ■ ■ ■

◆**No indication** of engine fuel leak:

FWD and AFT FUEL XFEED switches . . . On

This ensures fuel is available to both engines if the low tank empties.

▶▶Go to step 3

3 PUMP switches (all) . . . . ON

This ensures all fuel is available.

4 Plan to land at nearest suitable airport.

5 Avoid high nose up attitude and excessive acceleration and deceleration.

■ ■ ■ ■

Low Fuel Temperature

Condition: Fuel temperature is near the minimum.

1 **When** fuel temperature is approaching fuel temperature limit (3°C above the fuel freeze point):

Increase speed, change altitude, and or deviate to a warmer air mass to achieve a TAT equal to or higher than the fuel temperature limit.

TAT will increase approximately 0.5 to 0.7 °C for each .01 Mach increase in speed.

In extreme conditions it may be necessary to descend as low as FL250.

■ ■ ■ ■

Table of Contents

Table of Contents

Intentionally
Blank

OVHT

ELECTRIC HYDRAULIC OVERHEAT

Messages: L ELEC HYD OVHT R ELEC HYD OVHT

Condition: The pump temperature is high.

1 ELEC HYD PUMP switch . . . . Off

2 Do **not** accomplish the following checklist:

HYDRAULIC ELECTRIC PUMP

■ ■ ■ ■

OVHT

ENGINE HYDRAULIC OVERHEAT

Messages: L ENG HYD OVHT R ENG HYD OVHT

Condition: The pump temperature is high.

1 ENG HYD PUMP switch . . . . Off

2 Do **not** accomplish the following checklist:

HYDRAULIC ENGINE PUMP

■ ■ ■ ■

OVHT

HYDRAULIC (1 or 2) OVERHEAT

Messages: C HYD 1 OVHT C HYD 2 OVHT

Condition: The pump temperature is high.

1 ELEC HYD PUMP switch . . . . Off

2 Do **not** accomplish the following checklist:

HYDRAULIC ELECTRIC (1 or 2)

■ ■ ■ ■

PRESS

HYDRAULIC ELECTRIC (1 or 2)

Messages: C HYD ELEC 1 C HYD ELEC 2

Condition: The pump pressure is low.

1 ELEC HYD PUMP switch . . . . Off

■ ■ ■ ■

PRESS

HYDRAULIC ELECTRIC PUMP

Messages: L HYD ELEC PUMP R HYD ELEC PUMP

Condition: The pump pressure is low.

1 ELEC HYD PUMP switch . . . . Off

■ ■ ■ ■

PRESS

HYDRAULIC ENGINE PUMP

Messages: L HYD ENG PUMP R HYD ENG PUMP

Condition: The pump pressure is low.

1 ENG HYD PUMP switch . . . . Off

■ ■ ■ ■

RSVR

HYDRAULIC QUANTITY

Messages: C HYD QTY R HYD QTY
L HYD QTY

Condition: The hydraulic quantity is low.

■ ■ ■ ■

RSVR

HYDRAULIC RESERVOIR PRESSURE

Messages: C HYD RSVR PRESS
R HYD RSVR PRESS
L HYD RSVR PRESS

Condition: The hydraulic reservoir air pressure is low.

■ ■ ■ ■

SYS PRESS

HYDRAULIC SYSTEM PRESSURE (C only)

Messages: C HYD SYS PRESS

Condition: The hydraulic system pressure is low.

Objective: To attempt to avoid further damage.

1 C1 AND C2 ELEC HYD PUMP switches (both) . . Off

2 Do **not** autoland.

Inoperative Items

Center autopilot inop

Left autopilot stabilizer trim inop

One spoiler panel on each wing inop
Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

Center system hydraulic power to stabilizer trim inop
Right system powers the trim at half rate.

3 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

4 Do **not** accomplish the following checklists:

HYDRAULIC ELECTRIC (1 or 2)

STABILIZER TRIM

SPOILERS

YAW DAMPER

■ ■ ■ ■

Intentionally
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SYS PRESS

HYDRAULIC SYSTEM PRESSURE (L only)

Messages: L HYD SYS PRESS

Condition: The hydraulic system pressure is low.

Objective: To avoid further system damage, and configure for landing using alternate systems, if needed.

1 L ENG HYD PUMP switch . . . . Off

2 L ELEC HYD PUMP switch . . . . Off

3 Above 160 knots, avoid large or abrupt rudder inputs.

4 Do **not** autoland.

5 Do **not** use the autobrake.

6 Plan additional time for flap and gear extension.

Inoperative Items

Left autopilot inop

Some spoiler panels on each wing inop
Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

Rudder ratio inop

Left thrust reverser inop

7 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

▼ Continued on next page ▼

▼ **HYDRAULIC SYSTEM PRESSURE (L only) continued** ▼

8 Do **not** accomplish the following checklists:

HYDRAULIC ELECTRIC PUMP

HYDRAULIC ENGINE PUMP

SPOILERS

RUDDER RATIO

YAW DAMPER

9 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization. . . . . LDG ALT ____

Recall . . . . Checked

Autobrake **. . . . . .OFF**

Landing data . . . . VREF____, Minimums____

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

▼ **Continued on next page** ▼

▼ HYDRAULIC SYSTEM PRESSURE (L only) continued ▼

Alternate Flap Extension (if required)

If TE FLAP DISAGREE **is shown** during normal flap extension:

Use flaps 20 and VREF 20 for landing

GND PROX FLAP OVRD switch . . . . .OVRD

ALTN FLAPS selector . . . . Position to agree with FLAP lever

LE ALTN FLAPS arm switch . . . . ALTN

TE ALTN FLAPS arm switch . . . . ALTN

ALTN FLAPS selector . . . . Extend or retract flaps, as needed

Do **not** accomplish the following checklist:

TRAILING EDGE FLAP DISAGREE

Alternate Gear Extension (if required)

If GEAR DISAGREE **is shown** during normal gear extension:

Landing gear lever . . . . OFF

GND PROX GEAR OVRD switch . . . . .OVRD

Action is **not** reversible
Maximum 250K/.75M

ALTN GEAR EXTEND switch . . . . .DN

▼ Continued on next page ▼

▼ HYDRAULIC SYSTEM PRESSURE (L only) continued ▼

After gear down lights illuminate:

Landing gear lever . . . . DN

Do **not** arm speedbrakes. Automatic speedbrake is inoperative.

Nose wheel steering is inoperative. Differential braking is available.

▼ Continued on next page ▼

▼ **HYDRAULIC SYSTEM PRESSURE (L only) continued** ▼

Do **not** accomplish the following checklist:

GEAR DOORS

Landing Checklist

Speedbrake . . . . **DOWN**

Ensure speedbrakes are extended before using right thrust reverser.

Landing gear . . . . Down

Flaps . . . . ____

■ ■ ■ ■

Intentionally
Blank

SYS PRESS

HYDRAULIC SYSTEM PRESSURE (R only)

Messages: R HYD SYS PRESS

Condition: The hydraulic system pressure is low.

Objective: To avoid further system damage.

1 R ENG HYD PUMP switch . . . . Off

2 R ELEC HYD PUMP switch. . . . . Off

3 Do **not** autoland.

Inoperative Items

Right autopilot inop

Right stabilizer trim inop.
Center stabilizer powers the trim at half trim rate.

Autobrake inop

Some spoiler panels on each wing inop
Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

Right thrust reverser inop

4 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

5 Do **not** accomplish the following checklists:

HYDRAULIC ELECTRIC PUMP

HYDRAULIC ENGINE PUMP

SPOILERS

▼ Continued on next page ▼

▼ **HYDRAULIC SYSTEM PRESSURE (R only) continued** ▼

STABILIZER TRIM

6 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake **. . . . . OFF**

Landing data . . . . VREF ____, Minimums____

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps **. . . . . ____**

■ ■ ■ ■

HYDRAULIC SYSTEM PRESSURE (L and C)

SYS PRESS   SYS PRESS

Messages: L HYD SYS PRESS   C HYD SYS PRESS

Condition: Two hydraulic system pressures are low.

Objective: To avoid further system damage, and configure for landing using alternate systems, if needed.

1 L ENG HYD PUMP switch . . . . Off

2 L ELEC HYD PUMP switch . . . . Off

3 C1 and C2 ELEC HYD PUMP switches (both) . . . Off

4 SPEEDBRAKE lever . . . . DOWN

Do **not** arm SPEEDBRAKE lever.

5 Plan to land at the nearest suitable airport.

6 Crosswind limit is 20 knots.

7 Do **not** autoland.

8 Manually extend speedbrakes after landing.

9 Do **not** use auto brakes.

10 Use flaps 20 and VREF 30 + 20 for landing.

11 Avoid large or abrupt rudder inputs above 160 knots.

12 GND PROX FLAP OVRD switch . . . . OVRD

Continued on next page

13 Plan additional time for flap and gear extension.

Inoperative Items

Left and Center autopilots inop

Left thrust reverser inop

Some spoiler panels on each wing inop
Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

Center stabilizer trim inop
Right stabilizer powers the trim at half speed.

Rudder ratio system inop

14 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

15 Do **not** accomplish the following checklists:

HYDRAULIC ELECTRIC PUMP

HYDRAULIC ENGINE PUMP

HYDRAULIC ELECTRIC (1 or 2)

RUDDER RATIO

SPOILERS

STABILIZER TRIM

YAW DAMPER

16 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

HYDRAULIC SYSTEM PRESSURE (L and C) continued

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ___

Recall . . . . Checked

Autobrake **. . . . . OFF**

Landing data **. . . . . VREF 30 + 20, Minimums___**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Alternate Flap Extension (if required)

If TE FLAP DISAGREE **is shown** during normal flap extension:

ALTN FLAPS selector . . . . Position to agree with FLAP lever

LE ALTN FLAPS arm switch . . . . ALTN

TE ALTN FLAPS arm switch . . . . ALTN

ALTN FLAPS selector . . . . Extend or retract flaps as needed

Do **not** accomplish the following checklist:

TRAILING EDGE FLAP DISAGREE

Continued on next page

▼ **HYDRAULIC SYSTEM PRESSURE (L and C) continued** ▼

Alternate Gear Extension (if required)

If GEAR DISAGREE **is shown** during normal gear extension:

Landing gear lever . . . . OFF

GND PROX GEAR OVRD switch. . . . . OVRD

Action is **not** reversible
Maximum 250K/.75M

ALTN GEAR EXTEND switch . . . . DN

After gear down lights illuminate:

Landing gear lever . . . . DN

Nose wheel steering is inoperative. Differential braking is available.

Do **not** accomplish the following checklist:

GEAR DOORS

Landing Checklist

Speedbrake . . . . **Down**

Extend speedbrakes before using right thrust reverser.

Landing gear . . . . Down

Flaps. **20**

■ ■ ■ ■

HYDRAULIC SYSTEM PRESSURE (L and R)

SYS PRESS SYS PRESS

Messages: L HYD SYS PRESS R HYD SYS PRESS

Condition: Two hydraulic system pressures are low.

Objective: To avoid further system damage, and configure for landing using alternate systems.

1 L and R ENG HYD PUMP switches . . . . Off

2 L and R ELEC HYD PUMP switches. . . . . Off

3 SPEEDBRAKE lever . . . . DOWN

Do **not** arm SPEEDBRAKE lever.

4 Plan to land at the nearest suitable airport.

5 Crosswind limit is 20 knots.

6 Do **not** autoland.

7 Use flaps 20 and VREF 30 + 20 for landing.

8 Avoid large or abrupt rudder inputs above 160 knots.

9 GND PROX FLAP OVRD switch . . . . .OVRD

10 GND PROX GEAR OVRD switch . . . . .OVRD

11 Plan additional time for flap and gear extension.

▼ Continued on next page ▼

▼ HYDRAULIC SYSTEM PRESSURE (L and R) continued ▼

Inoperative Items

Left and Right autopilots inop

Left and Right thrust reversers inop

Nose wheel steering inop

Normal and alternate brakes inop

Reserve brakes source to normal brakes is available.

Some spoiler panels on each wing inop

Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

Right system hydraulic power to stabilizer trim inop

Center system powers the trim at half rate.

Rudder ratio system inop

Normal flap operation inop

Alternate flap operation is needed. Allow 3 minutes for flap extension during approach.

Normal landing gear extension and retraction inop

Alternate gear extension is needed.

12 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

▼ Continued on next page ▼

▼ **HYDRAULIC SYSTEM PRESSURE (L and R) continued** ▼

13 Do **not** accomplish the following checklists:

AUTOBRAKES

BRAKE SOURCE

HYDRAULIC ELECTRIC PUMP

HYDRAULIC ENGINE PUMP

GEAR DOORS

RUDDER RATIO

SPOILERS

STABILIZER TRIM

YAW DAMPER

14 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake **. . . . . OFF**

Landing data **. . . . . VREF 30 + 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

▼ **Continued on next page** ▼

▼ **HYDRAULIC SYSTEM PRESSURE (L and R) continued** ▼

Alternate Flap Extension

ALTN FLAPS selector . . . . Position to agree with FLAP lever

LE ALTN FLAPS arm switch . . . . ALTN

TE ALTN FLAPS arm switch . . . . ALTN

ALTN FLAPS selector . . . . Extend or retract flaps, as needed

Alternate Gear Extension

Landing gear lever . . . . OFF

Action is **not** reversible
Maximum 250K/.75M

ALTN GEAR EXTEND switch . . . . DN

After gear down lights illuminate:

Landing gear lever . . . . DN

RESERVE BRAKES switch . . . . **ON**

Do **not** accomplish the following checklist:

GEAR DOORS

Landing Checklist

Speedbrake . . . . **Down**

Landing gear . . . . Down

Flaps. **20**

■ ■ ■ ■

HYDRAULIC SYSTEM PRESSURE (R and C)

SYS PRESS   SYS PRESS

Messages: R HYD SYS PRESS   C HYD SYS PRESS

Condition: Two hydraulic system pressures are low.

Objective: To avoid further system damage.

1 R ENG HYD PUMP switch . . . . Off

2 R ELEC HYD PUMP switch. . . . . Off

3 C1 and C2 ELEC HYD PUMP switches. . . . . Off

4 Do **not** autoland.

5 Plan to land at the nearest suitable airport.

6 Crosswind limit is 20 knots.

7 Use flaps 20 and VREF 30 + 20 for landing

8 GND PROX FLAP OVRD switch . . . . OVRD

▼ Continued on next page ▼

▼ HYDRAULIC SYSTEM PRESSURE (R and C) continued ▼

Inoperative Items

All autopilots inop

All stabilizer trim inop

Elevator feel inop

Column forces may be significantly higher than normal, particularly during landing flare.

Autobrake inop

Right thrust reverser inop

Some spoiler panels on each wing inop

Roll rate may be reduced in flight. Speedbrake effectiveness may be reduced in flight and during landing.

9 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

10 Do **not** accomplish the following checklists:

HYDRAULIC ELECTRIC PUMP

HYDRAULIC ENGINE PUMP

HYDRAULIC ELECTRIC (1 or 2)

SPOILERS

STABILIZER TRIM

YAW DAMPER

11 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ HYDRAULIC SYSTEM PRESSURE (R and C) continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . **.OFF**

Landing data . . . . . **.VREF 30 + 20, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps . . . . **.20**

■ ■ ■ ■

UNLKD

RAT UNLOCKED

Messages: RAT UNLOCKED

Condition: The ram air turbine is not stowed and locked.

■ ■ ■ ■

Table of Contents

Table of Contents

Intentionally
Blank

AIR/GROUND SYSTEM

Messages: AIR/GND SYS

Condition: The air/ground system is failed in the air mode.

Inoperative Items

One or both thrust reversers inop

Automatic speedbrake inop

Manual speedbrake extension after landing is needed.

Autobrake inop

Manual braking is needed.

1 When deployed manually, spoiler capability is reduced.

2 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

3 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ___

Recall . . . . Checked

Autobrake . . . . **OFF**

Landing data . . . . VREF___, Minimums___

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . **DOWN**

Landing gear . . . . Down

Flaps . . . . ___

■ ■ ■ ■

Intentionally
Blank

ANTISKID

ANTISKID

Messages: ANTISKID

Condition: An antiskid system fault occurs.

1 Braking effectiveness may be reduced.

2 Use minimum braking consistent with runway conditions to reduce possibility of tire blowout.

3 Autobrake system is inoperative.

4 Check the Non-Normal Configuration Landing Distance tables in the Performance Inflight-QRH chapter.

5 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ ANTISKID continued ▼

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ___
Recall . . . . Checked
Autobrake . . . . **OFF**
Landing data . . . . VREF___, Minimums___
Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ___

Landing Checklist

Speedbrake . . . . ARMED
Landing gear . . . . Down
Flaps . . . . ___

■ ■ ■ ■

AUTO BRAKES

AUTOBRAKES

Messages: AUTOBRAKES

Condition: One of these occurs:
- The autobrake system is disarmed
- The autobrake system is failed

1 AUTO BRAKES selector . . . . Reselect

2 Choose one:

◆AUTO BRAKES light **extinguishes**:

■ ■ ■ ■

◆AUTO BRAKES light **stays illuminated**:

AUTO BRAKES selector . . . . OFF

3 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . **OFF**

Landing data . . . . VREF____, Minimums____

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

▼ Continued on next page ▼

▼ AUTOBRAKES continued ▼

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps . . . . ___

■ ■ ■ ■

BRAKE SOURCE

BRAKE SOURCE

Messages: BRAKE SOURCE

Condition: Normal and alternate brake system pressures are low.

1 RESERVE BRAKES switch . . . . ON

2 Choose one:

◆ BRAKE SOURCE light **extinguishes**:

■ ■ ■ ■

◆ BRAKE SOURCE light **stays illuminated**:

▶▶**Go to step 3**

3 Only accumulator pressure is available for braking. During landing rollout, apply steady, increasing brake pressure and hold to a full stop.

4 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake **. . . . . .OFF**

Landing data . . . . VREF____, Minimums____

Approach briefing . . . . Completed

▼ Continued on next page ▼

▼ BRAKE SOURCE continued ▼

Approach Checklist

Altimeters . . . . ____

Landing Checklist

Speedbrake . . . . ARMED

Landing gear . . . . Down

Flaps . . . . ____

After Landing

Do **not** taxi.

■ ■ ■ ■

GEAR

GEAR DISAGREE

Messages: GEAR DISAGREE

Condition: The landing gear position disagrees with the landing gear lever position.

Note: Do not use FMC fuel predictions with gear extended.

1 Choose one:

◆ Landing gear lever **UP**:

Observe the gear extend or extended limit speed of 270 knots and .82 Mach.

Flight with gear down increases fuel consumption and decreases climb performance. Refer to the Gear Down performance tables in Performance Inflight chapter for flight planning.

■ ■ ■ ■

◆ Landing gear lever **DN and any** gear down (green) lights **not** illuminated:

▶▶**Go to step 2**

◆ Landing gear lever **DN and all** gear down (green) lights **illuminated**:

GND PROX GEAR OVRD switch . . . . OVRD

Accomplish normal landing.

■ ■ ■ ■

▼ **Continued on next page** ▼

▼ **GEAR DISAGREE continued** ▼

2 Landing gear lever . . . . OFF

Maximum 250K/.75M

3 ALTN GEAR EXTEND switch . . . . DN

4 Choose one:

◆ **All** gear down (green) lights **illuminated**:

Landing gear lever . . . . DN

■ ■ ■ ■

◆ **Any** gear down (green) light **not** illuminated:

►► **Go to step 5**

5 Plan to land on available gear.

6 Landing gear lever . . . . DN

7 GND PROX GEAR OVRD switch . . . . OVRD

8 Use flaps 30 for landing.

This ensures slowest landing speed.

9 Do **not** arm speedbrake lever.

▼ **Continued on next page** ▼

▼ GEAR DISAGREE continued ▼

10 Choose one:

◆Stopping distance is **not critical**:

Do **not** use thrust reversers.

►►**Go to step 13**

◆Stopping distance is **critical**:

►►**Go to step 11**

11 Extend the speedbrakes after all gear, or the nose or engine nacelle have contacted the runway.

12 Do **not** use the thrust reversers unless stopping distance is critical.

13 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Pressurization . . . . LDG ALT ____

Recall . . . . Checked

Autobrake . . . . ____

Landing data . . . . **VREF 30, Minimums____**

Approach briefing . . . . Completed

Approach Checklist

Altimeters . . . . ____

▼ Continued on next page ▼

When at pattern altitude

PACK control selectors (both) . . . . OFF

Fuel PUMP switches (all) . . . . Off

Do **not** accomplish the following checklists:

FUEL SYSTEM PRESSURE

PACK OFF

Landing Checklist

Speedbrake . . . . **DOWN**

Landing gear . . . . Down

Flaps **30**

■ ■ ■ ■

DOORS

GEAR DOORS

Messages: GEAR DOORS

Condition: One or more landing gear doors are not closed.

Note: Do not use FMC fuel predictions with gear extended.

1 Choose one:

◆Landing gear lever **UP or DN**:

Observe the gear extend or extended limit speed of 270 knots and .82 Mach.

■ ■ ■ ■

◆Landing gear lever **OFF**:

Landing gear lever . . . . UP

■ ■ ■ ■

Gear Lever Will Not Move Up

Condition: The landing gear lever cannot move to UP.

1 Landing gear lever LOCK OVRD switch . . . . Push and hold

2 Landing gear lever . . . . UP, then OFF

■ ■ ■ ■

NOSE AIR/GROUND SYSTEM

Messages: NOSE A/G SYS

Condition: The nose air/ground system is failed in the air mode.

1 Takeoff configuration warning system inoperative.

■ ■ ■ ■

PARK BRAKE

PARKING BRAKE [ADVISORY]

Messages: PARKING BRAKE

Condition: The parking brake is set.

1 Antiskid is inoperative.

■ ■ ■ ■

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Non-Normal Checklists — Chapter NNC

Warning Systems — Section 15

Table of Contents

Table of Contents

Intentionally
Blank

ALT ALERT

ALTITUDE ALERT

Message: ALTITUDE ALERT

Condition: A deviation from the MCP set altitude occurs.

■ ■ ■ ■

ALTITUDE CALLOUTS

Message: ALT CALLOUTS

Condition: Altitude voice annunciations during approach are not supplied.

■ ■ ■ ■

CONFIG

CONFIG FLAPS

Message: FLAPS

Condition: The flaps are not in a takeoff position during takeoff.

■ ■ ■ ■

CONFIG

CONFIG GEAR NOT DOWN

Message: GEAR NOT DOWN

Condition: A landing gear is not down and locked and one of these occurs:

- A thrust lever is at idle below 800 feet radio altitude
- The flaps are in a landing position

■ ■ ■ ■

CONFIG

CONFIG PARKING BRAKE

Message: PARKING BRAKE

Condition: The parking brake is set during takeoff.

■ ■ ■ ■

CONFIG

CONFIG SPOILERS

Message: SPOILERS

Condition: The speedbrake lever is not DOWN during takeoff.

■ ■ ■ ■

CONFIG

CONFIG STABILIZER

Message: STABILIZER

Condition: The stabilizer is not in the green band during takeoff.

■ ■ ■ ■

EICAS CONTROL PANEL

Message: EICAS CONT PNL

Condition: The EICAS control panel is failed.

■ ■ ■ ■

EICAS DISPLAY

Message: EICAS DISPLAY

Condition: One EICAS display is failed.

■ ■ ■ ■

GROUND PROXIMITY SYSTEM

Message: GND PROX SYS

Condition: A ground proximity warning system fault occurs.

1 Some or all ground proximity alerts are not available.

2 Ground proximity alerts that occur are valid.

■ ■ ■ ■

OVSPD

OVERSPEED

Message: OVERSPEED

Condition: Airspeed is more than Vmo/Mmo.

■ ■ ■ ■

TCAS

Message: TCAS

Condition: TCAS system is failed.

■ ■ ■ ■

TCAS OFF

Message: TCAS OFF

Condition: TCAS modes TA or TA/RA are not selected.

■ ■ ■ ■

TERRAIN OVERRIDE

Message: TERR OVRD

Condition: The ground proximity terrain override switch is in override.

1 Look–ahead terrain alerts and the terrain display are not provided.

■ ■ ■ ■

TERRAIN POSITION

Message: TERR POS

Condition: Terrain position data is lost.

1 Position data for the terrain map and look-ahead terrain alerts are lost. Ground proximity alerts that occur are valid.

■ ■ ■ ■

WINDSHEAR SYSTEM

Message:	WINDSHEAR SYS
Condition:	A windshear system fault occurs.

1 Some or all windshear alerts are not available.

2 Windshear alerts that occur are still valid.

■ ■ ■ ■

Intentionally
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Operations Information — Chapter OI

Table of Contents — Section 0

Intentionally
Blank

Operational Information — Chapter OI

Ops Info — Section 1

Introduction

Note: This Section Reserved For Operator-Developed Information.

Intentionally
Blank

Performance Inflight - QRH Chapter PI-QRH

Table of Contents

Intentionally
Blank

Performance Inflight - QRH Chapter PI-QRH

Table of Contents Section 10

757-200 535E4 LB FAA

Performance Inflight - QRH Chapter PI-QRH
General Section 10

Flight With Unreliable Airspeed / Turbulent Air Penetration
Altitude and/or vertical speed indications may also be unreliable.

Climb (290/.78)
Flaps Up, Set Max Climb Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
40000	**PITCH ATT**	**4.5**	**4.5**		
	V/S (FT/MIN)	1800	900		
30000	**PITCH ATT**	**4.5**	**4.0**	**4.0**	**4.0**
	V/S (FT/MIN)	2500	1800	1300	800
20000	**PITCH ATT**	**7.0**	**6.5**	**6.0**	**6.0**
	V/S (FT/MIN)	3900	2900	2200	1600
10000	**PITCH ATT**	**10.0**	**8.5**	**8.0**	**7.5**
	V/S (FT/MIN)	5100	3800	3000	2300
SEA LEVEL	**PITCH ATT**	**13.5**	**11.0**	**10.0**	**9.5**
	V/S (FT/MIN)	6100	4600	3600	2900

Cruise (.78/290)
Flaps Up, EPR for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
40000	**PITCH ATT**	**2.5**	**3.0**		
	EPR	1.51	1.62		
	(Alt Mode %N1)	(83.6)	(88.4)		
35000	**PITCH ATT**	**1.5**	**2.5**	**3.0**	**3.5**
	EPR	1.45	1.50	1.59	1.71
	(Alt Mode %N1)	(81.1)	(83.6)	(87.3)	(93.6)
30000	**PITCH ATT**	**1.0**	**2.0**	**2.5**	**3.0**
	EPR	1.41	1.44	1.48	1.54
	(Alt Mode %N1)	(80.3)	(82.0)	(84.2)	(87.2)
25000	**PITCH ATT**	**1.5**	**2.0**	**2.5**	**3.5**
	EPR	1.34	1.37	1.40	1.45
	(Alt Mode %N1)	(76.6)	(78.2)	(80.3)	(82.9)
20000	**PITCH ATT**	**1.5**	**2.0**	**2.5**	**3.5**
	EPR	1.29	1.31	1.34	1.38
	(Alt Mode %N1)	(73.0)	(74.7)	(76.7)	(79.1)
15000	**PITCH ATT**	**1.5**	**2.0**	**3.0**	**3.5**
	EPR	1.24	1.26	1.28	1.32
	(Alt Mode %N1)	(69.6)	(71.3)	(73.3)	(75.7)

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

Descent (.78/290)

Flaps Up, Set Idle Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
40000	**PITCH ATT**	**-1.0**	**0.0**		
	V/S (FT/MIN)	-2600	-2500		
30000	**PITCH ATT**	**-2.5**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-3000	-2500	-2300	-2200
20000	**PITCH ATT**	**-2.5**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-2800	-2300	-2100	-2000
10000	**PITCH ATT**	**-3.0**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-2500	-2100	-1900	-1800
SEA LEVEL	**PITCH ATT**	**-3.0**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-2300	-1900	-1700	-1600

Holding (VREF30 + 80)

Flaps Up, EPR for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
10000	**PITCH ATT**	**5.5**	**5.5**	**6.0**	**6.0**
	EPR	1.15	1.19	1.23	1.27
	(Alt Mode %N1)	(55.1)	(61.0)	(66.2)	(70.6)
	KIAS	188	205	220	235
5000	**PITCH ATT**	**5.5**	**6.0**	**6.0**	**6.5**
	EPR	1.13	1.16	1.19	1.23
	(Alt Mode %N1)	(51.5)	(57.3)	(62.1)	(66.5)
	KIAS	188	205	220	235

Terminal Area (5000 FT)

EPR for Level Flight

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 LB)			
		140	180	220	260
FLAPS 1 (GEAR UP) (VREF30 + 60)	**PITCH ATT**	**6.5**	**7.0**	**7.5**	**8.0**
	EPR	1.14	1.18	1.22	1.25
	KIAS	169	185	201	216
	(Alt Mode %N1)	(52.5)	(58.5)	(64.3)	(68.5)
FLAPS 5 (GEAR UP) (VREF30 + 40)	**PITCH ATT**	**7.0**	**7.5**	**7.5**	**8.0**
	EPR	1.15	1.19	1.23	1.27
	KIAS	149	165	181	196
	(Alt Mode %N1)	(53.1)	(59.6)	(65.2)	(69.6)
FLAPS 15 (GEAR UP) (VREF30 + 20)	**PITCH ATT**	**8.0**	**8.0**	**8.0**	**7.5**
	EPR	1.17	1.21	1.26	1.30
	KIAS	128	145	161	176
	(Alt Mode %N1)	(55.6)	(62.5)	(67.7)	(72.5)
FLAPS 20 (GEAR UP) (VREF30 + 20)	**PITCH ATT**	**5.0**	**5.0**	**5.0**	**5.0**
	EPR	1.18	1.23	1.28	1.32
	KIAS	128	145	161	176
	(Alt Mode %N1)	(57.4)	(64.1)	(69.6)	(74.3)

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

Final Approach (1500 FT)

Gear Down, EPR for 3° Glideslope

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 LB)			
		140	180	220	260
FLAPS 25 (VREF25 + 10)	**PITCH ATT**	**2.5**	**2.5**	**2.5**	**2.5**
	EPR	1.12	1.16	1.19	1.22
	KIAS	121	137	152	167
	(Alt Mode %N1)	(48.8)	(54.4)	(59.8)	(64.2)
FLAPS 30 (VREF30 + 10)	**PITCH ATT**	**1.0**	**1.0**	**0.5**	**0.5**
	EPR	1.15	1.19	1.23	1.27
	KIAS	118	135	151	165
	(Alt Mode %N1)	(52.7)	(59.5)	(64.8)	(69.5)

Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT) / SPEED (KIAS OR MACH)								
	0	5	10	15	20	25	30	35	40
	250	250	250	290	290	290	290	.78	.78
60	1.41	1.41	1.40	1.40	1.40	1.39	1.39	1.39	1.38
50	1.45	1.45	1.45	1.45	1.44	1.43	1.44	1.44	1.43
40	1.50	1.50	1.50	1.50	1.49	1.49	1.49	1.49	1.48
30	1.52	1.56	1.55	1.55	1.55	1.54	1.54	1.55	1.53
20	1.52	1.57	1.61	1.61	1.61	1.60	1.60	1.61	1.60
10	1.52	1.57	1.61	1.66	1.67	1.66	1.67	1.67	1.66
0	1.52	1.57	1.61	1.66	1.69	1.72	1.72	1.73	1.72
-10	1.52	1.57	1.61	1.66	1.69	1.72	1.75	1.77	1.76
-20 & BELOW	1.52	1.57	1.61	1.66	1.69	1.72	1.75	1.79	1.80

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)								
	0	5	10	15	20	25	30	35	40
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ENGINE ANTI-ICE ON	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02	-0.02
ENGINE & WING ANTI-ICE ON	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.04	-0.05

VREF (KIAS)

WEIGHT (1000 LB)	FLAPS		
	30	25	20
260	155	157	165
240	148	150	158
220	140	142	151
200	133	135	144
180	125	127	136
160	117	119	128
140	109	111	119

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Performance Inflight - QRH — Chapter PI-QRH
Advisory Information — Section 11

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 30
Dry Runway

	LANDING DISTANCE AND ADJUSTMENTS (FT)												
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	190000 LB LANDING WEIGHT	PER 10000 LB ABOVE/ BELOW 190000 LB	PER 1000 FT STD/ HIGH*	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABV ISA	BLW ISA	PER 10 KTS ABOVE VREF30	ONE REV	NO REV
MAX MANUAL	2670	+100/-90	60/70	-110	380	40	-30	50	-50	220	50	100
MAX AUTO	4060	+160/-160	90/120	-180	580	50	-50	90	-90	310	130	260
AUTOBRAKE 4	4390	+190/-180	110/140	-210	680	60	-60	100	-100	360	140	290
AUTOBRAKE 3	4970	+240/-230	130/170	-260	850	70	-70	130	-130	450	160	330
AUTOBRAKE 2	5500	+290/-280	160/210	-300	1010	120	-130	150	-150	460	270	450
AUTOBRAKE 1	5910	+330/-330	190/250	-350	1170	200	-210	160	-160	460	600	900

Good Reported Braking Action

MAX MANUAL	3510	+160/-140	90/120	-170	610	80	-70	80	-80	290	180	430
MAX AUTO	4250	+180/-180	100/140	-200	690	100	-90	90	-90	310	310	730
AUTOBRAKE 4	4430	+190/-190	110/140	-220	730	80	-70	100	-100	360	180	530
AUTOBRAKE 3	4970	+240/-230	130/170	-260	850	80	-70	130	-130	450	160	330

Medium Reported Braking Action

MAX MANUAL	4610	+230/-210	130/180	-260	980	190	-150	110	-110	370	520	1350
MAX AUTO	4940	+250/-240	140/190	-290	1020	200	-170	120	-120	360	650	1680
AUTOBRAKE 4	4950	+250/-240	140/190	-290	1020	200	-170	120	-120	360	640	1670
AUTOBRAKE 3	5170	+260/-240	140/190	-300	1050	160	-120	130	-130	450	450	1430

Poor Reported Braking Action

MAX MANUAL	5750	+320/-280	180/250	-380	1500	420	-280	140	-140	420	1080	3250
MAX AUTO	5810	+330/-300	190/260	-380	1510	420	-310	140	-150	410	1180	3540
AUTOBRAKE 4	5820	+330/-300	190/260	-380	1510	420	-310	140	-150	410	1180	3540
AUTOBRAKE 3	5840	+330/-300	190/260	-380	1520	410	-290	140	-150	450	1160	3510

Reference distance is for sea level, standard day, no wind or slope, VREF30 approach speed and 2 engine reverse thrust.
Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 280 ft.
Autobrake data valid for both auto and manual speedbrakes.
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply the HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Normal Configuration Landing Distance
Flaps 25
Dry Runway

	LANDING DISTANCE AND ADJUSTMENTS (FT)											
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	190000 LB LANDING WEIGHT	PER 10000 LB ABOVE/ BELOW 190000 LB	PER 1000 FT STD/ HIGH*	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABV ISA	BLW ISA	PER 10 KTS ABOVE VREF25	ONE REV	NO REV
MAX MANUAL	2710	+110/-90	60/70	-110	380	40	-30	50	-50	220	50	110
MAX AUTO	4200	+160/-160	90/120	-180	590	60	-50	90	-90	320	140	280
AUTOBRAKE 4	4550	+190/-190	110/140	-210	690	60	-60	110	-110	380	150	300
AUTOBRAKE 3	5180	+240/-230	140/180	-260	870	80	-80	140	-140	480	170	340
AUTOBRAKE 2	5760	+290/-280	170/220	-310	1040	120	-130	160	-160	490	260	460
AUTOBRAKE 1	6210	+340/-340	200/260	-360	1210	210	-220	170	-170	490	630	920

Good Reported Braking Action

MAX MANUAL	3590	+150/-140	90/120	-170	610	90	-70	80	-80	300	190	450
MAX AUTO	4390	+180/-180	110/140	-210	710	110	-100	100	-100	320	330	780
AUTOBRAKE 4	4600	+190/-190	110/150	-220	740	80	-70	110	-110	380	190	560
AUTOBRAKE 3	5180	+240/-230	140/180	-260	870	80	-80	140	-140	480	170	350

Medium Reported Braking Action

MAX MANUAL	4770	+240/-210	140/190	-270	990	200	-160	110	-120	380	550	1460
MAX AUTO	5140	+250/-240	150/200	-300	1040	210	-180	120	-130	380	700	1830
AUTOBRAKE 4	5150	+250/-240	150/200	-300	1040	210	-180	120	-130	380	690	1810
AUTOBRAKE 3	5380	+260/-240	150/200	-310	1080	170	-120	140	-140	480	490	1560

Poor Reported Braking Action

MAX MANUAL	6000	+330/-290	190/270	-390	1530	440	-300	150	-150	440	1180	3600
MAX AUTO	6080	+340/-320	200/280	-390	1550	440	-330	150	-150	430	1300	3920
AUTOBRAKE 4	6080	+340/-320	200/280	-390	1550	440	-330	150	-150	430	1290	3920
AUTOBRAKE 3	6100	+330/-310	200/270	-390	1550	430	-310	150	-160	480	1270	3900

Reference distance is for sea level, standard day, no wind or slope, VREF25 approach speed and 2 engine reverse thrust.
Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 290 ft.
Autobrake data valid for both auto and manual speedbrakes.
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply the HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Dry Runway

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	3540	70/-60	75/105	-150	530	75	-65	400
ANTI-SKID SYSTEM INOP	VREF30	4120	90/-80	100/130	-200	745	100	-85	335
FLAPS UP	VREF30+50	3720	175/-60	105/165	-160	615	60	-55	305
HYDRAULIC SYSTEM CENTER INOP	VREF30	2750	55/-45	60/75	-110	400	40	-35	240
HYDRAULIC SYSTEM LEFT INOP	VREF30	3210	65/-55	70/90	-130	465	50	-45	310
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	3490	65/-60	75/105	-140	485	55	-45	310
HYDRAULIC SYSTEM RIGHT INOP	VREF30	3250	70/-60	75/105	-140	505	70	-60	355
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	3910	75/-65	90/120	-150	525	70	-60	365
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	4050	85/-75	105/140	-165	580	100	-85	430
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	5250	110/-95	140/185	-220	750	375	-280	690

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Dry Runway

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	2890	70/-50	60/80	-110	400	40	-40	220
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	3350	100/-50	80/110	-130	440	50	-40	240
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	3600	140/-60	90/130	-130	460	50	-50	240
LE SLAT DISAGREE	VREF20	2890	70/-50	65/85	-115	440	40	-35	230
ONE ENGINE INOP	VREF20	2940	75/-50	65/85	-120	455	45	-40	240
REVERSER UNLOCK FLAPS 20	VREF30+30	3390	105/-55	80/105	-140	515	55	-50	275
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	2890	70/-50	65/85	-115	440	40	-35	230
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	3300	125/-55	75/105	-140	510	50	-45	260
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	3510	145/-55	85/125	-145	545	55	-50	275
TRAILING EDGE FLAP DISAGREE	VREF20	2890	70/-50	65/85	-115	440	40	-35	230

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Good Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT) REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS HEAD WIND	WIND ADJ PER 10 KTS TAIL WIND	SLOPE ADJ PER 1% DOWN HILL	SLOPE ADJ PER 1% UP HILL	APPROACH SPEED PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	5140	110/-95	130/165	-265	950	245	-185	590
ANTI-SKID SYSTEM INOP	VREF30	4980	120/-105	135/180	-280	1070	195	-155	390
FLAPS UP	VREF30+50	5140	105/-95	145/205	-215	770	125	-105	305
HYDRAULIC SYSTEM CENTER INOP	VREF30	3610	85/-70	90/120	-175	645	95	-80	315
HYDRAULIC SYSTEM LEFT INOP	VREF30	4260	95/-85	110/140	-205	750	130	-105	415
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	4720	95/-95	125/170	-220	790	145	-120	430
HYDRAULIC SYSTEM RIGHT INOP	VREF30	4150	100/-85	110/150	-205	745	145	-120	445
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	5330	115/-105	145/200	-240	855	180	-145	490
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	5270	120/-105	150/210	-245	855	205	-165	535
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	6750	145/-130	195/265	-310	1060	1320	-780	865

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Good Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	3880	80/-80	100/140	-180	650	100	-80	300
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	4500	90/-90	120/170	-200	700	110	-100	320
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	4930	100/-90	140/200	-210	740	120	-110	330
LE SLAT DISAGREE	VREF20	3880	115/-105	100/140	-240	855	180	-145	490
ONE ENGINE INOP	VREF20	4070	85/-80	105/145	-195	705	120	-100	335
REVERSER UNLOCK FLAPS 20	VREF30+30	4700	95/-90	125/175	-215	760	135	-115	340
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	3880	80/-75	100/140	-185	670	100	-85	300
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	4490	95/-85	120/170	-200	720	110	-95	305
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	4800	100/-90	135/180	-205	740	115	-100	305
TRAILING EDGE FLAP DISAGREE	VREF20	3880	80/-75	100/140	-185	670	100	-85	300

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Medium Reported Braking Action

LANDING CONFIGURATION	VREF	REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS HEAD WIND	WIND ADJ PER 10 KTS TAIL WIND	SLOPE ADJ PER 1% DOWN HILL	SLOPE ADJ PER 1% UP HILL	APPROACH SPEED PER 10 KTS ABOVE VREF
		LANDING DISTANCE AND ADJUSTMENTS (FT)							
AIR-GROUND LOGIC IN AIR MODE	VREF30	8380	160/-120	225/300	-530	2000	1125	-620	830
ANTI-SKID SYSTEM INOP	VREF30	6170	160/-145	185/245	-400	1655	465	-300	445
FLAPS UP	VREF30+50	7070	160/-150	225/315	-340	1260	315	-240	405
HYDRAULIC SYSTEM CENTER INOP	VREF30	4760	125/-105	140/180	-270	1055	230	-170	390
HYDRAULIC SYSTEM LEFT INOP	VREF30	5810	145/-130	170/235	-335	1270	355	-250	525
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	6600	155/-145	200/290	-365	1350	410	-290	565
HYDRAULIC SYSTEM RIGHT INOP	VREF30	5780	155/-135	180/245	-335	1275	395	-275	550
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	7450	175/-160	235/330	-395	1450	495	-345	625
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	7520	185/-165	250/355	-400	1470	550	-385	675
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	10640	235/-210	350/490	-555	1970	5660	-1995	1190

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Medium Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	5250	120/-120	160/230	-290	1070	240	-190	390
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	6040	140/-130	190/270	-320	1140	260	-210	390
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	6740	160/-150	210/300	-340	1200	290	-240	420
LE SLAT DISAGREE	VREF20	5250	175/-160	155/225	-395	1450	495	-345	625
ONE ENGINE INOP	VREF20	5770	135/-130	170/235	-325	1215	335	-245	450
REVERSER UNLOCK FLAPS 20	VREF30+30	6620	155/-145	200/280	-350	1290	365	-270	445
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	5250	125/-115	155/225	-290	1110	255	-190	385
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	6150	145/-130	190/270	-315	1190	285	-215	395
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	6550	150/-140	205/290	-325	1220	295	-225	395
TRAILING EDGE FLAP DISAGREE	VREF20	5250	125/-115	155/225	-290	1110	255	-190	385

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Poor Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT) REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS HEAD WIND	WIND ADJ PER 10 KTS TAIL WIND	SLOPE ADJ PER 1% DOWN HILL	SLOPE ADJ PER 1% UP HILL	APPROACH SPEED PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	> 15000	-	-	-	-	-	-	-
ANTI-SKID SYSTEM INOP	VREF30	8090	230/-205	260/350	-660	3115	3435	-690	490
FLAPS UP	VREF30+50	9150	230/-210	315/470	-505	1965	765	-470	480
HYDRAULIC SYSTEM CENTER INOP	VREF30	5980	165/-145	190/255	-400	1645	545	-320	435
HYDRAULIC SYSTEM LEFT INOP	VREF30	7710	205/-180	255/355	-525	2125	1035	-530	605
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	8910	225/-210	305/475	-570	2265	1200	-620	675
HYDRAULIC SYSTEM RIGHT INOP	VREF30	7750	215/-185	270/370	-530	2145	1110	-565	630
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	10050	255/-225	355/525	-625	2420	1430	-730	725
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	10250	270/-240	375/560	-635	2460	1555	-790	770
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	> 15000	-	-	-	-	-	-	-

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Poor Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	6780	170/-160	220/330	-440	1690	570	-370	450
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	7690	200/-180	260/380	-460	1770	600	-400	450
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	8680	220/-200	300/430	-500	1860	670	-450	490
LE SLAT DISAGREE	VREF20	6780	255/-225	220/330	-625	2420	1430	-730	725
ONE ENGINE INOP	VREF20	7830	200/-190	255/355	-505	1990	925	-515	545
REVERSER UNLOCK FLAPS 20	VREF30+30	8850	225/-205	290/410	-535	2080	975	-555	525
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	6780	175/-160	220/330	-435	1755	640	-375	450
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	7960	205/-185	270/395	-475	1865	705	-420	465
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	8430	215/-195	290/420	-485	1900	720	-435	460
TRAILING EDGE FLAP DISAGREE	VREF20	6780	175/-160	220/330	-435	1755	640	-375	450

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Reference Brake Energy Per Brake (Millions of Foot Pounds)

		BRAKES ON SPEED (KIAS)																	
		80			100			120			140			160			180		
WEIGHT (1000 LB)	OAT (°F)	PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT		
		0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10
260	40	9.5	11.1	12.8	14.4	17.1	19.8	20.1	24.1	28.1	26.5	31.8	37.1	33.4	39.8		40.3		
	60	9.8	11.6	13.3	14.9	17.8	20.6	20.9	25.0	29.2	27.5	33.0	38.5	34.6	41.3		41.8		
	80	10.1	12.0	13.8	15.4	18.4	21.3	21.6	25.9	30.2	28.5	34.2	39.8	35.8	42.7		43.3		
	100	10.4	12.3	14.1	15.9	18.9	21.9	22.2	26.6	31.1	29.4	35.2	41.1	36.9	44.0		44.6		
	120	10.6	12.5	14.4	16.2	19.3	22.5	22.8	27.3	31.9	30.1	36.1	42.2	37.9	45.2		45.8		
240	40	8.8	10.4	12.0	13.4	15.9	18.4	18.7	22.3	26.0	24.6	29.5	34.4	31.0	37.0	43.1	37.5		
	60	9.2	10.8	12.4	13.9	16.5	19.1	19.4	23.2	27.0	25.5	30.6	35.7	32.1	38.4	44.7	39.0		
	80	9.5	11.1	12.8	14.4	17.1	19.8	20.0	24.0	27.9	26.4	31.7	37.0	33.2	39.7	46.2	40.3		
	100	9.7	11.4	13.2	14.8	17.5	20.3	20.6	24.7	28.8	27.2	32.7	38.1	34.3	41.0	47.6	41.5		
	120	9.9	11.7	13.4	15.1	17.9	20.8	21.1	25.3	29.5	27.9	33.5	39.1	35.2	42.1	49.0	42.7		
220	40	8.2	9.6	11.1	12.4	14.7	17.0	17.2	20.6	23.9	22.6	27.2	31.7	28.5	34.1	39.8	34.7	41.3	
	60	8.5	10.0	11.5	12.9	15.2	17.6	17.9	21.3	24.8	23.5	28.2	32.9	29.6	35.4	41.3	36.0	42.8	
	80	8.8	10.3	11.9	13.3	15.8	18.2	18.5	22.1	25.7	24.3	29.2	34.0	30.6	36.7	42.7	37.2	44.3	
	100	9.0	10.6	12.2	13.6	16.2	18.8	19.0	22.7	26.5	25.0	30.0	35.1	31.5	37.8	44.0	38.3	45.6	
	120	9.2	10.8	12.4	13.9	16.6	19.2	19.5	23.3	27.1	25.6	30.8	36.0	32.4	38.8	45.2	39.4	46.9	
200	40	7.6	8.9	10.2	11.4	13.5	15.6	15.8	18.8	21.8	20.6	24.8	28.9	26.0	31.2	36.4	31.6	37.8	43.9
	60	7.9	9.2	10.6	11.8	14.0	16.2	16.4	19.5	22.7	21.4	25.7	30.0	27.0	32.3	37.7	32.8	39.2	45.6
	80	8.1	9.5	10.9	12.2	14.5	16.7	16.9	20.2	23.4	22.2	26.6	31.0	27.9	33.5	39.0	34.0	40.5	47.1
	100	8.3	9.8	11.2	12.5	14.9	17.2	17.4	20.8	24.1	22.8	27.4	31.9	28.7	34.5	40.2	35.0	41.8	48.6
	120	8.5	9.9	11.4	12.8	15.2	17.6	17.8	21.3	24.7	23.4	28.1	32.8	29.5	35.4	41.3	35.9	42.9	50.0
180	40	7.0	8.2	9.3	10.4	12.3	14.1	14.3	17.0	19.7	18.6	22.3	26.0	23.4	28.1	32.8	28.5	34.1	39.7
	60	7.2	8.5	9.7	10.8	12.7	14.7	14.8	17.7	20.5	19.3	23.2	27.0	24.3	29.1	34.0	29.5	35.4	41.2
	80	7.5	8.7	10.0	11.1	13.2	15.2	15.3	18.3	21.2	20.0	24.0	27.9	25.1	30.2	35.2	30.6	36.6	42.6
	100	7.6	8.9	10.2	11.4	13.5	15.6	15.8	18.8	21.8	20.6	24.7	28.7	25.9	31.1	36.3	31.5	37.7	44.0
	120	7.8	9.1	10.4	11.6	13.8	15.9	16.1	19.2	22.3	21.1	25.3	29.5	26.5	31.9	37.2	32.3	38.7	45.2
160	40	6.4	7.4	8.4	9.4	11.0	12.7	12.8	15.2	17.6	16.6	19.8	23.1	20.7	24.9	29.0	25.2	30.2	35.2
	60	6.6	7.7	8.8	9.7	11.5	13.2	13.3	15.8	18.3	17.2	20.6	23.9	21.5	25.8	30.1	26.1	31.3	36.6
	80	6.8	7.9	9.1	10.0	11.8	13.6	13.7	16.3	18.9	17.8	21.3	24.8	22.3	26.7	31.2	27.0	32.4	37.8
	100	6.9	8.1	9.3	10.3	12.2	14.0	14.1	16.8	19.4	18.3	21.9	25.5	22.9	27.5	32.1	27.8	33.4	39.0
	120	7.0	8.2	9.4	10.5	12.4	14.3	14.4	17.2	19.9	18.8	22.5	26.1	23.5	28.2	32.9	28.5	34.3	40.0
140	40	5.7	6.7	7.6	8.4	9.8	11.3	11.3	13.4	15.5	14.6	17.3	20.1	18.0	21.6	25.1	21.7	26.1	30.4
	60	5.9	6.9	7.9	8.7	10.2	11.7	11.8	13.9	16.1	15.1	18.0	20.9	18.7	22.4	26.1	22.6	27.1	31.6
	80	6.1	7.1	8.1	9.0	10.5	12.1	12.1	14.4	16.6	15.6	18.6	21.6	19.4	23.2	27.0	23.3	28.0	32.7
	100	6.3	7.3	8.3	9.2	10.8	12.4	12.5	14.8	17.1	16.1	19.2	22.2	19.9	23.8	27.8	24.0	28.8	33.7
	120	6.3	7.4	8.4	9.3	11.0	12.7	12.7	15.1	17.5	16.4	19.6	22.8	20.4	24.4	28.5	24.6	29.6	34.5

***To correct for wind, enter table with the brakes on speed minus one half the headwind or plus 1.5 times the tailwind. If ground speed is used for brakes on speed, ignore wind altitude, and OAT effects.**

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Adjusted Brake Energy Per Brake (Millions of Foot Pounds)

No Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)										
EVENT		10	12	14	16	18	20	22	24	26	28	30
RTO MAX MAN		10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
LANDING	MAX MAN	8.6	10.5	12.4	14.3	16.2	18.1	20.0	22.0	23.9	25.8	27.7
LANDING	MAX AUTO	8.5	10.3	12.1	13.9	15.7	17.5	19.3	21.1	22.9	24.7	26.6
LANDING	AUTOBRAKE 4	8.4	10.2	11.9	13.6	15.3	17.0	18.7	20.4	22.1	23.8	25.6
LANDING	AUTOBRAKE 3	8.3	9.9	11.5	13.1	14.7	16.3	17.9	19.5	21.1	22.7	24.3
LANDING	AUTOBRAKE 2	8.1	9.6	11.1	12.6	14.1	15.5	17.0	18.5	19.9	21.4	22.8
LANDING	AUTOBRAKE 1	7.9	9.3	10.7	12.0	13.3	14.6	15.9	17.2	18.5	19.8	21.1

Two Engine Reverse

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)										
EVENT		10	12	14	16	18	20	22	24	26	28	30
RTO MAX MAN		10.0	12.0	14.0	16.0	18.0	20.0	22.0	24.0	26.0	28.0	30.0
LANDING	MAX MAN	7.6	9.2	10.9	12.6	14.4	16.1	17.9	19.7	21.4	23.2	24.8
LANDING	MAX AUTO	5.8	7.2	8.6	10.0	11.5	12.9	14.4	15.9	17.3	18.8	20.3
LANDING	AUTOBRAKE 4	4.5	5.7	6.8	8.0	9.1	10.3	11.5	12.7	14.0	15.2	16.5
LANDING	AUTOBRAKE 3	3.3	4.2	5.1	5.9	6.9	7.8	8.7	9.7	10.7	11.7	12.7
LANDING	AUTOBRAKE 2	2.3	2.9	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0
LANDING	AUTOBRAKE 1	1.7	2.1	2.4	2.8	3.2	3.6	4.0	4.5	4.9	5.4	5.9

Cooling Time (Minutes)

	ADJUSTED BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
	8 & BELOW	9	10	12	14	16	17	18 TO 27	28 & ABOVE
INFLIGHT GEAR DOWN	NO SPECIAL PROCEDURE REQUIRED	1	2	4	5	7	7	CAUTION	FUSE PLUG MELT ZONE
GROUND		10	20	38	51	62	66		
BTMS	UP TO 2	2	2	3	3	4	5	5 TO 8	8 & ABOVE

Observe maximum quick turnaround limit.

Table shows energy per brake added by a single stop with all brakes operating. Energy is assumed to be equally distributed among the operating brakes. Total energy is the sum of residual energy plus energy added.

Add 0.65 million foot pounds per brake for each taxi mile.

For one brake deactivated, increase brake energy by 15 percent.

When in caution zone, wheel fuse plugs may melt. Delay takeoff and inspect after one hour. If overheat occurs after takeoff, extend gear soon for at least 8 minutes.

When in fuse plug melt zone, clear runway immediately. Unless required, do not set parking brake. Do not attempt to taxi for one hour. Tire, wheel and brake replacement may be required. If overheat occurs after takeoff, extend gear soon for at least 12 minutes.

Brake temperature monitor system (BTMS) indication on EICAS may be used to 10 to 15 minutes after airplane has come to a complete stop, or inflight with gear retracted, to determine recommended cooling schedule.

Performance Inflight - QRH — Chapter PI-QRH

Engine Inoperative — Section 12

ENGINE INOP

Initial Max Continuous EPR

Based on engine bleed for one pack on

PRESSURE ALTITUDE (FT)		CRUISE MACH NUMBER .72	.76	.80
41000	EPR	1.81	1.80	1.79
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.04	0.04	0.04
39000	EPR	1.81	1.80	1.79
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.04	0.04	0.04
37000	EPR	1.82	1.80	1.79
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.04	0.04	0.04
35000	EPR	1.81	1.80	1.79
	MAX TAT (SAT)	-21 (-44)	-18 (-44)	-15 (-44)
	EPR CORR	0.05	0.05	0.05
33000	EPR	1.80	1.79	1.78
	MAX TAT (SAT)	-16 (-40)	-14 (-41)	-11 (-41)
	EPR CORR	0.05	0.05	0.05
31000	EPR	1.79	1.78	1.77
	MAX TAT (SAT)	-12 (-36)	-9 (-36)	-6 (-36)
	EPR CORR	0.05	0.05	0.05

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

ENGINE INOP

Max Continuous EPR

41000 FT to 22000 FT Pressure Altitudes

Based on engine bleed for one pack on and anti-ice off

PRESSURE ALTITUDE (FT)		KIAS					MACH NUMBER					
		180	200	220	240	260	.70	.72	.74	.76	.78	.80
41000	EPR		1.82	1.81	1.79		1.82	1.81	1.81	1.80	1.80	1.79
	MAX TAT		-25	-21	-17		-24	-23	-22	-20	-19	-17
	EPR CORR		0.04	0.04	0.04		0.04	0.04	0.04	0.04	0.04	0.04
39000	EPR		1.83	1.82	1.80	1.78	1.82	1.81	1.81	1.80	1.80	-1.79
	MAX TAT		-27	-23	-19	-15	-24	-23	-22	-20	-19	-17
	EPR CORR		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
37000	EPR		1.84	1.82	1.81	1.79	1.82	1.82	1.81	1.80	1.80	1.79
	MAX TAT		-29	-25	-21	-17	-24	-23	-22	-20	-19	-17
	EPR CORR		0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
35000	EPR		1.84	1.82	1.81	1.80	1.81	1.81	1.80	1.80	1.79	1.79
	MAX TAT		-28	-24	-21	-17	-22	-21	-19	-18	-16	-15
	EPR CORR		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
33000	EPR		1.83	1.82	1.81	1.80	1.81	1.80	1.79	1.79	1.78	1.78
	MAX TAT		-25	-22	-19	-15	-18	-16	-15	-14	-12	-11
	EPR CORR		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
31000	EPR		1.83	1.82	1.81	1.79	1.80	1.79	1.78	1.78	1.77	1.77
	MAX TAT		-22	-19	-16	-13	-13	-12	-10	-9	-8	-6
	EPR CORR		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
29000	EPR		1.82	1.81	1.80	1.79	1.79	1.78	1.77	1.77	1.76	1.75
	MAX TAT		-19	-16	-13	-10	-9	-7	-6	-5	-3	-2
	EPR CORR		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
27000	EPR		1.82	1.81	1.80	1.79	1.78	1.77	1.76	1.76	1.75	1.74
	MAX TAT		-16	-13	-11	-8	-5	-3	-2	0	1	3
	EPR CORR		0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
25000	EPR	1.82	1.81	1.80	1.80	1.79	1.77	1.76	1.75	1.75	1.74	1.73
	MAX TAT	-15	-13	-10	-8	-5	0	1	3	4	6	7
	EPR CORR	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
22000	EPR	1.81	1.80	1.80	1.79	1.78	1.75	1.74	1.73	1.72	1.72	
	MAX TAT	-10	-8	-6	-3	-1	6	8	9	11	12	
	EPR CORR	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

EPR Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	0	10	20	30	40
PACKS OFF	0.01	0.01	0.01	0.01	0.01
ENGINE ANTI-ICE ON	-0.01	-0.01	-0.01	-0.01	-0.02
ENGINE & WING ANTI-ICE ON	-0.03	-0.03	-0.03	-0.05	-0.08

ENGINE INOP

Max Continuous EPR

20000 FT to Sea Level Pressure Altitudes

Based on engine bleed for one pack on and anti-ice off

PRESSURE ALTITUDE (FT)		KIAS					MACH NUMBER					
		180	200	220	240	260	.70	.72	.74	.76	.78	.80
20000	EPR	1.80	1.80	1.79	1.78	1.77	1.73	1.72	1.71	1.71		
	MAX TAT	-6	-5	-3	0	2	11	12	14	15		
	EPR CORR	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06		
18000	EPR	1.79	1.78	1.78	1.77	1.76	1.71	1.70	1.69			
	MAX TAT	-3	-1	1	3	5	15	17	18			
	EPR CORR	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06			
16000	EPR	1.78	1.77	1.76	1.75	1.74	1.69					
	MAX TAT	0	2	4	6	8	19					
	EPR CORR	0.06	0.06	0.06	0.06	0.06	0.06					
14000	EPR	1.76	1.75	1.75	1.74	1.73						
	MAX TAT	4	6	7	9	11						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
12000	EPR	1.75	1.74	1.73	1.72	1.71						
	MAX TAT	8	9	11	12	14						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
10000	EPR	1.73	1.72	1.71	1.70	1.69						
	MAX TAT	11	13	14	16	17						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
5000	EPR	1.68	1.67	1.67	1.66	1.65						
	MAX TAT	20	21	23	24	26						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
1500	EPR	1.63	1.62	1.62	1.61	1.60						
	MAX TAT	27	28	29	30	32						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
0	EPR	1.61	1.60	1.60	1.59	1.58						
	MAX TAT	29	30	32	33	34						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

EPR Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)				
	0	10	20	30	40
PACKS OFF	0.01	0.01	0.01	0.01	0.01
ENGINE ANTI-ICE ON	-0.01	-0.01	-0.01	-0.01	-0.02
ENGINE & WING ANTI-ICE ON	-0.03	-0.03	-0.03	-0.05	-0.08

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude

100 ft/min residual rate of climb
Includes APU fuel burn

WEIGHT (1000 LB)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFT DOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	250	254	19300	18100	16600
240	231	245	21700	20700	19400
220	212	235	24000	23100	22100
200	193	224	26500	25700	24800
180	174	213	29100	28400	27600
160	154	201	32000	31300	30600
140	135	189	35300	34500	33800

Driftdown/LRC Cruise Range Capability

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
278	258	240	225	212	200	189	180	171	163	156
557	516	481	451	424	400	379	360	342	327	312
831	771	720	675	635	600	568	540	514	491	470
1101	1024	957	898	846	800	758	721	687	656	628
1370	1276	1194	1121	1057	1000	949	902	860	822	787
1639	1527	1430	1344	1268	1200	1139	1084	1034	988	947
1908	1779	1666	1567	1479	1400	1329	1265	1207	1154	1106
2179	2032	1904	1790	1690	1600	1519	1446	1380	1319	1264
2454	2288	2143	2015	1901	1800	1709	1627	1552	1484	1421

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 LB)						TIME (HR:MIN)
	WEIGHT AT START OF DRIFTDOWN (1000 LB)						
	160	180	200	220	240	260	
200	2.8	3.1	3.4	3.7	3.9	4.2	0:34
400	6.2	6.8	7.5	8.1	8.8	9.5	1:08
600	9.3	10.3	11.3	12.3	13.3	14.4	1:40
800	12.3	13.6	14.9	16.3	17.7	19.1	2:11
1000	15.2	16.9	18.6	20.3	22.0	23.8	2:42
1200	18.2	20.2	22.2	24.2	26.3	28.4	3:13
1400	21.0	23.4	25.7	28.1	30.5	33.0	3:44
1600	23.8	26.5	29.2	31.9	34.6	37.4	4:15
1800	26.6	29.6	32.6	35.6	38.7	41.9	4:48

Includes APU fuel burn.
Driftdown at optimum driftdown speed and cruise at Long Range Cruise speed.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	14600	11500	8300
250	16300	13700	10300
240	17900	15700	12500
230	19500	17500	14900
220	20900	19300	17000
210	22300	20900	19100
200	23700	22400	20900
190	25200	23900	22400
180	26600	25500	24100
170	28100	27000	25800
160	29600	28600	27400
150	31200	30300	29100
140	32900	32000	31000
130	34700	33800	32900
120	36600	35800	34800

With engine anti-ice on, decrease altitude capability by 1000 ft.
With engine and wing anti-ice on, decrease altitude capability by 3400 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)								
		10	14	18	21	23	25	27	29	31
260	EPR	1.57	1.65							
	MACH	.574	.606							
	KIAS	319	313							
	FF/ENG	9867	9808							
240	EPR	1.54	1.61	1.70						
	MACH	.557	.590	.623						
	KIAS	309	304	298						
	FF/ENG	9127	9040	9034						
220	EPR	1.50	1.57	1.65	1.72					
	MACH	.539	.572	.605	.632					
	KIAS	299	295	289	285					
	FF/ENG	8411	8292	8244	8273					
200	EPR	1.47	1.53	1.61	1.67	1.72	1.77			
	MACH	.519	.552	.586	.611	.629	.650			
	KIAS	288	284	279	275	272	270			
	FF/ENG	7710	7557	7483	7466	7487	7555			
180	EPR	1.43	1.49	1.56	1.62	1.67	1.71	1.76		
	MACH	.497	.530	.564	.590	.607	.625	.646		
	KIAS	275	272	269	265	262	259	257		
	FF/ENG	7015	6856	6744	6702	6692	6702	6773		
160	EPR	1.40	1.45	1.51	1.57	1.61	1.66	1.70	1.75	1.80
	MACH	.474	.505	.539	.566	.583	.601	.619	.639	.661
	KIAS	262	260	257	254	251	249	246	244	242
	FF/ENG	6347	6161	6030	5964	5936	5922	5925	5984	6108
140	EPR	1.36	1.41	1.47	1.51	1.55	1.59	1.64	1.68	1.73
	MACH	.448	.479	.511	.538	.555	.573	.591	.610	.629
	KIAS	247	246	243	241	239	237	234	232	229
	FF/ENG	5655	5491	5339	5253	5207	5177	5159	5155	5193
120	EPR	1.31	1.36	1.41	1.46	1.49	1.53	1.57	1.61	1.66
	MACH	.413	.448	.481	.505	.523	.541	.560	.578	.597
	KIAS	228	230	228	226	224	223	221	219	217
	FF/ENG	4875	4811	4668	4565	4513	4463	4428	4406	4394

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
288	265	245	228	213	200	190	181	173	166	159
576	531	490	456	427	400	381	363	347	332	319
866	797	736	684	640	600	572	545	521	499	479
1156	1064	982	913	853	800	762	726	694	665	639
1448	1332	1229	1142	1067	1000	952	909	868	832	799
1741	1601	1477	1372	1281	1200	1143	1090	1041	997	958
2036	1871	1725	1602	1495	1400	1333	1271	1214	1163	1117
2332	2142	1974	1832	1709	1600	1523	1452	1387	1329	1276
2630	2414	2223	2062	1924	1800	1713	1633	1560	1494	1434

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		28	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN
200	4.5	0:41	3.9	0:40	3.5	0:39	3.2	0:38	2.8	0:36
400	9.2	1:18	8.3	1:15	7.7	1:12	7.2	1:10	6.7	1:06
600	13.9	1:55	12.7	1:50	11.8	1:46	11.1	1:42	10.5	1:36
800	18.5	2:32	17.0	2:26	15.9	2:20	15.0	2:14	14.2	2:06
1000	23.0	3:10	21.2	3:02	19.9	2:54	18.8	2:47	17.8	2:37
1200	27.5	3:48	25.4	3:38	23.8	3:28	22.5	3:20	21.4	3:07
1400	32.0	4:27	29.6	4:14	27.7	4:03	26.3	3:53	24.9	3:38
1600	36.4	5:06	33.7	4:51	31.6	4:38	29.9	4:27	28.4	4:09
1800	40.7	5:45	37.8	5:29	35.4	5:13	33.5	5:00	31.8	4:41

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)					
	160	180	200	220	240	260
5	-0.4	-0.2	0.0	0.3	0.6	1.0
10	-0.8	-0.4	0.0	0.8	1.5	2.2
15	-1.3	-0.7	0.0	1.2	2.3	3.5
20	-1.7	-0.9	0.0	1.6	3.2	4.8
25	-2.2	-1.1	0.0	2.1	4.1	6.1
30	-2.7	-1.3	0.0	2.5	4.9	7.3
35	-3.1	-1.6	0.0	2.9	5.8	8.6
40	-3.6	-1.8	0.0	3.3	6.7	9.9
45	-4.1	-2.0	0.0	3.8	7.6	11.3

Includes APU fuel burn.

ENGINE INOP

MAX CONTINUOUS THRUST

Holding

Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
260	EPR	1.39	1.45	1.54	1.65			
	KIAS	235	235	235	235			
	FF/ENG	8720	8640	8590	8710			
240	EPR	1.37	1.41	1.50	1.60	1.73		
	KIAS	228	228	228	228	228		
	FF/ENG	8070	7970	7890	7930	8170		
220	EPR	1.34	1.38	1.46	1.55	1.67		
	KIAS	220	220	220	220	220		
	FF/ENG	7420	7320	7220	7200	7330		
200	EPR	1.31	1.35	1.42	1.51	1.61	1.75	
	KIAS	213	213	213	213	213	213	
	FF/ENG	6770	6680	6570	6510	6550	6790	
180	EPR	1.28	1.32	1.38	1.46	1.56	1.68	
	KIAS	205	205	205	205	205	205	
	FF/ENG	6130	6050	5940	5850	5830	5950	
160	EPR	1.25	1.28	1.34	1.41	1.50	1.61	1.75
	KIAS	197	197	197	197	197	197	197
	FF/ENG	5490	5430	5320	5220	5160	5190	5420
140	EPR	1.22	1.25	1.30	1.36	1.44	1.54	1.66
	KIAS	188	188	188	188	188	188	188
	FF/ENG	4870	4800	4710	4620	4540	4510	4580
120	EPR	1.19	1.22	1.26	1.32	1.39	1.47	1.58
	KIAS	179	179	179	179	179	179	179
	FF/ENG	4250	4190	4110	4030	3940	3880	3870

This table includes 5% additional fuel for holding in a racetrack pattern.

Performance Inflight - QRH — Chapter PI-QRH
Gear Down — Section 13

GEAR DOWN

210 KIAS Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)														
	0	5	10	12	14	16	18	20	22	24	26	28	30	32	34
55	1.43	1.43	1.43	1.43	1.43	1.43	1.42	1.42	1.42	1.41	1.41	1.41	1.41	1.41	1.41
50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.44	1.44	1.44	1.44	1.44	1.44	1.44	1.44
45	1.48	1.48	1.48	1.48	1.48	1.47	1.47	1.47	1.46	1.46	1.46	1.46	1.46	1.46	1.46
40	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.49	1.49	1.49	1.49	1.49	1.49	1.49	1.49
35	1.53	1.53	1.53	1.53	1.53	1.53	1.52	1.52	1.52	1.51	1.51	1.51	1.51	1.52	1.52
30	1.55	1.56	1.55	1.55	1.56	1.55	1.55	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
25	1.55	1.58	1.58	1.58	1.58	1.58	1.58	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57
20	1.55	1.60	1.61	1.61	1.61	1.61	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.61
15	1.55	1.60	1.64	1.64	1.64	1.64	1.64	1.63	1.63	1.63	1.63	1.63	1.63	1.64	1.64
10	1.55	1.60	1.65	1.67	1.68	1.67	1.67	1.66	1.66	1.66	1.66	1.66	1.66	1.67	1.67
5	1.55	1.60	1.65	1.68	1.70	1.70	1.70	1.69	1.69	1.69	1.69	1.69	1.69	1.70	1.70
0	1.55	1.60	1.65	1.68	1.70	1.71	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.72	1.73
-5	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.75	1.74	1.74	1.75	1.75	1.75	1.75
-10	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.77	1.77	1.77	1.77	1.77
-15	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.78	1.79	1.79	1.79	1.79
-20	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.78	1.79	1.80	1.81	1.81
-25	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.78	1.79	1.80	1.82	1.83
-30	1.55	1.60	1.65	1.68	1.70	1.71	1.73	1.74	1.76	1.77	1.78	1.79	1.80	1.82	1.83

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)											
	0	5	10	12	16	20	24	26	28	30	32	34
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ENGINE ANTI-ICE ON	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.02
ENGINE & WING ANTI-ICE ON	-0.01	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03	-0.04

Long Range Cruise Altitude Capability

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	19800	16700	13700
250	21400	18700	15800
240	23100	20600	17700
230	24800	22600	19600
220	26500	24400	21800
210	28200	26300	23900
200	29800	28200	26100
190	31200	29900	28200
180	32700	31500	30000
170	34100	33100	31700
160	35600	34700	33500
150	36800	36100	35200
140	37900	37300	36600
130	39200	38500	37800
120	40500	39700	39000

GEAR DOWN

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)										
		10	14	18	21	23	25	27	29	31	33	35
260	EPR	1.47	1.54	1.62								
	MACH	.455	.485	.515								
	KIAS	254	251	247								
	FF/ENG	7405	7267	7158								
240	EPR	1.44	1.51	1.58	1.64	1.69						
	MACH	.440	.470	.500	.524	.540						
	KIAS	246	243	240	237	234						
	FF/ENG	6877	6730	6607	6555	6541						
220	EPR	1.41	1.47	1.54	1.60	1.64	1.69					
	MACH	.424	.453	.484	.508	.524	.540					
	KIAS	236	234	232	229	227	225					
	FF/ENG	6331	6190	6074	6002	5968	5955					
200	EPR	1.38	1.44	1.50	1.56	1.60	1.64	1.69	1.74			
	MACH	.406	.436	.466	.490	.506	.522	.539	.556			
	KIAS	226	225	223	221	219	217	215	213			
	FF/ENG	5780	5673	5543	5460	5420	5383	5377	5408			
180	EPR	1.34	1.40	1.46	1.51	1.55	1.59	1.63	1.68	1.73		
	MACH	.384	.416	.446	.470	.486	.502	.519	.537	.560		
	KIAS	214	215	213	212	210	208	207	205	205		
	FF/ENG	5205	5128	5015	4937	4888	4843	4816	4815	4908		
160	EPR	1.31	1.36	1.42	1.46	1.50	1.54	1.58	1.62	1.67	1.73	1.79
	MACH	.363	.393	.424	.448	.464	.480	.496	.516	.539	.562	.587
	KIAS	202	202	202	201	200	199	197	197	197	197	197
	FF/ENG	4640	4573	4490	4414	4366	4315	4277	4282	4320	4409	4528
140	EPR	1.27	1.32	1.37	1.41	1.45	1.48	1.52	1.57	1.61	1.66	1.72
	MACH	.341	.367	.398	.423	.439	.456	.475	.495	.517	.539	.563
	KIAS	189	189	190	190	189	188	188	188	188	188	188
	FF/ENG	4080	4007	3950	3894	3854	3811	3796	3792	3802	3841	3911
120	EPR	1.24	1.28	1.33	1.37	1.40	1.43	1.47	1.51	1.55	1.60	1.65
	MACH	.323	.349	.377	.400	.417	.434	.453	.472	.493	.514	.537
	KIAS	179	179	179	179	179	179	179	179	179	179	179
	FF/ENG	3613	3558	3605	3440	3405	3425	3401	3384	3325	3339	3365

GEAR DOWN

Long Range Cruise Enroute Fuel and Time

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
327	292	261	237	217	200	188	178	168	160	152
659	586	524	475	435	400	377	356	337	319	304
998	886	791	715	654	600	565	533	504	478	456
1342	1189	1059	956	873	800	753	711	672	638	608
1692	1496	1329	1198	1092	1000	941	888	840	797	759
2048	1807	1602	1442	1312	1200	1129	1064	1006	954	909
2411	2123	1877	1686	1533	1400	1317	1241	1173	1112	1059
2781	2443	2155	1933	1754	1600	1504	1417	1339	1270	1209
3157	2766	2435	2180	1976	1800	1692	1593	1505	1427	1358

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		28	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN
200	8.4	0:51	7.6	0:49	6.8	0:47	6.2	0:45	5.4	0:43
400	17.1	1:39	15.6	1:34	14.3	1:29	13.2	1:26	11.9	1:21
600	25.5	2:28	23.5	2:20	21.6	2:13	20.0	2:07	18.1	1:59
800	33.8	3:18	31.2	3:06	28.8	2:57	26.7	2:48	24.3	2:37
1000	41.9	4:10	38.7	3:54	35.8	3:41	33.3	3:30	30.3	3:16
1200	49.8	5:02	46.1	4:43	42.7	4:27	39.7	4:13	36.1	3:56
1400	57.5	5:56	53.3	5:33	49.4	5:13	46.0	4:57	41.8	4:36
1600	65.0	6:52	60.3	6:25	56.0	6:01	52.1	5:41	47.5	5:16
1800	72.3	7:48	67.2	7:17	62.5	6:50	58.2	6:26	52.9	5:57

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)					
	160	180	200	220	240	260
10	-1.0	-0.5	0.0	0.7	1.4	2.2
20	-2.0	-1.0	0.0	1.5	3.0	4.6
30	-3.1	-1.5	0.0	2.2	4.5	6.9
40	-4.3	-2.1	0.0	2.9	5.9	9.1
50	-5.4	-2.6	0.0	3.5	7.3	11.2
60	-6.5	-3.2	0.0	4.2	8.6	13.2
70	-7.6	-3.8	0.0	4.7	9.8	15.1

Descent at VREF30 + 80

PRESSURE ALT (1000 FT)	5	10	15	17	19	21	23	25	27	29	31	33	35
DISTANCE (NM)	12	21	30	34	38	41	45	49	53	57	61	65	69
TIME (MINUTES)	7	9	11	12	13	13	14	15	16	16	17	18	18

GEAR DOWN

Holding
Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
260	EPR	1.33	1.37	1.45	1.54	1.64		
	KIAS	235	235	235	235	235		
	FF/ENG	7390	7280	7150	7090	7150		
240	EPR	1.31	1.35	1.42	1.50	1.60		
	KIAS	228	228	228	228	228		
	FF/ENG	6880	6780	6640	6560	6570		
220	EPR	1.29	1.32	1.39	1.47	1.56	1.68	
	KIAS	220	220	220	220	220	220	
	FF/ENG	6370	6290	6150	6050	6020	6110	
200	EPR	1.26	1.30	1.36	1.43	1.52	1.63	
	KIAS	213	213	213	213	213	213	
	FF/ENG	5870	5800	5670	5560	5490	5520	
180	EPR	1.24	1.27	1.33	1.40	1.48	1.58	1.71
	KIAS	205	205	205	205	205	205	205
	FF/ENG	5380	5310	5200	5080	5000	4980	5100
160	EPR	1.22	1.25	1.30	1.36	1.44	1.53	1.65
	KIAS	197	197	197	197	197	197	197
	FF/ENG	4900	4830	4730	4630	4530	4480	4510
140	EPR	1.20	1.23	1.27	1.33	1.40	1.48	1.59
	KIAS	188	188	188	188	188	188	188
	FF/ENG	4420	4350	4260	4180	4070	4000	3980
120	EPR	1.18	1.20	1.24	1.29	1.35	1.43	1.53
	KIAS	179	179	179	179	179	179	179
	FF/ENG	4270	3880	3790	3720	3630	3600	3550

This table includes 5% additional fuel for holding in a racetrack pattern.

Performance Inflight - QRH — Chapter PI-QRH

Gear Down, Engine Inop — Section 14

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude

100 ft/min residual rate of climb
Includes APU fuel burn

WEIGHT (1000 LB)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFT DOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
240	226	225	3300		
220	208	218	7000	4900	2300
200	190	210	10500	8800	6600
180	171	203	14100	12700	10800
160	152	195	17400	16300	15000
140	134	187	20700	19900	18900

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA+10°C & BELOW	ISA+15°C	ISA+20°C
210	5700	2100	
200	8100	5400	1300
190	10600	8100	5200
180	12400	10700	8100
170	14400	12800	10900
160	16200	14900	13200
150	17900	16800	15400
140	19700	18700	17500
130	21500	20600	19600
120	23200	22500	21500

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)							
		6	8	10	12	14	16	18	20
200	EPR	1.62	1.66	1.70					
	MACH	.363	.374	.383					
	KIAS	217	216	213					
	FF/ENG	10785	10750	10700					
180	EPR	1.56	1.60	1.65	1.69	1.75			
	MACH	.348	.359	.370	.383	.398			
	KIAS	208	207	206	205	205			
	FF/ENG	9711	9658	9610	9656	9795			
160	EPR	1.51	1.55	1.59	1.63	1.68	1.73		
	MACH	.333	.343	.354	.368	.382	.397		
	KIAS	199	198	197	197	197	197		
	FF/ENG	8698	8611	8561	8594	8661	8774		
140	EPR	1.46	1.49	1.53	1.57	1.62	1.66	1.72	1.77
	MACH	.315	.327	.339	.352	.366	.380	.396	.412
	KIAS	188	188	188	188	188	188	188	188
	FF/ENG	7680	7644	7621	7617	7635	7683	7769	7906
120	EPR	1.41	1.44	1.47	1.51	1.55	1.59	1.64	1.69
	MACH	.300	.311	.323	.335	.349	.362	.377	.392
	KIAS	179	179	179	179	179	179	179	179
	FF/ENG	6808	6763	6724	6700	6685	6689	6719	6777

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
171	151	133	120	109	100	94	88	82	78	74
346	304	268	241	219	200	187	174	164	155	147
523	459	405	362	329	300	280	262	246	232	220
702	615	541	484	439	400	373	349	328	309	293
881	771	677	606	549	500	466	436	409	386	366
1062	928	815	728	659	600	560	524	491	463	439
1245	1087	954	851	770	700	653	610	573	540	511
1429	1246	1091	974	880	800	746	697	654	616	583

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)							
	6		10		14		18	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)
100	4.4	0:29	4.0	0:28	3.6	0:27	3.3	0:26
200	9.0	0:55	8.3	0:53	7.8	0:51	7.5	0:48
300	13.6	1:21	12.6	1:18	12.0	1:14	11.6	1:11
400	18.0	1:48	16.9	1:43	16.1	1:38	15.6	1:33
500	22.5	2:14	21.0	2:09	20.1	2:02	19.6	1:55
600	26.8	2:41	25.2	2:34	24.0	2:26	23.5	2:18
700	31.1	3:08	29.2	3:00	27.9	2:50	27.3	2:41
800	35.4	3:36	33.2	3:26	31.8	3:15	31.0	3:04

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)					
	160	180	200	220	240	260
5	-0.5	-0.3	0.0	0.3	0.7	1.0
10	-1.0	-0.5	0.0	0.8	1.5	2.3
15	-1.6	-0.8	0.0	1.2	2.4	3.5
20	-2.1	-1.1	0.0	1.6	3.2	4.7
25	-2.7	-1.4	0.0	2.0	4.0	6.0
30	-3.2	-1.6	0.0	2.5	4.9	7.3
35	-3.7	-1.9	0.0	2.9	5.7	8.5

Includes APU fuel burn.

GEAR DOWN

ENGINE INOP

MAX CONTINUOUS THRUST

Holding

Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)			
		1500	5000	10000	15000
240	EPR	1.60			
	KIAS	228			
	FF/ENG	13170			
220	EPR	1.56	1.63		
	KIAS	220	220		
	FF/ENG	12070	12120		
200	EPR	1.52	1.58	1.70	
	KIAS	213	213	213	
	FF/ENG	11030	11020	11200	
180	EPR	1.47	1.54	1.64	
	KIAS	205	205	205	
	FF/ENG	10050	10000	10050	
160	EPR	1.43	1.49	1.59	1.71
	KIAS	197	197	197	197
	FF/ENG	9100	9020	8990	9150
140	EPR	1.39	1.44	1.53	1.64
	KIAS	188	188	188	188
	FF/ENG	8190	8090	8000	8040
120	EPR	1.34	1.39	1.47	1.57
	KIAS	179	179	179	179
	FF/ENG	7280	7180	7060	7020

This table includes 5% additional fuel for holding in a racetrack pattern.

Performance Inflight - QRH — Chapter PI-QRH
Text — Section 15

Introduction

This chapter contains information to supplement performance data from the Flight Management Computer (FMC). In addition, sufficient inflight data is provided to complete a flight with the FMC inoperative. In the event of conflict between data presented in this chapter and that contained in the approved Airplane Flight Manual, the Flight Manual shall always take precedence.

General

Flight with Unreliable Airspeed / Turbulent Air Penetration

Pitch attitude and average EPR information is provided for use in all phases of flight in the event of unreliable airspeed/Mach indications resulting from blocking or freezing of the pitot system. Loss of radome or turbulent air may also cause unreliable airspeed/Mach indications. The cruise table in this section may also be used for turbulent air penetration.

Pitch attitude is shown in bold type for emphasis since altitude and/or vertical speed indications may also be unreliable.

Max Climb EPR

This table shows Max Climb EPR for a 250/290/.78 climb speed schedule, normal engine bleed for packs on and anti-ice off. Enter the table with airport pressure altitude and TAT and read EPR. EPR adjustments are shown for packs off and anti-ice operation.

VREF

The Reference Speed table contains flaps 30, 25 and 20 landing speeds for a given weight.

Advisory Information

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distance on dry runways and slippery runways with good, medium, and poor reported braking action. These values are actual landing distances and do not include the 1.67 regulatory factor. Therefore, they cannot be used to determine the dispatch required landing field length.

To use these tables, determine the reference landing distance for the selected braking configuration. Then adjust the reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers to obtain the actual landing distance.

When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. If the surface is affected by water, snow, or ice and the braking action is reported as "good", conditions should not be expected to be as good as on clean, dry runways. The value "good" is comparative and is intended to mean that airplanes should not experience braking or directional control difficulties when landing. The performance level used to calculate the "good" data is consistent with wet runway testing done on early Boeing jets. The performance level used to calculate "poor" data reflects runways covered with wet ice.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" braking action, the airplane may not be able to achieve these deceleration rates. In these cases, runway slope and inoperative reversers influence the stopping distance. Since it cannot be determined quickly when this becomes a factor, it is conservative to add the effects of slope and inoperative reversers when using the autobrake system.

Non-normal Configuration Landing Distance

Advisory information is provided to support non-normal configurations that affect the landing performance of the airplane. Landing distances and adjustments are provided for dry runways and runways with good, medium, and poor reported braking action.

Enter the table with the applicable non-normal configuration and read the normal approach speed. The reference landing distance is a reference distance from 50 ft above the threshold to stop based on a reference landing weight and speed at sea level, zero wind, and zero slope. Subsequent columns provide adjustments for off-reference landing weight, altitude, wind, slope, and speed conditions. Each adjustment is independently added to the reference landing distance. Landing distance includes the effects of max manual braking and reverse thrust.

Recommeded Brake Cooling Schedule

Advisory information is provided to assist in avoiding the problems associated with hot brakes. For normal operation, most landings are at weights below the AFM quick turnaround limit weight.

Use of the recommended cooling schedule will help avoid brake overheat and fuse plug problems that could result from repeated landings at short time intervals or a rejected takeoff.

Enter the Recommended Brake Cooling Schedule table with the airplane weight and brakes on speed, adjusted for wind, at the appropriate temperature and altitude condition. Instructions for applying wind adjustments are included below the table. Linear interpolation may be used to obtain intermediate values. The resulting number is the reference brake energy per brake in millions of foot-pounds, and represents the amount of energy absorbed by each brake during a rejected takeoff

To determine the energy per brake absorbed during landing, enter the appropriate Adjusted Brake Energy Per Brake table (No Reverse Thrust or Two Engine Reverse) with the reference brake energy per brake and the type of braking used during landing (Max Manual, Max Auto, or Autobrake). The resulting number is the adjusted brake energy per brake and represents the energy absorbed in each brake during the landing.

The recommended cooling time is found in the final table by entering with the adjusted brake energy per brake or brake temperature monitor system (BTMS) indication on EICAS. Times are provided for ground cooling and inflight gear down cooling.

If brake temperature monitor indication on EICAS is available, the hottest brake indication 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted, may be used to determine the recommended cooling schedule by entering at the bottom of the chart. The brake temperature light illuminates when the hottest brake is registering 5 on the EICAS indication and extinguishes as the hottest brake cools with an EICAS indication of 4.

Engine Inoperative

Initial Max Continuous EPR

The Initial Max Continuous EPR setting for use following an engine failure is shown. The table shows a range of Cruise Mach numbers to provide a target EPR setting at the start of driftdown. Also shown is the maximum TAT at which the limit EPR can be set. Once driftdown is established, the Max Continuous EPR table should be used to determine EPR for the given conditions.

Max Continuous EPR

Power setting is based on one engine operating with one A/C pack operating and all anti-ice bleeds off. Enter the table with pressure altitude and IAS or Mach to read EPR.

It is desirable to maintain engine thrust level within the limits of the Max Cruise thrust rating. However, where thrust level in excess of Max Cruise rating is required, such as for meeting terrain clearance, ATC altitude assignments, or to attain maximum range capability, it is permissible to use the thrust needed up to the Max Continuous thrust rating. The Max Continuous thrust rating is intended primarily for emergency use at the discretion of the pilot and is the maximum thrust that may be used continuously.

Driftdown Speed/Level Off Altitude

The table shows optimum driftdown speed as a function of cruise weight at start of driftdown. Also shown are the approximate weight and pressure altitude at which the airplane will level off considering 100 ft/min residual rate of climb.

The level off altitude is dependent on air temperature (ISA deviation).

Driftdown/LRC Range Capability

This table shows the range capability from the start of driftdown. Driftdown is continued to level off altitude. As weight decreases due to fuel burn, the airplane is accelerated to Long Range Cruise speed. Cruise is continued at level off altitude and Long Range Cruise speed.

To determine fuel required, enter the Ground to Air Miles Conversion table with the desired ground distance and adjust for anticipated winds to obtain air distance to destination. Then enter the Driftdown/Cruise Fuel and Time table with air distance and weight at start of driftdown to determine fuel and time required. If altitudes other than the level off altitude are used, fuel and time required may be obtained by using the Engine Inoperative Long Range Cruise Enroute Fuel and Time table.

Long Range Cruise Altitude Capability

The table shows the maximum altitude that can be maintained at a given weight and air temperature (ISA deviation), based on Long Range Cruise speed, Max Continuous thrust, and 100 ft/min residual rate of climb.

Long Range Cruise Control

The table provides target EPR, engine inoperative Long Range Cruise Mach number, IAS and fuel flow for the airplane weight and pressure altitude. The fuel flow values in this table reflect single engine fuel burn.

Long Range Cruise Diversion Fuel and Time

Tables are provided for crews to determine the fuel and time required to proceed to an alternate airfield with one engine inoperative. The data is based on single engine Long Range Cruise speed and .78/290/250 descent. Enter with Air Distance as determined from the Ground to Air Miles Conversion table and read Fuel and Time required at the cruise pressure altitude. Adjust the fuel obtained for deviation from the reference weight at checkpoint as required by entering the Fuel Required Adjustment table with the fuel required for the reference weight and the actual weight at checkpoint.

Holding

Target EPR, indicated airspeed and fuel flow per engine information is tabulated for holding with flaps up based on the FMC optimum holding speed schedule. This is the higher of the maximum endurance speed and the maneuvering speed. Small variations in airspeed will not appreciably affect the overall endurance time. Enter the table with weight and pressure altitude to read EPR, IAS and fuel flow per engine.

Gear Down

This section contains performance for airplane operation with the landing gear extended for all phases of flight. The data is based on engine bleeds for normal air conditioning.

NOTE: The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS will generate inaccurate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA), maximum altitude, and compute overly shallow descent path. To obtain accurate ETA predictions, gear down cruise speed and altitude should be entered on the CLB and CRZ pages. Gear down cruise speed should also be entered on the DES page and a STEP SIZE of zero should be entered on the PERF INIT or CRZ page. Use of the VNAV during descent under these circumstances is not recommended.

Tables for gear down performance in this section are identical in format and used in the same manner as tables for the gear up configuration previously described.

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Performance Inflight - QRH — Chapter PI-QRH

Table of Contents — Section 20

757-200 PW2037 LB FAA

Performance Inflight - QRH
General

Chapter PI-QRH
Section 20

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

Climb (290/.78)

Flaps Up, Set Max Climb Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
40000	**PITCH ATT**	**4.5**	**4.0**		
	V/S (FT/MIN)	1600	700		
30000	**PITCH ATT**	**4.0**	**4.0**	**3.5**	**4.0**
	V/S (FT/MIN)	2200	1600	1100	700
20000	**PITCH ATT**	**6.5**	**6.0**	**5.5**	**5.5**
	V/S (FT/MIN)	3500	2600	1900	1400
10000	**PITCH ATT**	**9.5**	**8.0**	**7.5**	**7.0**
	V/S (FT/MIN)	4600	3500	2700	2100
SEA LEVEL	**PITCH ATT**	**12.5**	**10.5**	**9.5**	**8.5**
	V/S (FT/MIN)	5600	4200	3300	2600

Cruise (.78/290)

Flaps Up, EPR for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB)			
		140	180	220	260
40000	**PITCH ATT**	**2.5**	**3.0**		
	EPR	1.14	1.26		
	(Alt Mode %N1)	(77.1)	(81.3)		
35000	**PITCH ATT**	**1.5**	**2.5**	**3.0**	**3.5**
	EPR	1.08	1.13	1.23	1.38
	(Alt Mode %N1)	(74.6)	(77.1)	(80.4)	(85.7)
30000	**PITCH ATT**	**1.0**	**2.0**	**2.5**	**3.0**
	EPR	1.03	1.07	1.11	1.18
	(Alt Mode %N1)	(73.8)	(75.4)	(77.5)	(80.2)
25000	**PITCH ATT**	**1.5**	**2.0**	**2.5**	**3.5**
	EPR	0.99	1.02	1.05	1.10
	(Alt Mode %N1)	(70.3)	(71.9)	(73.8)	(76.3)
20000	**PITCH ATT**	**1.5**	**2.0**	**2.5**	**3.5**
	EPR	0.98	1.00	1.02	1.05
	(Alt Mode %N1)	(67.2)	(68.5)	(70.5)	(72.8)
15000	**PITCH ATT**	**1.5**	**2.0**	**3.0**	**3.5**
	EPR	0.97	0.98	1.00	1.03
	(Alt Mode %N1)	(64.0)	(65.3)	(67.2)	(69.5)

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

Descent (.78/290)

Flaps Up, Set Idle Thrust

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB) 140	180	220	260
40000	**PITCH ATT**	**-0.5**	**0.5**		
	V/S (FT/MIN)	-2300	-2300		
30000	**PITCH ATT**	**-2.0**	**-1.0**	**0.0**	**0.5**
	V/S (FT/MIN)	-2700	-2300	-2100	-2000
20000	**PITCH ATT**	**-2.0**	**-1.0**	**0.0**	**1.0**
	V/S (FT/MIN)	-2500	-2100	-1900	-1800
10000	**PITCH ATT**	**-2.5**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-2400	-2000	-1800	-1700
SEA LEVEL	**PITCH ATT**	**-3.0**	**-1.5**	**-0.5**	**0.5**
	V/S (FT/MIN)	-2200	-1800	-1600	-1500

Holding

Flaps Up, EPR for Level Flight

PRESSURE ALTITUDE (FT)		WEIGHT (1000 LB) 140	180	220	260
10000	**PITCH ATT**	**5.5**	**5.5**	**6.0**	**6.0**
	EPR	1.01	1.02	1.03	1.04
	(Alt Mode %N1)	(50.9)	(56.4)	(61.0)	(64.9)
	KIAS	188	205	222	242
5000	**PITCH ATT**	**5.5**	**6.0**	**6.0**	**6.0**
	EPR	1.01	1.01	1.02	1.03
	(Alt Mode %N1)	(47.6)	(52.9)	(57.5)	(61.4)
	KIAS	188	205	222	241

Terminal Area (5000 FT)

EPR for Level Flight

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 LB) 140	180	220	260
FLAPS 1 (GEAR UP) (VREF30 + 60)	**PITCH ATT**	**6.5**	**7.0**	**7.5**	**8.0**
	EPR	1.02	1.04	1.05	1.07
	KIAS	169	185	201	216
	(Alt Mode %N1)	(47.2)	(52.8)	(58.1)	(63.2)
FLAPS 5 (GEAR UP) (VREF30 + 40)	**PITCH ATT**	**7.0**	**7.0**	**7.5**	**7.5**
	EPR	1.04	1.05	1.07	1.09
	KIAS	149	165	181	196
	(Alt Mode %N1)	(47.2)	(53.6)	(59.6)	(64.1)
FLAPS 15 (GEAR UP) (VREF30 + 20)	**PITCH ATT**	**8.0**	**8.0**	**8.0**	**8.0**
	EPR	1.05	1.07	1.10	1.12
	KIAS	128	145	161	176
	(Alt Mode %N1)	(48.9)	(56.1)	(62.0)	(66.2)
FLAPS 20 (GEAR UP) (VREF30 + 20)	**PITCH ATT**	**5.0**	**5.0**	**5.0**	**5.0**
	EPR	1.06	1.08	1.12	1.14
	KIAS	128	145	161	176
	(Alt Mode %N1)	(50.5)	(58.0)	(63.5)	(67.9)

Flight With Unreliable Airspeed / Turbulent Air Penetration

Altitude and/or vertical speed indications may also be unreliable.

Final Approach (1500 FT)

Gear Down, EPR for 3° Glideslope

FLAP POSITION (VREF + INCREMENT)		WEIGHT (1000 LB)			
		140	180	220	260
FLAPS 25 (VREF25 + 10)	**PITCH ATT**	**2.5**	**2.5**	**2.5**	**2.5**
	EPR	1.03	1.04	1.06	1.07
	KIAS	121	137	152	167
	(Alt Mode %N1)	(42.0)	(47.6)	(52.7)	(57.6)
FLAPS 30 (VREF30 + 10)	**PITCH ATT**	**1.0**	**1.0**	**0.5**	**0.5**
	EPR	1.04	1.06	1.08	1.11
	KIAS	118	135	151	165
	(Alt Mode %N1)	(45.4)	(52.0)	(58.2)	(63.1)

Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)/SPEED (KIAS OR MACH)								
	0	5	10	15	20	25	30	35	40
	250	250	250	290	290	290	290	.78	.78
60	1.15	1.14	1.12	1.08	1.05	1.02	0.99	0.98	0.97
50	1.18	1.17	1.16	1.11	1.09	1.06	1.04	1.03	1.02
40	1.22	1.21	1.19	1.15	1.13	1.11	1.09	1.08	1.07
30	1.24	1.25	1.23	1.20	1.18	1.16	1.14	1.13	1.12
20	1.24	1.27	1.28	1.25	1.23	1.21	1.19	1.18	1.18
10	1.24	1.27	1.30	1.29	1.29	1.27	1.26	1.25	1.24
0	1.24	1.27	1.30	1.29	1.32	1.35	1.33	1.32	1.32
-10	1.24	1.27	1.30	1.29	1.32	1.35	1.39	1.41	1.41
-20	1.24	1.27	1.30	1.29	1.32	1.35	1.39	1.48	1.50

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)								
	0	5	10	15	20	25	30	35	40
PACKS OFF	0.01	0.01	0.01	0.01	0.02	0.02	0.03	0.04	0.04
ENGINE ANTI-ICE ON	0.00	0.00	-0.03	-0.03	-0.03	-0.04	-0.04	-0.05	-0.07
ENGINE & WING ANTI-ICE ON	-0.02	-0.02	-0.06	-0.06	-0.06	-0.07	-0.08	-0.10	-0.13

VREF (KIAS)

WEIGHT (1000 LB)	FLAPS		
	30	25	20
260	155	157	165
240	148	150	158
220	140	142	151
200	133	135	144
180	125	127	136
160	117	119	128
140	109	111	119

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ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 30

Dry Runway

	LANDING DISTANCE AND ADJUSTMENTS (FT)											
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	190000 LB LANDING WEIGHT	PER 10000 LB ABOVE/ BELOW 190000 LB	PER 1000 FT STD/ HIGH*	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABV ISA	BLW ISA	PER 10 KTS ABOVE VREF30	ONE REV	NO REV
MAX MANUAL	2700	+100/-90	60/70	-110	380	40	-30	50	-50	210	60	130
MAX AUTO	4050	+160/-160	90/120	-180	570	50	-50	90	-90	310	180	360
AUTOBRAKE 4	4380	+190/-180	110/140	-210	680	60	-60	110	-100	360	190	390
AUTOBRAKE 3	4950	+240/-240	140/180	-250	850	90	-90	140	-130	410	240	470
AUTOBRAKE 2	5300	+290/-280	170/220	-290	980	150	-150	160	-140	410	540	800
AUTOBRAKE 1	5540	+330/-290	190/270	-320	1110	190	-170	170	-150	410	960	1450

Good Reported Braking Action

MAX MANUAL	3520	+150/-130	90/120	-170	610	80	-70	80	-80	280	220	540
MAX AUTO	4210	+180/-170	100/140	-200	690	90	-80	100	-90	310	360	910
AUTOBRAKE 4	4430	+190/-190	110/140	-220	730	80	-70	110	-110	360	240	670
AUTOBRAKE 3	4950	+240/-240	140/180	-250	850	90	-90	140	-130	410	240	480

Medium Reported Braking Action

MAX MANUAL	4570	+220/-190	130/180	-260	970	180	-140	120	-110	340	590	1640
MAX AUTO	4820	+240/-220	140/190	-280	1000	190	-160	130	-110	340	740	2050
AUTOBRAKE 4	4850	+240/-220	140/190	-280	1000	180	-150	130	-110	360	720	2020
AUTOBRAKE 3	5190	+250/-250	150/190	-300	1060	160	-150	140	-130	410	460	1660

Poor Reported Braking Action

MAX MANUAL	5630	+290/-260	170/250	-370	1470	390	-260	150	-130	380	1200	3850
MAX AUTO	5630	+300/-280	180/250	-400	1480	390	-280	160	-130	370	1320	4200
AUTOBRAKE 4	5630	+300/-280	180/250	-400	1480	390	-280	160	-130	380	1320	4200
AUTOBRAKE 3	5740	+300/-280	170/250	-400	1490	370	-270	160	-140	410	1200	4080

Reference distance is for sea level, standard day, no wind or slope, VREF30 approach speed and 2 engine reverse thrust.
Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 270 ft.
Autobrake data valid both for auto and manual speedbrakes.
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply the HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Normal Configuration Landing Distance

Flaps 25

Dry Runway

	LANDING DISTANCE AND ADJUSTMENTS (FT)											
	REF DIST	WT ADJ	ALT ADJ	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		TEMP ADJ PER 10°C		VREF ADJ	REVERSE THRUST ADJ	
BRAKING CONFIGURATION	190000 LB LANDING WEIGHT	PER 10000 LB ABOVE/ BELOW 190000 LB	PER 1000 FT STD/ HIGH*	HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	ABV ISA	BLW ISA	PER 10 KTS ABOVE VREF25	ONE REV	NO REV
MAX MANUAL	2730	+90/-90	60/80	-110	390	40	-30	60	-50	210	60	140
MAX AUTO	4170	+160/-160	100/130	-180	580	50	-50	100	-90	320	190	400
AUTOBRAKE 4	4520	+190/-190	110/150	-210	690	60	-60	120	-110	380	210	430
AUTOBRAKE 3	5120	+240/-240	140/190	-260	860	90	-100	150	-130	430	270	530
AUTOBRAKE 2	5480	+290/-290	180/240	-300	1000	160	-160	180	-150	430	610	900
AUTOBRAKE 1	5720	+330/-300	200/280	-330	1120	200	-180	190	-150	430	1070	1600

Good Reported Braking Action

MAX MANUAL	3580	+150/-130	90/120	-170	610	80	-70	80	-80	280	230	580
MAX AUTO	4320	+180/-170	100/140	-210	690	90	-80	100	-100	320	380	990
AUTOBRAKE 4	4570	+190/-190	110/150	-220	740	80	-80	120	-110	380	250	720
AUTOBRAKE 3	5120	+240/-240	140/190	-260	860	90	-100	150	-130	430	270	530

Medium Reported Braking Action

MAX MANUAL	4670	+220/-190	130/190	-260	980	180	-150	120	-110	350	640	1810
MAX AUTO	4950	+240/-220	140/200	-290	1010	190	-160	140	-120	350	810	2270
AUTOBRAKE 4	4990	+230/-220	140/200	-290	1010	180	-150	130	-120	380	770	2230
AUTOBRAKE 3	5360	+250/-250	150/200	-310	1080	170	-150	150	-140	430	500	1840

Poor Reported Braking Action

MAX MANUAL	5780	+290/-260	170/250	-370	1490	400	-270	160	-140	390	1300	4320
MAX AUTO	5780	+300/-280	180/260	-400	1490	400	-290	170	-140	390	1440	4730
AUTOBRAKE 4	5780	+300/-280	180/260	-400	1490	400	-290	170	-140	390	1430	4720
AUTOBRAKE 3	5920	+300/-280	180/250	-410	1510	380	-270	170	-140	430	1290	4590

Reference distance is for sea level, standard day, no wind or slope, VREF25 approach speed and 2 engine reverse thrust.
Max Manual braking data valid for auto speedbrakes. For manual speedbrakes, increase reference landing distance by 270 ft.
Autobrake data valid for both auto and manual speedbrakes.
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply the HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Dry Runway

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	3550	70/-60	85/120	-150	535	75	-65	400
ANTI-SKID SYSTEM INOP	VREF30	4070	85/-75	95/140	-195	730	90	-75	320
FLAPS UP	VREF30+50	3650	160/-60	100/160	-150	585	55	-50	285
HYDRAULIC SYSTEM CENTER INOP	VREF30	2740	55/-45	60/80	-110	400	40	-35	235
HYDRAULIC SYSTEM LEFT INOP	VREF30	3250	65/-55	70/100	-135	475	50	-45	310
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	3520	65/-60	80/110	-140	490	55	-50	310
HYDRAULIC SYSTEM RIGHT INOP	VREF30	3300	70/-60	80/120	-145	515	75	-65	355
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	3930	75/-65	95/130	-155	530	65	-60	360
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	4070	80/-75	110/155	-170	585	100	-85	425
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	5590	105/-90	155/245	-240	815	220	-175	755

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System Only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Dry Runway

		LANDING DISTANCE AND ADJUSTMENTS (FT)							
LANDING CONFIGURATION	VREF	REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	2870	65/-50	60/75	-115	395	35	-35	220
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	3330	95/-55	80/105	-125	430	45	-40	230
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	3550	120/-60	85/130	-130	445	45	-45	235
LE SLAT DISAGREE	VREF20	2860	70/-45	65/80	-110	430	35	-35	220
ONE ENGINE INOP	VREF20	2920	75/-50	65/85	-115	450	40	-35	235
REVERSER UNLOCK FLAPS 20	VREF30+30	3360	105/-55	80/105	-135	505	50	-45	265
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	2860	70/-45	65/80	-110	430	35	-35	220
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	3240	115/-50	75/100	-135	495	45	-40	245
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	3450	135/-55	80/125	-140	525	50	-45	255
TRAILING EDGE FLAP DISAGREE	VREF20	2860	70/-45	65/80	-110	430	35	-35	220

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Good Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT) REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS HEAD WIND	WIND ADJ PER 10 KTS TAIL WIND	SLOPE ADJ PER 1% DOWN HILL	SLOPE ADJ PER 1% UP HILL	APPROACH SPEED PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	5180	110/-90	150/240	-270	965	255	-190	590
ANTI-SKID SYSTEM INOP	VREF30	4850	115/-100	130/185	-265	1035	170	-135	365
FLAPS UP	VREF30+50	4870	100/-90	140/190	-200	720	100	-90	285
HYDRAULIC SYSTEM CENTER INOP	VREF30	3540	80/-70	90/125	-170	630	85	-75	300
HYDRAULIC SYSTEM LEFT INOP	VREF30	4320	95/-85	115/170	-215	775	135	-110	415
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	4750	95/-90	130/190	-225	810	145	-120	420
HYDRAULIC SYSTEM RIGHT INOP	VREF30	4210	100/-85	120/175	-210	770	150	-120	440
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	5320	110/-100	150/225	-245	865	175	-140	480
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	5250	115/-105	155/240	-245	865	195	-160	520
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	7440	140/-115	235/385	-350	1210	495	-355	980

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Good Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	3750	80/-75	95/135	-175	625	85	-75	290
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	4360	90/-85	120/170	-190	670	95	-85	300
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	4690	95/-90	130/185	-200	695	100	-90	305
LE SLAT DISAGREE	VREF20	3740	75/-70	95/135	-175	640	85	-75	280
ONE ENGINE INOP	VREF20	3970	85/-80	105/140	-190	685	110	-90	320
REVERSER UNLOCK FLAPS 20	VREF30+30	4580	95/-90	125/170	-205	740	125	-105	325
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	3740	75/-70	95/135	-175	640	85	-75	280
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	4280	90/-80	115/165	-185	680	90	-80	280
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	4560	95/-85	125/180	-190	700	95	-85	280
TRAILING EDGE FLAP DISAGREE	VREF20	3740	75/-70	95/135	-175	640	85	-75	280

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Medium Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	8530	160/-105	315/640	-545	2090	1210	-650	830
ANTI-SKID SYSTEM INOP	VREF30	5860	150/-130	170/255	-375	1565	385	-255	410
FLAPS UP	VREF30+50	6390	150/-135	205/295	-300	1140	230	-185	360
HYDRAULIC SYSTEM CENTER INOP	VREF30	4550	115/-100	135/190	-255	1005	195	-150	360
HYDRAULIC SYSTEM LEFT INOP	VREF30	5930	140/-120	185/305	-350	1360	380	-265	515
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	6610	145/-135	210/345	-375	1425	420	-290	540
HYDRAULIC SYSTEM RIGHT INOP	VREF30	5890	150/-125	195/325	-355	1365	415	-285	540
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	7360	170/-150	245/395	-400	1500	475	-335	595
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	7400	180/-155	260/420	-405	1515	525	-365	635
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	13060	210/-105	510/1075	-730	2640	2455	-1215	1420

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System Only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Medium Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT): REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	4880	115/-105	140/210	-265	990	185	-150	360
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	5640	135/-120	170/245	-285	1050	205	-170	360
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	6100	145/-130	195/280	-295	1085	215	-180	370
LE SLAT DISAGREE	VREF20	4870	115/-105	140/210	-265	1025	195	-150	350
ONE ENGINE INOP	VREF20	5480	130/-120	160/230	-305	1155	285	-210	420
REVERSER UNLOCK FLAPS 20	VREF30+30	6280	150/-135	190/270	-325	1220	310	-235	415
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	4870	115/-105	140/210	-265	1025	195	-150	350
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	5600	135/-120	175/250	-280	1080	210	-165	350
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	5950	140/-125	185/270	-290	1105	220	-170	350
TRAILING EDGE FLAP DISAGREE	VREF20	4870	115/-105	140/210	-265	1025	195	-150	350

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Poor Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
AIR-GROUND LOGIC IN AIR MODE	VREF30	> 15000	-	-	-	-	-	-	-
ANTI-SKID SYSTEM INOP	VREF30	7460	205/-175	235/335	-600	2865	2340	-565	445
FLAPS UP	VREF30+50	7880	200/-180	275/400	-425	1720	515	-325	415
HYDRAULIC SYSTEM CENTER INOP	VREF30	5590	155/-130	175/265	-370	1545	445	-270	400
HYDRAULIC SYSTEM LEFT INOP	VREF30	8060	190//-150	300/555	-590	2555	1645	-615	590
HYDRAULIC SYSTEM LEFT INOP WITH LE SLAT OR TE FLAPS DISAGREE FOR FLAPS ≥ 20	VREF20	9050	205/-175	340/630	-630	2670	1790	-680	635
HYDRAULIC SYSTEM RIGHT INOP	VREF30	8090	200/-155	315/585	-600	2580	1740	-650	610
HYDRAULIC SYSTEMS CENTER AND LEFT INOP FLAPS 20	VREF30+20	9960	235/-190	380/705	-665	2775	1930	-745	675
HYDRAULIC SYSTEMS CENTER AND RIGHT INOP FLAPS 20	VREF30+20	10100	250/-200	405/750	-675	2805	2055	-800	715
HYDRAULIC SYSTEM** LEFT & RIGHT INOP FLAPS 20	VREF30+20	> 15000	-	-	-	-	-	-	-

*** Reference distance assumes sea level, standard day with no wind or slope.**
****Reserve Brake System only.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Non-Normal Configuration Landing Distance

Poor Reported Braking Action

LANDING CONFIGURATION	VREF	LANDING DISTANCE AND ADJUSTMENTS (FT)							
		REFERENCE DISTANCE* FOR 190000 LB LANDING WEIGHT	WT ADJ PER 5000 LB ABOVE/ BELOW 190000 LB	ALTITUDE ADJ PER 1000 FT STD/HIGH ***	WIND ADJ PER 10 KTS		SLOPE ADJ PER 1%		APPROACH SPEED
					HEAD WIND	TAIL WIND	DOWN HILL	UP HILL	PER 10 KTS ABOVE VREF
LE SLAT ASYMMETRY FLAPS>20	VREF20	6020	155/-140	190/285	-380	1510	410	-275	405
LE SLAT ASYMMETRY FLAPS = 20	VREF30+30	6890	180/-160	225/340	-405	1580	435	-300	400
LE SLAT ASYMMETRY 5 ≤ FLAPS < 20	VREF30+40	7490	195/-175	255/370	-420	1625	455	-315	425
LE SLAT DISAGREE	VREF20	6020	155/-140	190/285	-380	1580	455	-280	395
ONE ENGINE INOP	VREF20	7170	190/-175	230/335	-460	1845	720	-420	500
REVERSER UNLOCK FLAPS 20	VREF30+30	8120	210/-190	270/380	-485	1925	760	-450	485
TRAILING EDGE FLAP ASYMMETRY FLAPS ≥ 20	VREF20	6020	155/-140	190/285	-380	1580	455	-280	395
TRAILING EDGE ASYMMETRY 5<FLAPS<20	VREF30+30	6900	180/-155	230/345	-400	1645	480	-300	405
TRAILING EDGE ASYMMETRY FLAPS ≤ 5	VREF30+40	7310	190/-165	250/365	-410	1675	490	-305	400
TRAILING EDGE FLAP DISAGREE	VREF20	6020	155/-140	190/285	-380	1580	455	-280	395

*** Reference distance assumes sea level, standard day with no wind or slope.**
Assumes maximum manual braking and maximum reverse thrust when available on operating engine(s).
Actual (unfactored) distances are shown.
Includes distance from 50 ft above threshold (1000 ft of air distance).

***** For landing distance at or below 8000 ft pressure altitude, apply the STD adjustment. For altitudes higher than 8000 ft, first apply the STD adjustment to derive a new reference landing distance for 8000 ft, then apply HIGH adjustment to this new reference distance.**

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Reference Brake Energy Per Brake (Millions of Foot Pounds)

		BRAKES ON SPEED (KIAS)																	
		80			100			120			140			160			180		
WEIGHT (1000 LB)	OAT (°F)	PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT			PRESS ALT		
		0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10
260	20	8.8	10.5	12.2	13.5	16.2	18.9	19.0	22.9	26.8	25.2	30.4	35.6	31.8	38.2		39.0		
	40	9.2	10.9	12.7	14.0	16.8	19.6	19.8	23.8	27.9	26.2	31.6	37.0	33.1	39.7		40.5		
	60	9.5	11.4	13.2	14.6	17.5	20.4	20.6	24.8	29.0	27.3	32.9	38.5	34.4	41.3		42.1		
	80	9.9	11.7	13.6	15.1	18.1	21.1	21.3	25.7	30.0	28.2	34.0	39.8	35.6	42.7		43.6		
	100	10.1	12.0	14.0	15.5	18.6	21.7	21.9	26.4	30.9	29.0	35.0	41.0	36.6	44.0		44.9		
	120	10.2	12.2	14.2	15.8	18.9	22.1	22.3	26.9	31.5	29.6	35.8	42.0	37.5	45.0		45.9		
240	20	8.2	9.8	11.3	12.6	15.0	17.5	17.6	21.2	24.8	23.3	28.2	33.0	29.5	35.5	41.5	35.9		
	40	8.5	10.2	11.8	13.1	15.6	18.2	18.3	22.1	25.8	24.3	29.3	34.3	30.7	36.9	43.1	37.3		
	60	8.9	10.6	12.3	13.6	16.3	18.9	19.1	23.0	26.8	25.2	30.4	35.6	31.9	38.3	44.8	38.8		
	80	9.2	10.9	12.7	14.1	16.8	19.6	19.7	23.8	27.8	26.1	31.5	36.9	33.0	39.7	46.3	40.1		
	100	9.4	11.2	13.0	14.4	17.3	20.1	20.3	24.4	28.6	26.9	32.4	38.0	34.0	40.8	47.7	41.3		
	120	9.5	11.3	13.2	14.6	17.6	20.5	20.6	24.9	29.2	27.4	33.1	38.8	34.7	41.8	48.9	42.3		
220	20	7.6	9.0	10.5	11.6	13.9	16.1	16.2	19.5	22.8	21.4	25.9	30.3	27.1	32.7	38.2	33.1	39.6	
	40	7.9	9.4	10.9	12.1	14.4	16.8	16.9	20.3	23.7	22.3	26.9	31.5	28.2	34.0	39.7	34.4	41.2	
	60	8.2	9.8	11.3	12.5	15.0	17.5	17.6	21.1	24.7	23.2	28.0	32.7	29.3	35.3	41.3	35.7	42.8	
	80	8.5	10.1	11.7	13.0	15.5	18.1	18.2	21.9	25.5	24.0	29.0	33.9	30.3	36.5	42.7	37.0	44.3	
	100	8.7	10.4	12.0	13.3	15.9	18.5	18.7	22.4	26.2	24.7	29.8	34.9	31.2	37.6	44.0	38.1	45.6	
	120	8.8	10.5	12.2	13.5	16.2	18.9	19.0	22.9	26.8	25.1	30.4	35.6	31.9	38.5	45.0	38.9	46.7	
200	20	7.0	8.3	9.6	10.6	12.7	14.8	14.8	17.8	20.8	19.5	23.5	27.6	24.7	29.8	34.9	30.1	36.2	42.3
	40	7.3	8.7	10.0	11.1	13.2	15.4	15.4	18.5	21.6	20.3	24.5	28.6	25.6	30.9	36.2	31.3	37.6	44.0
	60	7.6	9.0	10.4	11.5	13.7	16.0	16.0	19.3	22.5	21.1	25.5	29.8	26.7	32.2	37.7	32.6	39.1	45.7
	80	7.9	9.3	10.8	11.9	14.2	16.5	16.6	19.9	23.3	21.9	26.4	30.8	27.6	33.3	39.0	33.7	40.5	47.3
	100	8.0	9.5	11.0	12.2	14.6	17.0	17.0	20.5	23.9	22.5	27.1	31.7	28.4	34.3	40.1	34.7	41.7	48.7
	120	8.1	9.6	11.2	12.4	14.8	17.3	17.3	20.8	24.4	22.9	27.6	32.4	29.0	35.0	41.0	35.4	42.7	49.9
180	20	6.4	7.6	8.8	9.7	11.5	13.4	13.4	16.1	18.7	17.6	21.2	24.8	22.2	26.8	31.4	27.1	32.6	38.2
	40	6.7	7.9	9.1	10.1	12.0	13.9	14.0	16.7	19.5	18.3	22.0	25.8	23.1	27.8	32.6	28.1	33.9	39.7
	60	7.0	8.2	9.5	10.5	12.5	14.5	14.5	17.4	20.3	19.0	22.9	26.8	24.0	28.9	33.9	29.3	35.2	41.2
	80	7.2	8.5	9.8	10.8	12.9	15.0	15.0	18.0	21.0	19.7	23.7	27.7	24.8	30.0	35.1	30.3	36.5	42.7
	100	7.3	8.7	10.1	11.1	13.2	15.4	15.4	18.5	21.6	20.2	24.4	28.5	25.5	30.8	36.1	31.1	37.5	43.9
	120	7.4	8.8	10.2	11.2	13.4	15.6	15.7	18.8	22.0	20.6	24.9	29.1	26.0	31.5	36.9	31.8	38.4	45.0
160	20	5.8	6.9	8.0	8.7	10.4	12.0	12.0	14.4	16.7	15.7	18.8	22.0	19.6	23.7	27.7	23.9	28.8	33.8
	40	6.1	7.2	8.3	9.1	10.8	12.5	12.5	14.9	17.4	16.3	19.6	22.9	20.4	24.6	28.8	24.8	30.0	35.1
	60	6.3	7.5	8.6	9.4	11.2	13.0	13.0	15.5	18.1	16.9	20.4	23.8	21.2	25.6	30.0	25.8	31.2	36.5
	80	6.5	7.7	8.9	9.8	11.6	13.5	13.5	16.1	18.7	17.5	21.1	24.6	22.0	26.5	31.0	26.8	32.3	37.8
	100	6.6	7.9	9.1	10.0	11.9	13.8	13.8	16.5	19.2	18.0	21.6	25.3	22.6	27.3	31.9	27.5	33.2	38.9
	120	6.7	7.9	9.2	10.1	12.0	14.0	14.0	16.8	19.6	18.3	22.1	25.8	23.0	27.8	32.6	28.1	33.9	39.8
140	20	5.2	6.2	7.1	7.8	9.2	10.7	10.6	12.6	14.7	13.7	16.4	19.2	17.0	20.5	24.0	20.6	24.9	29.1
	40	5.4	6.4	7.4	8.1	9.6	11.1	11.0	13.2	15.3	14.3	17.1	19.9	17.7	21.3	24.9	21.4	25.8	30.3
	60	5.7	6.7	7.7	8.4	10.0	11.5	11.5	13.7	15.9	14.8	17.8	20.7	18.4	22.2	25.9	22.3	26.9	31.5
	80	5.8	6.9	8.0	8.7	10.3	11.9	11.9	14.2	16.5	15.4	18.4	21.5	19.1	23.0	26.9	23.1	27.8	32.6
	100	5.9	7.0	8.1	8.9	10.5	12.2	12.1	14.5	16.9	15.8	18.9	22.1	19.6	23.6	27.6	23.7	28.6	33.5
	120	6.0	7.1	8.2	8.9	10.7	12.4	12.3	14.7	17.2	16.0	19.2	22.5	20.0	24.1	28.2	24.2	29.2	34.3

To correct for wind, enter table with the brakes on speed minus one half the headwind or plus 1.5 times the tailwind.

If ground speed is used for brakes on speed, ignore wind and enter table with sea level, 60°F.

DO NOT USE FOR FLIGHT

ADVISORY INFORMATION

Recommended Brake Cooling Schedule

Adjusted Brake Energy Per Brake (Millions of Foot Pounds)

No Reverse Thrust

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)										
EVENT		10	12	14	16	18	20	22	24	26	28	30
RTO MAX MAN		10	12	14	16	18	20	22	24	26	28	30
LANDING	MAX MAN	9.2	11.2	13.1	15.0	17.0	18.9	20.9	22.8	24.7	26.7	28.6
LANDING	MAX AUTO	8.9	10.8	12.6	14.4	16.3	18.1	19.9	21.7	23.5	25.3	27.2
LANDING	AUTOBRAKE 4	8.8	10.6	12.3	14.0	15.7	17.4	19.1	20.8	22.5	24.2	26.0
LANDING	AUTOBRAKE 3	8.7	10.4	12.0	13.7	15.3	16.9	18.4	20.0	21.6	23.2	24.8
LANDING	AUTOBRAKE 2	8.6	10.2	11.7	13.2	14.7	16.2	17.7	19.1	20.6	22.0	23.5
LANDING	AUTOBRAKE 1	8.4	9.8	11.3	12.6	14.0	15.3	16.6	17.8	19.1	20.4	21.7

Two Engine Reverse

		REFERENCE BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)										
EVENT		10	12	14	16	18	20	22	24	26	28	30
RTO MAX MAN		10	12	14	16	18	20	22	24	26	28	30
LANDING	MAX MAN	7.6	9.2	10.8	12.5	14.2	15.9	17.6	19.3	21.0	22.6	24.2
LANDING	MAX AUTO	5.0	6.3	7.6	8.9	10.2	11.5	12.9	14.2	15.6	16.9	18.3
LANDING	AUTOBRAKE 4	3.4	4.3	5.3	6.2	7.2	8.2	9.2	10.2	11.3	12.3	13.5
LANDING	AUTOBRAKE 3	2.4	3.0	3.6	4.2	4.8	5.5	6.2	6.9	7.7	8.4	9.3
LANDING	AUTOBRAKE 2	1.9	2.2	2.5	2.9	3.2	3.6	4.0	4.5	4.9	5.4	5.9
LANDING	AUTOBRAKE 1	1.5	1.7	1.9	2.1	2.3	2.5	2.8	3.0	3.2	3.5	3.7

Cooling Time (Minutes)

	ADJUSTED BRAKE ENERGY PER BRAKE (MILLIONS OF FOOT POUNDS)								
	8 & BELOW	9	10	12	14	16	17	18 TO 27	28 & ABOVE
INFLIGHT GEAR DOWN	NO SPECIAL PROCEDURE REQUIRED	1	2	4	5	7	7	CAUTION	FUSE PLUG MELT ZONE
GROUND		10	20	38	51	62	66		
BTMS	UP TO 2	2	2	3	3	4	5	5 TO 8	8 & ABOVE

Observe maximum quick turnaround limit.
Table shows energy per brake added by a single stop with all brakes operating. Energy is assumed to be equally distributed among the operating brakes. Total energy is the sum of residual energy plus energy added.
Add 0.65 million foot pounds per brake for each taxi mile.
For one brake deactivated, increase brake energy by 15 percent.
When in caution zone, wheel fuse plugs may melt. Delay takeoff and inspect after one hour. If overheat occurs after takeoff, extend gear soon for at least 8 minutes.
When in fuse plug melt zone, clear runway immediately. Unless required, do not set parking brake. Do not attempt to taxi for one hour. Tire, wheel and brake replacement may be required. If overheat occurs after takeoff, extend gear soon for at least 12 minutes.
Brake temperature monitor system (BTMS) indication on EICAS may be used to 10 to 15 minutes after airplane has come to a complete stop, or inflight with gear retracted, to determine recommended cooling schedule.

ENGINE INOP

Initial Max Continuous EPR

Based on engine bleed for one pack on

PRESSURE ALTITUDE (FT)		CRUISE MACH NUMBER		
		.72	.76	.80
41000	EPR	1.56	1.52	1.48
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.12	0.12	0.12
39000	EPR	1.56	1.52	1.48
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.12	0.12	0.12
37000	EPR	1.57	1.53	1.49
	MAX TAT (SAT)	-23 (-46)	-20 (-46)	-17 (-46)
	EPR CORR	0.12	0.12	0.12
35000	EPR	1.54	1.50	1.46
	MAX TAT (SAT)	-21 (-44)	-18 (-44)	-15 (-44)
	EPR CORR	0.12	0.12	0.12
33000	EPR	1.49	1.45	1.42
	MAX TAT (SAT)	-16 (-40)	-13 (-40)	-11 (-41)
	EPR CORR	0.12	0.12	0.12
31000	EPR	1.44	1.41	1.38
	MAX TAT (SAT)	-12 (-36)	-9 (-36)	-6 (-36)
	EPR CORR	0.10	0.10	0.10

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

ENGINE INOP

Max Continuous EPR

41000 FT to 22000 FT Pressure Altitudes

Based on engine bleed for one pack on and anti-ice off

PRESSURE ALTITUDE (FT)		KIAS					MACH NUMBER					
		180	200	220	240	260	.70	.72	.74	.76	.78	.80
41000	EPR		1.57	1.53	1.47	1.42	1.57	1.56	1.54	1.52	1.50	1.48
	MAX TAT		-25	-21	-17	-12	-24	-23	-22	-20	-19	-17
	EPR CORR		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
39000	EPR		1.57	1.56	1.51	1.45	1.57	1.56	1.54	1.52	1.50	1.48
	MAX TAT		-27	-23	-19	-15	-24	-23	-22	-20	-19	-17
	EPR CORR		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
37000	EPR		1.57	1.57	1.54	1.49	1.57	1.57	1.55	1.53	1.51	1.49
	MAX TAT		-28	-25	-21	-17	-24	-23	-22	-20	-19	-17
	EPR CORR		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
35000	EPR		1.57	1.57	1.54	1.49	1.56	1.54	1.52	1.50	1.48	1.46
	MAX TAT		-28	-24	-21	-17	-22	-21	-19	-18	-16	-15
	EPR CORR		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
33000	EPR		1.57	1.56	1.52	1.47	1.51	1.49	1.47	1.45	1.44	1.42
	MAX TAT		-25	-22	-19	-15	-18	-16	-15	-13	-12	-11
	EPR CORR		0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
31000	EPR		1.56	1.53	1.49	1.45	1.46	1.44	1.43	1.41	1.40	1.38
	MAX TAT		-22	-19	-16	-13	-13	-12	-10	-9	-8	-6
	EPR CORR		0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
29000	EPR		1.56	1.52	1.48	1.45	1.44	1.42	1.40	1.39	1.37	1.35
	MAX TAT		-19	-16	-13	-10	-9	-7	-6	-5	-3	-2
	EPR CORR		0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
27000	EPR	1.57	1.56	1.53	1.49	1.46	1.43	1.41	1.39	1.37	1.36	1.34
	MAX TAT	-18	-16	-13	-11	-8	-5	-3	-2	0	1	3
	EPR CORR	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
25000	EPR	1.57	1.56	1.53	1.50	1.47	1.41	1.40	1.38	1.36	1.35	1.33
	MAX TAT	-15	-13	-10	-8	-5	0	1	3	4	6	7
	EPR CORR	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09
22000	EPR	1.57	1.55	1.53	1.51	1.48	1.40	1.38	1.36	1.35	1.33	
	MAX TAT	-10	-8	-6	-3	-1	6	8	9	11	12	
	EPR CORR	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

EPR Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)						
	0	8000	8001	10000	20000	30000	40000
PACKS OFF	0.01	0.01	0.01	0.01	0.02	0.03	0.04
ENGINE ANTI-ICE ON	0.00	0.00	-0.03	-0.03	-0.03	-0.04	-0.07
ENGINE & WING ANTI-ICE ON	-0.02	-0.02	-0.05	-0.06	-0.06	-0.08	-0.13

ENGINE INOP

Max Continuous EPR

20000 FT to Sea Level Pressure Altitudes

Based on engine bleed for one pack on and anti-ice off

PRESSURE ALTITUDE (FT)		KIAS					MACH NUMBER					
		180	200	220	240	260	.70	.72	.74	.76	.78	.80
	EPR	1.57	1.55	1.53	1.51	1.48	1.39	1.37	1.36			
20000	MAX TAT	-6	-5	-3	0	2	11	12	14			
	EPR CORR	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08			
	EPR	1.55	1.53	1.51	1.48	1.46	1.36	1.34				
18000	MAX TAT	-3	-1	1	3	5	15	17				
	EPR CORR	0.08	0.08	0.08	0.08	0.08	0.08	0.08				
	EPR	1.53	1.51	1.49	1.46	1.44	1.33					
16000	MAX TAT	0	2	4	6	8	19					
	EPR CORR	0.07	0.07	0.07	0.07	0.07	0.07					
	EPR	1.50	1.49	1.47	1.44	1.42						
14000	MAX TAT	4	6	7	9	11						
	EPR CORR	0.07	0.07	0.07	0.07	0.07						
	EPR	1.48	1.46	1.45	1.43	1.40						
12000	MAX TAT	8	9	11	12	14						
	EPR CORR	0.07	0.07	0.07	0.07	0.07						
	EPR	1.46	1.44	1.43	1.41	1.39						
10000	MAX TAT	11	13	14	16	18						
	EPR CORR	0.06	0.06	0.06	0.06	0.06						
	EPR	1.40	1.39	1.33	1.36	1.35						
5000	MAX TAT	20	21	23	24	26						
	EPR CORR	0.05	0.05	0.05	0.05	0.05						
	EPR	1.35	1.34	1.30	1.31	1.30						
1500	MAX TAT	27	28	29	30	32						
	EPR CORR	0.05	0.05	0.05	0.05	0.05						
	EPR	1.33	1.32	1.30	1.29	1.28						
0	MAX TAT	29	30	32	33	34						
	EPR CORR	0.04	0.04	0.04	0.04	0.04						

Decrease EPR by the EPR CORR for every 10°C above the MAX TAT shown.

EPR Adjustments for Engine Bleed

BLEED CONFIGURATION	PRESSURE ALTITUDE (FT)						
	0	8000	8001	10000	20000	30000	40000
PACKS OFF	0.01	0.01	0.01	0.01	0.02	0.03	0.04
ENGINE ANTI-ICE ON	0.00	0.00	-0.03	-0.03	-0.03	-0.04	-0.07
ENGINE & WING ANTI-ICE ON	-0.02	-0.02	-0.05	-0.06	-0.06	-0.08	-0.13

ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude

100 ft/min residual rate of climb

Includes APU fuel burn

WEIGHT (1000 LB)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFT DOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	250	249	18900	17400	15500
240	232	240	21100	20100	18600
220	213	230	23300	22300	21200
200	193	219	25600	24700	23600
180	174	208	28000	27200	26200
160	154	197	30900	30000	29000
140	135	187	33800	33400	32200

Driftdown/LRC Cruise Range Capability

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
282	260	242	226	212	200	189	179	170	162	155
563	521	484	452	425	400	378	358	341	325	310
839	777	724	677	636	600	568	539	512	489	467
1110	1030	961	901	847	800	758	720	685	654	625
1379	1282	1197	1124	1058	1000	948	901	858	820	784
1647	1533	1433	1346	1269	1200	1138	1082	1032	986	944
1916	1784	1670	1569	1480	1400	1328	1264	1205	1152	1103
2186	2037	1907	1792	1691	1600	1519	1445	1378	1317	1262
2461	2292	2146	2017	1902	1800	1708	1625	1550	1482	1419

Driftdown/Cruise Fuel and Time

AIR DIST (NM)	FUEL REQUIRED (1000 LB)						TIME (HR:MIN)
	WEIGHT AT START OF DRIFTDOWN (1000 LB)						
	160	180	200	220	240	260	
200	2.7	3.0	3.3	3.5	3.8	4.1	0:35
400	6.1	6.7	7.3	8.0	8.7	9.3	1:10
600	9.0	10.0	11.0	12.0	13.0	14.1	1:42
800	12.0	13.3	14.6	16.0	17.3	18.7	2:14
1000	14.9	16.6	18.2	19.9	21.5	23.2	2:45
1200	17.7	19.8	21.7	23.7	25.7	27.7	3:15
1400	20.6	22.9	25.2	27.5	29.8	32.1	3:46
1600	23.3	26.0	28.6	31.2	33.8	36.5	4:17
1800	26.1	29.1	32.0	34.9	37.8	40.8	4:50

Includes APU fuel burn.
Driftdown at optimum driftdown speed and cruise at Long Range Cruise speed.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Altitude Capability

100 ft/min residual rate of climb

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	12200	8100	5100
250	14700	10300	7100
240	16400	12700	9100
230	18300	15000	11200
220	20000	17400	13700
210	21200	19700	16000
200	22300	21100	18600
190	23600	22400	20700
180	24900	23700	22100
170	26200	25100	23500
160	27500	26500	25100
150	29000	28000	26600
140	30800	29500	28300
130	33100	31400	30000
120	35100	33900	32000

With engine anti-ice on, decrease altitude capability by 2600 ft.
With engine and wing anti-ice on, decrease altitude capability by 6600 ft.

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)								
		10	14	18	21	23	25	27	29	31
260	EPR	1.27	1.34							
	MACH	.598	.621							
	KIAS	332	321							
	FF/ENG	10076	9797							
240	EPR	1.24	1.30	1.39						
	MACH	.582	.611	.633						
	KIAS	323	316	303						
	FF/ENG	9361	9173	8859						
220	EPR	1.21	1.27	1.34	1.42					
	MACH	.561	.596	.620	.642					
	KIAS	311	308	297	290					
	FF/ENG	8560	8495	8158	8155					
200	EPR	1.18	1.24	1.30	1.36	1.42				
	MACH	.532	.576	.608	.624	.639				
	KIAS	295	297	291	281	277				
	FF/ENG	7706	7770	7540	7365	7396				
180	EPR	1.15	1.20	1.26	1.32	1.36	1.42			
	MACH	.498	.549	.589	.611	.621	.635			
	KIAS	276	282	281	275	269	264			
	FF/ENG	6813	6942	6872	6746	6640	6629			
160	EPR	1.13	1.17	1.22	1.27	1.31	1.35	1.40		
	MACH	.473	.511	.561	.590	.606	.618	.630		
	KIAS	262	262	267	265	262	256	250		
	FF/ENG	6082	6079	6107	6080	6015	5925	5872		
140	EPR	1.11	1.14	1.18	1.22	1.26	1.29	1.33	1.38	1.45
	MACH	.451	.477	.520	.559	.580	.598	.612	.623	.639
	KIAS	249	245	247	251	250	247	243	237	233
	FF/ENG	5434	5286	5265	5322	5337	5280	5225	5142	5136
120	EPR	1.09	1.11	1.14	1.17	1.20	1.23	1.27	1.31	1.36
	MACH	.423	.451	.479	.511	.538	.564	.584	.602	.616
	KIAS	234	231	227	228	231	233	232	229	224
	FF/ENG	4765	4638	4460	4477	4527	4561	4555	4504	4426

ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Ground to Air Miles Conversion

AIR DISTANCE (NM) HEADWIND COMPONENT (KTS)					GROUND DISTANCE (NM)	AIR DISTANCE (NM) TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
286	264	244	227	213	200	191	182	174	167	160
571	527	488	455	426	400	381	364	348	334	322
859	792	733	683	639	600	572	547	524	502	483
1148	1059	979	911	853	800	763	729	698	669	644
1440	1326	1226	1140	1066	1000	954	912	873	837	804
1733	1595	1473	1370	1280	1200	1144	1093	1046	1003	965
2029	1866	1721	1599	1494	1400	1335	1275	1220	1170	1125
2325	2137	1970	1830	1708	1600	1526	1457	1394	1336	1284
2623	2409	2220	2061	1923	1800	1716	1638	1567	1502	1443

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)									
	10		14		18		22		28	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)
200	4.3	0:41	3.8	0:39	3.4	0:38	3.1	0:37	2.7	0:35
400	8.9	1:17	8.2	1:12	7.4	1:10	6.9	1:09	6.5	1:04
600	13.5	1:53	12.4	1:46	11.4	1:42	10.7	1:40	10.2	1:33
800	18.0	2:30	16.7	2:20	15.4	2:15	14.4	2:12	13.9	2:02
1000	22.4	3:08	20.8	2:55	19.3	2:47	18.1	2:44	17.5	2:31
1200	26.8	3:46	24.9	3:30	23.1	3:20	21.8	3:16	21.0	3:01
1400	31.2	4:25	29.0	4:06	27.0	3:54	25.4	3:48	24.5	3:31
1600	35.5	5:04	33.1	4:42	30.7	4:27	29.0	4:20	27.9	4:02
1800	39.7	5:43	37.0	5:18	34.5	5:01	32.5	4:52	31.3	4:32

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)					
	160	180	200	220	240	260
5	-0.4	-0.2	0.0	0.4	0.8	2.0
10	-0.9	-0.5	0.0	0.8	1.8	3.9
15	-1.4	-0.7	0.0	1.3	2.7	5.6
20	-1.9	-1.0	0.0	1.7	3.6	7.2
25	-2.4	-1.2	0.0	2.2	4.5	8.5
30	-2.9	-1.5	0.0	2.6	5.4	9.7
35	-3.4	-1.7	0.0	3.0	6.2	10.7
40	-3.9	-2.0	0.0	3.4	7.0	11.5
45	-4.4	-2.2	0.0	3.8	7.8	12.0

Includes APU fuel burn.

ENGINE INOP

MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
260	EPR	1.16	1.20	1.26	1.35			
	KIAS	241	241	242	243			
	FF/ENG	8460	8430	8430	8440			
240	EPR	1.15	1.18	1.23	1.31	1.43		
	KIAS	231	232	233	234	235		
	FF/ENG	7800	7760	7730	7710	7910		
220	EPR	1.13	1.16	1.21	1.27	1.38		
	KIAS	221	222	223	224	225		
	FF/ENG	7140	7100	7050	7020	7100		
200	EPR	1.12	1.14	1.18	1.24	1.33	1.47	
	KIAS	213	213	213	213	214	215	
	FF/ENG	6590	6450	6390	6320	6360	6640	
180	EPR	1.10	1.12	1.15	1.21	1.28	1.39	
	KIAS	205	205	205	205	205	205	
	FF/ENG	6020	5870	5760	5670	5690	5780	
160	EPR	1.08	1.10	1.13	1.17	1.23	1.32	1.48
	KIAS	197	197	197	197	197	197	197
	FF/ENG	5420	5330	5130	5040	5020	5070	5270
140	EPR	1.07	1.08	1.11	1.14	1.19	1.26	1.38
	KIAS	188	188	188	188	188	188	188
	FF/ENG	4820	4740	4560	4430	4400	4420	4480
120	EPR	1.06	1.07	1.09	1.11	1.15	1.21	1.30
	KIAS	179	179	179	179	179	179	179
	FF/ENG	4230	4160	4000	3860	3800	3800	3870

This table includes 5% additional fuel for holding in a racetrack pattern.

Performance Inflight - QRH — Chapter PI-QRH
Gear Down — Section 23

GEAR DOWN

210 KIAS Max Climb EPR

Based on engine bleed for packs on and anti-ice off

TAT (°C)	PRESSURE ALTITUDE (1000 FT)														
	0	5	10	12	14	16	18	20	22	24	26	28	30	32	34
55	1.18	1.17	1.16	1.16	1.15	1.14	1.14	1.13	1.11	1.10	1.09	1.07	1.06	1.04	1.03
50	1.19	1.19	1.18	1.18	1.17	1.16	1.15	1.14	1.13	1.12	1.11	1.09	1.08	1.06	1.05
45	1.21	1.21	1.20	1.19	1.19	1.18	1.17	1.16	1.15	1.14	1.12	1.11	1.10	1.08	1.07
40	1.23	1.22	1.21	1.21	1.20	1.20	1.19	1.18	1.17	1.16	1.14	1.13	1.12	1.10	1.09
35	1.25	1.24	1.23	1.23	1.22	1.22	1.21	1.20	1.19	1.18	1.17	1.15	1.14	1.12	1.11
30	1.26	1.26	1.25	1.25	1.24	1.24	1.23	1.22	1.21	1.20	1.19	1.18	1.16	1.15	1.14
25	1.26	1.29	1.28	1.27	1.27	1.26	1.25	1.25	1.24	1.22	1.21	1.20	1.19	1.17	1.16
20	1.26	1.30	1.30	1.30	1.29	1.29	1.28	1.27	1.26	1.25	1.24	1.23	1.21	1.20	1.19
15	1.26	1.30	1.33	1.33	1.32	1.31	1.31	1.30	1.29	1.28	1.27	1.25	1.24	1.23	1.22
10	1.26	1.30	1.34	1.35	1.35	1.34	1.34	1.33	1.32	1.31	1.30	1.28	1.27	1.26	1.25
5	1.26	1.30	1.34	1.36	1.37	1.38	1.37	1.36	1.35	1.34	1.33	1.32	1.30	1.29	1.28
0	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.40	1.39	1.37	1.36	1.35	1.34	1.33	1.32
-5	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.42	1.41	1.40	1.39	1.38	1.37	1.36
-10	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.44	1.46	1.45	1.44	1.43	1.42	1.41
-15	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.44	1.46	1.48	1.49	1.48	1.47	1.47
-20	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.44	1.46	1.48	1.50	1.53	1.54	1.53
-25	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.44	1.46	1.48	1.50	1.53	1.56	1.57
-30	1.26	1.30	1.34	1.36	1.37	1.39	1.40	1.42	1.44	1.46	1.48	1.50	1.53	1.56	1.57

EPR Adjustments for Engine Bleeds

BLEED CONFIGURATION	PRESSURE ALTITUDE (1000 FT)												
	0	5	10	12	16	18	22	24	26	28	30	32	34
PACKS OFF	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.04	0.04
ENGINE ANTI-ICE ON	0.00	0.00	-0.03	-0.03	-0.03	-0.03	-0.03	-0.04	-0.04	-0.04	-0.04	-0.05	-0.05
ENGINE & WING ANTI-ICE ON	-0.02	-0.02	-0.05	-0.06	-0.06	-0.06	-0.06	-0.07	-0.07	-0.08	-0.08	-0.09	-0.10

Long Range Cruise Altitude Capability

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
260	15500	13600	10700
250	17200	15100	12800
240	18900	16900	14800
230	20700	18600	16500
220	22600	20300	18400
210	24800	22100	20200
200	27000	24100	22100
190	29200	26300	24000
180	31500	28700	26000
170	33300	31300	28300
160	34600	33600	31100
150	35700	35500	33500
140	36900	36900	35600
130	38200	38100	37000
120	39500	39400	38200

GEAR DOWN

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)										
		10	14	18	21	23	25	27	29	31	33	35
260	EPR	1.20	1.25									
	MACH	.451	.483									
	KIAS	251	250									
	FF/ENG	7079	7051									
240	EPR	1.18	1.22	1.29								
	MACH	.434	.466	.506								
	KIAS	242	241	242								
	FF/ENG	6515	6477	6483								
220	EPR	1.16	1.20	1.25	1.31							
	MACH	.417	.449	.482	.517							
	KIAS	232	232	231	233							
	FF/ENG	5955	5928	5832	5934							
200	EPR	1.14	1.17	1.22	1.26	1.30	1.35	1.40				
	MACH	.400	.430	.462	.489	.514	.536	.553				
	KIAS	222	222	221	221	223	223	221				
	FF/ENG	5409	5371	5282	5290	5363	5394	5396				
180	EPR	1.12	1.15	1.19	1.23	1.26	1.30	1.35	1.40	1.47		
	MACH	.383	.409	.441	.466	.484	.508	.532	.550	.569		
	KIAS	213	211	210	210	209	211	212	210	208		
	FF/ENG	4907	4821	4741	4714	4722	4787	4828	4831	4854		
160	EPR	1.10	1.13	1.16	1.19	1.22	1.25	1.29	1.33	1.38	1.45	1.55
	MACH	.365	.389	.418	.442	.460	.477	.500	.525	.545	.564	.589
	KIAS	203	200	199	199	198	198	199	200	199	197	197
	FF/ENG	4431	4304	4198	4183	4176	4162	4210	4258	4246	4279	4440
140	EPR	1.08	1.11	1.13	1.16	1.18	1.21	1.24	1.27	1.32	1.37	1.43
	MACH	.344	.369	.396	.420	.437	.456	.475	.495	.517	.539	.563
	KIAS	191	190	188	188	188	188	188	188	188	188	188
	FF/ENG	3928	3828	3705	3692	3694	3693	3696	3713	3704	3717	3780
120	EPR	1.07	1.09	1.11	1.13	1.15	1.17	1.20	1.23	1.26	1.30	1.35
	MACH	.323	.349	.377	.400	.417	.434	.453	.472	.493	.514	.537
	KIAS	179	179	179	179	179	179	179	179	179	179	179
	FF/ENG	3456	3380	3325	3294	3291	3288	3287	3287	3267	3258	3258

GEAR DOWN

Long Range Cruise Enroute Fuel and Time
Ground to Air Miles Conversion

AIR DISTANCE (NM) HEADWIND COMPONENT (KTS) 100	80	60	40	20	GROUND DISTANCE (NM)	AIR DISTANCE (NM) TAILWIND COMPONENT (KTS) 20	40	60	80	100
329	293	262	237	217	200	188	178	168	160	153
664	590	527	477	436	400	377	357	338	321	306
1002	889	792	716	654	600	566	534	506	481	459
1345	1192	1060	957	873	800	754	712	675	641	612
1693	1497	1330	1199	1092	1000	943	890	843	801	764
2045	1805	1601	1441	1312	1200	1131	1067	1010	960	915
2404	2118	1875	1685	1532	1400	1318	1244	1178	1118	1066
2768	2434	2150	1930	1753	1600	1506	1420	1344	1276	1216
3140	2756	2429	2177	1975	1800	1693	1597	1510	1432	1365

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT) 10		14		18		22		28	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)
200	7.9	0:51	7.2	0:49	6.5	0:47	6.0	0:45	5.3	0:42
400	16.2	1:40	15.0	1:35	13.7	1:30	12.8	1:25	11.6	1:19
600	24.2	2:29	22.5	2:21	20.7	2:14	19.4	2:07	17.7	1:56
800	32.1	3:19	29.9	3:09	27.6	2:58	25.9	2:48	23.7	2:33
1000	39.8	4:10	37.1	3:57	34.3	3:43	32.2	3:31	29.6	3:11
1200	47.3	5:02	44.1	4:46	40.9	4:30	38.4	4:14	35.4	3:50
1400	54.7	5:55	51.0	5:36	47.3	5:17	44.5	4:58	41.0	4:29
1600	61.9	6:49	57.8	6:27	53.6	6:04	50.4	5:43	46.5	5:09
1800	69.0	7:45	64.4	7:19	59.7	6:53	56.2	6:28	51.9	5:50

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB) 160	180	200	220	240	260
10	-0.9	-0.5	0.0	0.8	1.7	2.6
20	-2.0	-1.0	0.0	1.6	3.4	5.3
30	-3.0	-1.5	0.0	2.3	5.0	7.8
40	-4.1	-2.0	0.0	3.0	6.5	10.1
50	-5.1	-2.6	0.0	3.6	7.8	12.2
60	-6.2	-3.1	0.0	4.2	8.9	14.1
70	-7.2	-3.6	0.0	4.8	9.9	15.8

Descent at VREF30+80

PRESSURE ALTITUDE (1000 FT)	5	10	15	17	19	21	23	25	27	29	31	33	35
DISTANCE (NM)	12	22	31	35	39	42	46	50	54	58	62	66	70
TIME (MINUTES)	7	9	12	13	14	14	15	16	17	18	18	19	20

GEAR DOWN

Holding
Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)						
		1500	5000	10000	15000	20000	25000	30000
260	EPR	1.12	1.14	1.19	1.25			
	KIAS	235	235	235	235			
	FF/ENG	7030	6940	6900	6850			
240	EPR	1.11	1.13	1.17	1.22	1.31		
	KIAS	228	228	228	228	228		
	FF/ENG	6590	6430	6380	6320	6370		
220	EPR	1.09	1.11	1.15	1.20	1.27		
	KIAS	220	220	220	220	220		
	FF/ENG	6130	5990	5880	5800	5830		
200	EPR	1.08	1.10	1.13	1.17	1.24	1.33	
	KIAS	213	213	213	213	213	213	
	FF/ENG	5660	5570	5390	5310	5300	5360	
180	EPR	1.07	1.09	1.11	1.15	1.21	1.29	1.42
	KIAS	205	205	205	205	205	205	205
	FF/ENG	5210	5110	4930	4830	4810	4850	4940
160	EPR	1.06	1.07	1.10	1.13	1.18	1.25	1.35
	KIAS	197	197	197	197	197	197	197
	FF/ENG	4740	4670	4490	4370	4340	4350	4370
140	EPR	1.05	1.06	1.08	1.11	1.15	1.21	1.29
	KIAS	188	188	188	188	188	188	188
	FF/ENG	4290	4220	4060	3930	3880	3880	3900
120	EPR	1.04	1.05	1.07	1.09	1.12	1.17	1.24
	KIAS	179	179	179	179	179	179	179
	FF/ENG	3850	3770	3630	3500	3460	3450	3460

This table includes 5% additional fuel for holding in a racetrack pattern.

Performance Inflight - QRH — Chapter PI-QRH
Gear Down, Engine Inop — Section 24

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Driftdown Speed/Level Off Altitude
100 ft/min residual rate of climb
Includes APU fuel burn

WEIGHT (1000 LB)		OPTIMUM DRIFTDOWN SPEED (KIAS)	LEVEL OFF ALTITUDE (FT)		
START DRIFTDOWN	LEVEL OFF		ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
220	208	218	6000	2700	
200	190	210	10000	7800	5300
180	172	203	13700	11900	9700
160	153	195	17300	15800	14100
140	134	187	20600	19700	18300

Long Range Cruise Altitude Capability
100 ft/min residual rate of climb

WEIGHT (1000 LB)	PRESSURE ALTITUDE (FT)		
	ISA + 10°C & BELOW	ISA + 15°C	ISA + 20°C
200	6200		
190	9100	5700	
180	11800	9000	5800
170	14100	12000	8800
160	16000	14400	12200
150	17900	16400	14600
140	19800	18500	16800
130	21400	20500	19200
120	22900	22000	21000

With engine bleed for packs off, increase altitude capability by 100 ft.
With engine anti-ice on, decrease altitude capability by 5100 ft.
With engine and wing anti-ice on, decrease altitude capability by 8900 ft.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Long Range Cruise Control

WEIGHT (1000 LB)		PRESSURE ALTITUDE (1000 FT)							
		6	8	10	12	14	16	18	20
200	EPR	1.36	1.40						
	MACH	.368	.378						
	KIAS	220	218						
	FF/ENG	10640	10565						
180	EPR	1.32	1.35	1.39	1.43				
	MACH	.353	.364	.374	.385				
	KIAS	211	210	208	206				
	FF/ENG	9622	9548	9443	9407				
160	EPR	1.27	1.30	1.33	1.37	1.41	1.47		
	MACH	.334	.346	.358	.369	.382	.397		
	KIAS	200	199	199	197	197	197		
	FF/ENG	8498	8488	8450	8352	8379	8418		
140	EPR	1.23	1.25	1.28	1.31	1.35	1.40	1.45	1.52
	MACH	.315	.327	.339	.352	.366	.380	.396	.412
	KIAS	188	188	188	188	188	188	188	188
	FF/ENG	7481	7445	7432	7423	7423	7375	7448	7644
120	EPR	1.19	1.21	1.24	1.26	1.30	1.33	1.37	1.42
	MACH	.300	.311	.323	.335	.349	.362	.377	.392
	KIAS	179	179	179	179	179	179	179	179
	FF/ENG	6612	6590	6559	6520	6536	6457	6465	6502

GEAR DOWN
ENGINE INOP

MAX CONTINUOUS THRUST

Long Range Cruise Diversion Fuel and Time

Ground to Air Miles Conversion

AIR DISTANCE (NM)					GROUND DISTANCE (NM)	AIR DISTANCE (NM)				
HEADWIND COMPONENT (KTS)						TAILWIND COMPONENT (KTS)				
100	80	60	40	20		20	40	60	80	100
169	149	132	119	109	100	93	88	83	78	75
343	302	267	240	219	200	187	175	165	156	148
518	455	402	361	328	300	281	263	247	234	222
694	610	538	483	438	400	374	350	329	311	295
872	765	674	604	548	500	467	438	411	388	368
1051	921	811	726	658	600	560	524	492	464	440
1232	1078	948	848	769	700	653	611	574	541	513
1415	1237	1087	971	879	800	746	698	655	617	585

Reference Fuel and Time Required at Check Point

AIR DIST (NM)	PRESSURE ALTITUDE (1000 FT)							
	6		10		14		18	
	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)	FUEL (1000 LB)	TIME (HR:MIN)
100	4.3	0:29	3.8	0:28	3.4	0:27	3.2	0:26
200	8.8	0:54	8.0	0:53	7.6	0:51	7.3	0:47
300	13.2	1:20	12.2	1:17	11.6	1:14	11.3	1:09
400	17.6	1:46	16.3	1:42	15.6	1:38	15.2	1:31
500	21.9	2:12	20.4	2:07	19.5	2:02	19.1	1:53
600	26.1	2:39	24.4	2:32	23.3	2:26	22.9	2:16
700	30.4	3:06	28.4	2:58	27.1	2:50	26.6	2:39
800	34.5	3:33	32.3	3:23	30.9	3:15	30.3	3:02

Fuel Required Adjustment (1000 LB)

REFERENCE FUEL REQUIRED (1000 LB)	WEIGHT AT CHECK POINT (1000 LB)				
	160	180	200	220	240
5	-0.5	-0.2	0.0	0.4	1.0
10	-1.1	-0.5	0.0	0.8	2.0
15	-1.6	-0.8	0.0	1.3	3.0
20	-2.2	-1.1	0.0	1.7	3.9
25	-2.8	-1.4	0.0	2.2	4.8
30	-3.3	-1.6	0.0	2.7	5.7
35	-3.9	-1.9	0.0	3.1	6.5

Includes APU fuel burn.

GEAR DOWN
ENGINE INOP
MAX CONTINUOUS THRUST

Holding
Flaps Up

WEIGHT (1000 LB)		PRESSURE ALTITUDE (FT)			
		1500	5000	10000	15000
220	EPR	1.31	1.37		
	KIAS	220	220		
	FF/ENG	11760	11740		
200	EPR	1.27	1.33		
	KIAS	213	213		
	FF/ENG	10730	10720		
180	EPR	1.24	1.29	1.38	
	KIAS	205	205	205	
	FF/ENG	9780	9740	9730	
160	EPR	1.21	1.25	1.33	1.44
	KIAS	197	197	197	197
	FF/ENG	8850	8780	8750	8760
140	EPR	1.18	1.22	1.28	1.37
	KIAS	188	188	188	188
	FF/ENG	7910	7870	7800	7730
120	EPR	1.15	1.18	1.24	1.31
	KIAS	179	179	179	179
	FF/ENG	6970	6950	6890	6790

This table includes 5% additional fuel for holding in a racetrack pattern.

Introduction

This chapter contains information to supplement performance data from the Flight Management Computer (FMC). In addition, sufficient inflight data is provided to complete a flight with the FMC inoperative. In the event of conflict between data presented in this chapter and that contained in the approved Airplane Flight Manual, the Flight Manual shall always take precedence.

General

Flight with Unreliable Airspeed / Turbulent Air Penetration

Pitch attitude and average EPR information is provided for use in all phases of flight in the event of unreliable airspeed/Mach indications resulting from blocking or freezing of the pitot system. Loss of radome or turbulent air may also cause unreliable airspeed/Mach indications. The cruise table in this section may also be used for turbulent air penetration.

Pitch attitude is shown in bold type for emphasis since altitude and/or vertical speed indications may also be unreliable.

Max Climb EPR

This table shows Max Climb EPR for a 250/290/.78 climb speed schedule, normal engine bleed for packs on and anti-ice off. Enter the table with airport pressure altitude and TAT and read EPR. EPR adjustments are shown for packs off and anti-ice operation.

VREF

The Reference Speed table contains flaps 30, 25 and 20 landing speeds for a given weight.

Advisory Information

Normal Configuration Landing Distance

Tables are provided as advisory information for normal configuration landing distance on dry runways and slippery runways with good, medium, and poor reported braking action. These values are actual landing distances and do not include the 1.67 regulatory factor. Therefore, they cannot be used to determine the dispatch required landing field length.

To use these tables, determine the reference landing distance for the selected braking configuration. Then adjust the reference distance for landing weight, altitude, wind, slope, temperature, approach speed, and the number of operative thrust reversers to obtain the actual landing distance.

When landing on slippery runways or runways contaminated with ice, snow, slush, or standing water, the reported braking action must be considered. If the surface is affected by water, snow, or ice and the braking action is reported as "good", conditions should not be expected to be as good as on clean, dry runways. The value "good" is comparative and is intended to mean that airplanes should not experience braking or directional control difficulties when landing. The performance level used to calculate the "good" data is consistent with wet runway testing done on early Boeing jets. The performance level used to calculate "poor" data reflects runways covered with wet ice.

Use of the autobrake system commands the airplane to a constant deceleration rate. In some conditions, such as a runway with "poor" braking action, the airplane may not be able to achieve these deceleration rates. In these cases, runway slope and inoperative reversers influence the stopping distance. Since it cannot be determined quickly when this becomes a factor, it is conservative to add the effects of slope and inoperative reversers when using the autobrake system.

Non-normal Configuration Landing Distance

Advisory information is provided to support non-normal configurations that affect the landing performance of the airplane. Landing distances and adjustments are provided for dry runways and runways with good, medium, and poor reported braking action.

Enter the table with the applicable non-normal configuration and read the normal approach speed. The reference landing distance is a reference distance from 50 ft above the threshold to stop based on a reference landing weight and speed at sea level, zero wind, and zero slope. Subsequent columns provide adjustments for off-reference landing weight, altitude, wind, slope, and speed conditions. Each adjustment is independently added to the reference landing distance. Landing distance includes the effects of max manual braking and reverse thrust.

Recommeded Brake Cooling Schedule

Advisory information is provided to assist in avoiding the problems associated with hot brakes. For normal operation, most landings are at weights below the AFM quick turnaround limit weight.

Use of the recommended cooling schedule will help avoid brake overheat and fuse plug problems that could result from repeated landings at short time intervals or a rejected takeoff.

Enter the Recommended Brake Cooling Schedule table with the airplane weight and brakes on speed, adjusted for wind, at the appropriate temperature and altitude condition. Instructions for applying wind adjustments are included below the table. Linear interpolation may be used to obtain intermediate values. The resulting number is the reference brake energy per brake in millions of foot-pounds, and represents the amount of energy absorbed by each brake during a rejected takeoff

To determine the energy per brake absorbed during landing, enter the appropriate Adjusted Brake Energy Per Brake table (No Reverse Thrust or Two Engine Reverse) with the reference brake energy per brake and the type of braking used during landing (Max Manual, Max Auto, or Autobrake). The resulting number is the adjusted brake energy per brake and represents the energy absorbed in each brake during the landing.

The recommended cooling time is found in the final table by entering with the adjusted brake energy per brake or brake temperature monitor system (BTMS) indication on EICAS. Times are provided for ground cooling and inflight gear down cooling.

If brake temperature monitor indication on EICAS is available, the hottest brake indication 10 to 15 minutes after the airplane has come to a complete stop, or inflight with gear retracted, may be used to determine the recommended cooling schedule by entering at the bottom of the chart. The brake temperature light illuminates when the hottest brake is registering 5 on the EICAS indication and extinguishes as the hottest brake cools with an EICAS indication of 4.

Engine Inoperative

Initial Max Continuous EPR

The Initial Max Continuous EPR setting for use following an engine failure is shown. The table shows a range of Cruise Mach numbers to provide a target EPR setting at the start of driftdown. Also shown is the maximum TAT at which the limit EPR can be set. Once driftdown is established, the Max Continuous EPR table should be used to determine EPR for the given conditions.

Max Continuous EPR

Power setting is based on one engine operating with one A/C pack operating and all anti-ice bleeds off. Enter the table with pressure altitude and IAS or Mach to read EPR.

It is desirable to maintain engine thrust level within the limits of the Max Cruise thrust rating. However, where thrust level in excess of Max Cruise rating is required, such as for meeting terrain clearance, ATC altitude assignments, or to attain maximum range capability, it is permissible to use the thrust needed up to the Max Continuous thrust rating. The Max Continuous thrust rating is intended primarily for emergency use at the discretion of the pilot and is the maximum thrust that may be used continuously.

Driftdown Speed/Level Off Altitude

The table shows optimum driftdown speed as a function of cruise weight at start of driftdown. Also shown are the approximate weight and pressure altitude at which the airplane will level off considering 100 ft/min residual rate of climb.

The level off altitude is dependent on air temperature (ISA deviation).

Driftdown/LRC Range Capability

This table shows the range capability from the start of driftdown. Driftdown is continued to level off altitude. As weight decreases due to fuel burn, the airplane is accelerated to Long Range Cruise speed. Cruise is continued at level off altitude and Long Range Cruise speed.

To determine fuel required, enter the Ground to Air Miles Conversion table with the desired ground distance and adjust for anticipated winds to obtain air distance to destination. Then enter the Driftdown/Cruise Fuel and Time table with air distance and weight at start of driftdown to determine fuel and time required. If altitudes other than the level off altitude are used, fuel and time required may be obtained by using the Engine Inoperative Long Range Cruise Enroute Fuel and Time table.

Long Range Cruise Altitude Capability

The table shows the maximum altitude that can be maintained at a given weight and air temperature (ISA deviation), based on Long Range Cruise speed, Max Continuous thrust, and 100 ft/min residual rate of climb.

Long Range Cruise Control

The table provides target EPR, engine inoperative Long Range Cruise Mach number, IAS and fuel flow for the airplane weight and pressure altitude. The fuel flow values in this table reflect single engine fuel burn.

Long Range Cruise Diversion Fuel and Time

Tables are provided for crews to determine the fuel and time required to proceed to an alternate airfield with one engine inoperative. The data is based on single engine Long Range Cruise speed and .78/290/250 descent. Enter with Air Distance as determined from the Ground to Air Miles Conversion table and read Fuel and Time required at the cruise pressure altitude. Adjust the fuel obtained for deviation from the reference weight at checkpoint as required by entering the Fuel Required Adjustment table with the fuel required for the reference weight and the actual weight at checkpoint.

Holding

Target EPR, indicated airspeed and fuel flow per engine information is tabulated for holding with flaps up based on the FMC optimum holding speed schedule. This is the higher of the maximum endurance speed and the maneuvering speed. Small variations in airspeed will not appreciably affect the overall endurance time. Enter the table with weight and pressure altitude to read EPR, IAS and fuel flow per engine.

Gear Down

This section contains performance for airplane operation with the landing gear extended for all phases of flight. The data is based on engine bleeds for normal air conditioning.

NOTE: The Flight Management Computer System (FMCS) does not contain special provisions for operation with landing gear extended. As a result, the FMCS will generate inaccurate enroute speed schedules, display non-conservative predictions of fuel burn, estimated time of arrival (ETA), maximum altitude, and compute overly shallow descent path. To obtain accurate ETA predictions, gear down cruise speed and altitude should be entered on the CLB and CRZ pages. Gear down cruise speed should also be entered on the DES page and a STEP SIZE of zero should be entered on the PERF INIT or CRZ page. Use of the VNAV during descent under these circumstances is not recommended.

Tables for gear down performance in this section are identical in format and used in the same manner as tables for the gear up configuration previously described.

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Maneuvers — Chapter Man
Table of Contents — Section 0

General

Non-Normal Maneuvers and Flight Patterns are included for training and review purposes.

Non-Normal Maneuvers

Flight crews are expected to do non-normal maneuvers from memory.

Flight Patterns

Flight patterns show procedures for some all-engine and engine-inoperative situations.

Flight patterns do not include all procedural items but show required/recommended:

- configuration changes
- thrust changes
- Mode Control Panel (MCP) changes
- pitch mode and roll mode changes
- checklist calls.

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Approach to Stall Recovery

The following is immediately accomplished at the first indication of stall buffet or stick shaker.

Pilot Flying	Pilot Monitoring
• Advance thrust levers to maximum thrust* • Smoothly adjust pitch attitude** to avoid ground contact or obstacles • Level the wings (do not change flaps or landing gear configuration) • Retract the speedbrakes	• Verify maximum thrust • Monitor altitude and airspeed • Call out any trend toward terrain contact • Verify all required actions have been completed and call out any omissions
When ground contact is no longer a factor: • Adjust pitch attitude to accelerate while minimizing altitude loss • Return to a speed appropriate for the configuration	

Note: * If an approach to stall is encountered with the autopilot engaged, apply maximum thrust and allow the airplane to return to the normal airspeed.

Note: **At high altitude, it may be necessary to descend to accelerate.

Note: If autopilot response is not acceptable, it should be disengaged.

Pilot Induced Roll Oscillation

Pilot Induced Oscillations (PIO) are inadvertent, sustained oscillations of the airplane resulting from interactions between the aircraft and control inputs by the pilot. They are often associated with tasks where the pilot is attempting to precisely and quickly accomplish a flight maneuver (such as the final phase of landing). In a fully developed lateral PIO, pilot control wheel inputs will be out of phase with the airplane roll response.

Flight crews should be aware of the potential for pilot induced roll oscillations when using high rate, high magnitude, rapidly reversed control wheel inputs. This potential is increased when in landing configuration with gusty wind conditions. Pilot techniques that utilize abrupt and pulsing control inputs may also contribute to these events.

The following action should be accomplished immediately when either pilot recognizes that a PIO exists:

Pilot Flying	Pilot Monitoring
Announce the situation	
Immediately stop lateral control wheel inputs until the airplane stabilizes	Verify appropriate pilot response
Initiate go-around if oscillations do not diminish or if the aircraft is not in a position from which a safe landing can be made	Recommend go-around if airplane is not stabilized for landing

Rejected Takeoff

The captain has the sole responsibility for the decision to reject the takeoff. The decision must be made in time to start the rejected takeoff maneuver by V1. If the decision is to reject the takeoff, the captain must clearly announce “REJECT,” immediately start the rejected takeoff maneuver, and assume control of the airplane. If the first officer is making the takeoff, the first officer must maintain control of the airplane until the captain makes a positive input to the controls.

Prior to 80 knots the takeoff should be rejected for any of the following:

- activation of the master caution
- system failure(s)
- unusual noise or vibration
- tire failure
- abnormally slow acceleration
- takeoff configuration warning
- fire or fire warning
- engine failure
- if a side window opens
- if the airplane is unsafe or unable to fly
- predictive windshear warning

Above 80 knots and prior to V1, the takeoff should be rejected for any of the following:

- fire or fire warning
- engine failure
- if the airplane is unsafe or unable to fly.
- predictive windshear warning

During the takeoff, the crew member observing the non-normal situation will immediately call it out as clearly as possible.

Captain	First Officer
Without delay: Simultaneously close the thrust levers, disengage the autothrottles, and apply maximum manual wheel brakes or verify operation of RTO autobrake. If RTO autobrake is selected, monitor system performance and apply manual wheel brakes if the autobrake disarm or deceleration is not adequate. Raise SPEEDBRAKE lever. Apply the maximum amount of reverse thrust consistent with conditions. Continue maximum braking until certain the airplane will stop on the runway.	Verify actions as follows: Thrust levers closed. Autothrottle disengaged. Maximum brakes applied. Verify speedbrake lever UP and call “SPEEDBRAKES UP.” If speedbrake lever not UP call “SPEEDBRAKES NOT UP.” Reverse thrust applied. Call out any omitted action items.
Field length permitting: Initiate movement of the reverse thrust levers to reach the reverse idle detent by taxi speed.	Call out 60 knots. Communicate the reject decision to the control tower and appropriate crew members as soon as practical.

When the airplane is stopped, perform procedures as required.

Review Brake Cooling Schedule for brake cooling time and precautions (refer to the Performance Inflight chapter).

Consider the following:

- The possibility of wheel fuse plugs melting
- The need to clear the runway
- The requirement for remote parking
- Wind direction in case of fire
- Alerting fire equipment
- Not setting the parking brake unless passenger evacuation is necessary
- Advising the ground crew of the hot brake hazard
- Advising passengers of the need to remain seated or evacuate
- Completion of Non–Normal checklist (if appropriate) for conditions which caused the RTO

Terrain Avoidance

Ground Proximity Caution

Accomplish the following maneuver for any of these aural alerts*:

- CAUTION TERRAIN
- TERRAIN
- DON'T SINK
- GLIDESLOPE
- SINK RATE
- TOO LOW FLAPS
- TOO LOW GEAR
- TOO LOW TERRAIN
- BANK ANGLE

Pilot Flying	Pilot Monitoring
Correct the flight path or the airplane configuration.	

The below glideslope deviation alert may be cancelled or inhibited for:

- localizer or backcourse approach
- circling approach from an ILS
- when conditions require a deliberate approach below glideslope
- unreliable glideslope signal.

Note: If a terrain caution occurs when flying under daylight VMC, and positive visual verification is made that no terrain hazard exists, the alert may be regarded as cautionary and the approach may be continued.

Note: *As installed, some repeat.

Ground Proximity Warning

Accomplish the following maneuver for any of these conditions:

- activation of the "TERRAIN TERRAIN PULL UP" warning
- activation of the "PULL UP" warning
- other situations resulting in unacceptable flight toward terrain.

Pilot Flying	Pilot Monitoring
• Disconnect autopilot. • Disconnect autothrottle. • Aggressively apply maximum* thrust. • Simultaneously roll wings level and rotate to an initial pitch attitude of 20°. • Retract speedbrakes. • If terrain remains a threat, continue rotation up to the pitch limit indicator or stick shaker or initial buffet.	• Verify maximum* thrust. • Verify all required actions have been completed and call out any omissions.
• Do not change gear or flap configuration until terrain separation is assured. • Monitor radio altimeter for sustained or increasing terrain separation. • When clear of the terrain, slowly decrease pitch attitude and accelerate.	• Monitor vertical speed and altitude (radio altitude for terrain clearance and barometric altitude for a minimum safe altitude). • Call out any trend toward terrain contact.

Note: Aft control column force increases as the airspeed decreases. In all cases, the pitch attitude that results in intermittent stick shaker or initial buffet is the upper pitch attitude limit. Flight at intermittent stick shaker may be required to obtain positive terrain separation. Smooth, steady control will avoid a pitch attitude overshoot and stall.

Note: Do not use flight director commands.

Note: * Maximum thrust can be obtained by advancing the thrust levers to the takeoff or go-around limit. On airplanes with EEC’s operating normally, the pilot may advance the thrust levers full forward. If terrain contact is imminent, advance thrust levers full forward.

Note: If positive visual verification is made that no terrain hazard exists when flying under daylight VMC conditions prior to a terrain warning, the alert may be regarded as cautionary and the approach may be continued.

Traffic Avoidance

The following is accomplished immediately by recall whenever a TCAS traffic advisory (TA) or resolution advisory (RA) occurs.

WARNING: Comply with the RA if there is a conflict between the RA and air traffic control.

WARNING: Once an RA has been issued, safe separation could be compromised if current vertical speed is changed, except as necessary to comply with the RA. This is because TCAS II–to–TCAS II coordination may be in progress with the intruder aircraft, and any change in vertical speed that does not comply with the RA may negate the effectiveness of the other aircraft's compliance with the RA.

Note: If stick shaker or initial buffet occurs during the maneuver, immediately accomplish the APPROACH TO STALL RECOVERY procedure.

Note: If high speed buffet occurs during the maneuver, relax pitch force as necessary to reduce buffet, but continue the maneuver.

Note: Do not use flight director pitch commands until clear of conflict.

For TA:

Pilot Flying	Pilot Monitoring
Look for traffic using traffic display as a guide. Call out any conflicting traffic.	
If traffic is sighted, maneuver if needed.	

Note: Maneuvers based solely on a TA may result in reduced separation and are not recommended.

For RA, except a climb in landing configuration:

WARNING: A DESCEND (fly down) RA issued below 1,000 feet AGL should not be followed.

Pilot Flying	Pilot Monitoring
If maneuvering is required, disengage the autopilot and autothrottle. Smoothly adjust pitch and thrust to satisfy the RA command. Follow the planned lateral flight path unless visual contact with the conflicting traffic requires other action.	
Attempt to establish visual contact. Call out any conflicting traffic.	

For a climb RA in landing configuration:

Pilot Flying	Pilot Monitoring
Disengage the autopilot and autothrottle. Advance thrust levers forward to ensure maximum thrust is attained and call for FLAPS 20. Smoothly adjust pitch to satisfy the RA command. Follow the planned lateral flight path unless visual contact with the conflicting traffic requires other action.	Verify maximum thrust set. Position flap lever to 20 detent.
Verify a positive rate of climb on the altimeter and call "GEAR UP."	Verify a positive rate of climb on the altimeter and call "POSITIVE RATE." Set the landing gear lever to UP.
Attempt to establish visual contact. Call out any conflicting traffic.	

Upset Recovery

An upset can generally be defined as unintentionally exceeding the following conditions:

- pitch attitude greater than 25 degrees nose up, or
- pitch attitude greater than 10 degrees nose down, or
- bank angle greater than 45 degrees, or
- within above parameters but flying at airspeeds inappropriate for the conditions.

The following techniques represent a logical progression for recovering the airplane. The sequence of actions is for guidance only and represents a series of options to be considered and used depending on the situation. Not all the actions may be necessary once recovery is underway. If needed, use pitch trim sparingly. Careful use of rudder to aid roll control should be considered only if roll control is ineffective and the airplane is not stalled.

These techniques assume that the airplane is not stalled. A stalled condition can exist at any attitude and may be recognized by continuous stick shaker activation accompanied by one or more of the following:

- buffeting, which could be heavy at times
- lack of pitch authority and/or roll control
- inability to arrest descent rate.

If the airplane is stalled, recovery from the stall must be accomplished first by applying and maintaining nose down elevator until stall recovery is complete and stick shaker activation ceases.

Nose High Recovery

Pilot Flying	Pilot Monitoring
• Recognize and confirm the situation.	
• Disconnect autopilot and autothrottle. • Apply as much as full nose down elevator. • *Apply appropriate nose down stabilizer trim. • Reduce thrust. • *Roll (adjust bank angle) to obtain a nose down pitch rate. • Complete the recovery: - when approaching the horizon, roll to wings level -check airspeed and adjust thrust -establish pitch attitude.	• Call out attitude, airspeed and altitude throughout the recovery. • Verify all required actions have been completed and call out any omissions.

Nose Low Recovery

Pilot Flying	Pilot Monitoring
• Recognize and confirm the situation.	
• Disconnect autopilot and autothrottle. • Recover from stall, if required. • *Roll in the shortest direction to wings level (unload and roll if bank angle is more than 90 degrees). • Recover to level flight: - apply nose up elevator - *apply nose up trim, if required - adjust thrust and drag as required.	• Call out attitude, airspeed and altitude throughout the recovery. • Verify all required actions have been completed and call out any omissions.

WARNING: * EXCESSIVE USE OF PITCH TRIM OR RUDDER MAY AGGRAVATE AN UPSET SITUATION OR MAY RESULT IN LOSS OF CONTROL AND/OR HIGH STRUCTURAL LOADS.

Windshear

Predictive Windshear (PWS)

PWS Cautions

For predictive windshear caution alert: (“MONITOR RADAR DISPLAY” aural)

Pilot Flying	Pilot Monitoring
• Maneuver as required to avoid the windshear.	

PWS Warnings

Predictive windshear warning during takeoff roll: (“WINDSHEAR AHEAD, WINDSHEAR AHEAD” aural)

- Prior to V1, reject takeoff.
- After V1, perform the Windshear Escape Maneuver.

Predictive windshear warning during approach: (“GO–AROUND, WINDSHEAR AHEAD” aural)

- perform Windshear Escape Maneuver or, at pilot’s discretion, perform a normal go–around.

Windshear Indications

The following are indications the airplane is encountering a windshear:

- Unacceptable flight path deviations; recognized as uncontrolled changes from normal steady state flight conditions below 1,000 feet AGL, in excess of any of the following:
    - 15 knots indicated airspeed
    - 500 FPM vertical speed
    - 5 degrees pitch attitude
    - 1 dot displacement from the glideslope
    - unusual thrust lever position for a significant period of time.
- Windshear Immediate-Alert Warning (two-tone siren followed by “WINDSHEAR,WINDSHEAR,WINDSHEAR”)

Windshear Encounter

Windshear encountered during takeoff roll:

- If windshear is encountered prior to V1, there may not be sufficient runway remaining to stop if an RTO is initiated at V1. At VR, rotate at a normal rate toward a 15 degree pitch attitude. Once airborne, perform the Windshear Escape Maneuver.
- If windshear is encountered near the normal rotation speed and airspeed suddenly decreases, there may not be sufficient runway left to accelerate back to normal takeoff speed. If there is insufficient runway left to stop, initiate a normal rotation at least 2,000 feet before the end of the runway even if airspeed is low. Higher than normal attitudes may be required to lift off in the remaining runway. Ensure maximum thrust is set.

Windshear encountered in flight:

- perform the Windshear Escape Maneuver.

Windshear Escape Maneuver With Flight Director Guidance

Pilot Flying	Pilot Monitoring
MANUAL FLIGHT • Disconnect autopilot. • Push either go–around switch. • Aggressively apply maximum* thrust. • Disconnect autothrottle. • Simultaneously roll wings level and rotate toward an initial pitch attitude of 15°. • Retract speedbrakes. • Follow flight director GA guidance (if available). AUTOMATIC FLIGHT • Press either go–around switch.** • Verify GA mode annunciation. • Verify thrust advances to GA power. • Retract speedbrakes. • Monitor system performance***.	• Verify maximum* thrust. • Verify all required actions have been completed and call out any omissions.
• Do not change gear or flap configuration until windshear is no longer a factor. • Monitor vertical speed and altitude. • Do not attempt to regain lost airspeed until windshear is no longer a factor.	• Monitor vertical speed and altitude. • Call out any trend toward terrain contact, descending flight path, or significant airspeed changes.

Note: Aft control column force increases as the airspeed decreases. In all cases, the pitch attitude that results in intermittent stick shaker or initial buffet is the upper pitch attitude limit. Flight at intermittent stick shaker may be required to obtain positive terrain separation. Smooth, steady control will avoid a pitch attitude overshoot and stall.

Note: * Maximum thrust can be obtained by advancing the thrust levers to the takeoff or go-around limit. On airplanes with EEC’s operating normally, the pilot may advance the thrust levers full forward. If terrain contact is imminent, advance thrust levers full forward.

Note: ** If GA is not available, disconnect autopilot and autothrottle and fly manually.

WARNING: * Severe windshear may exceed the performance capability of the AFDS. The pilot flying must be prepared to disconnect the autopilot and autothrottle and fly manually.**

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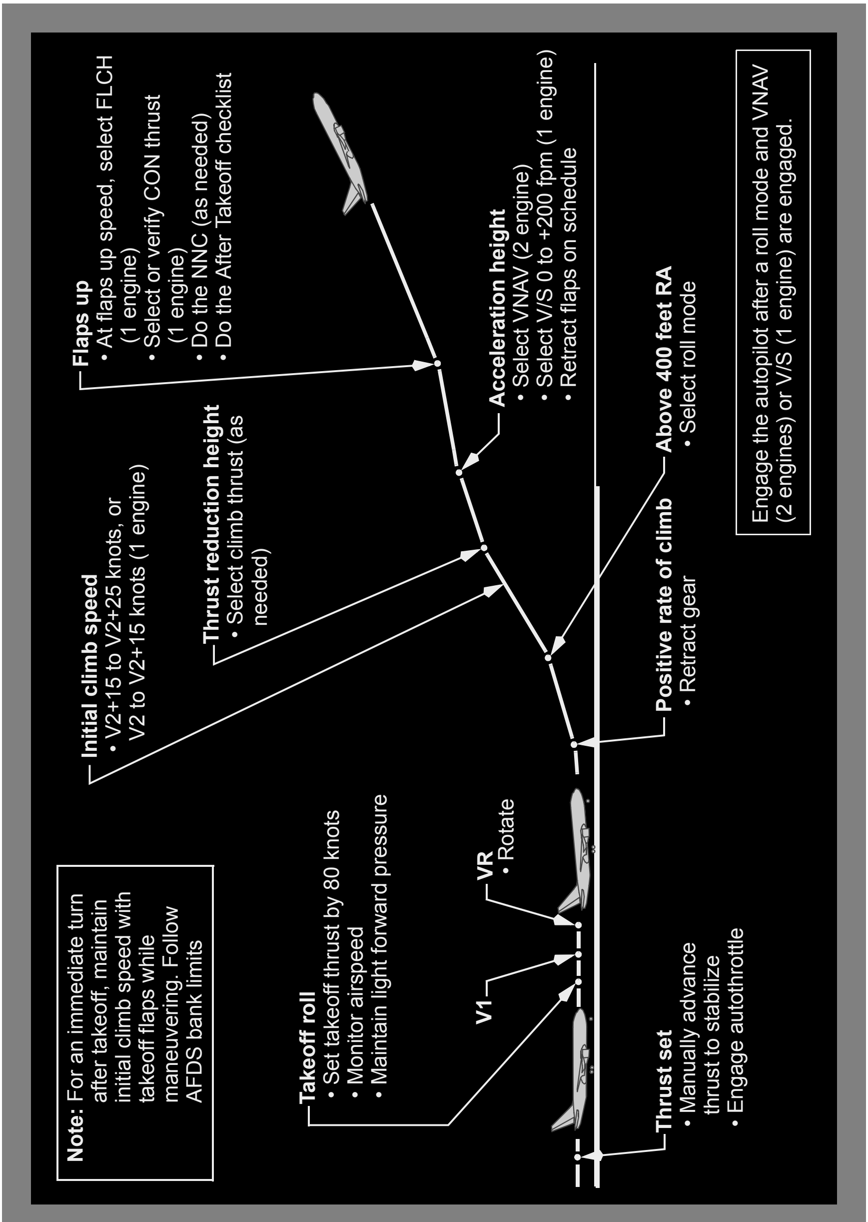
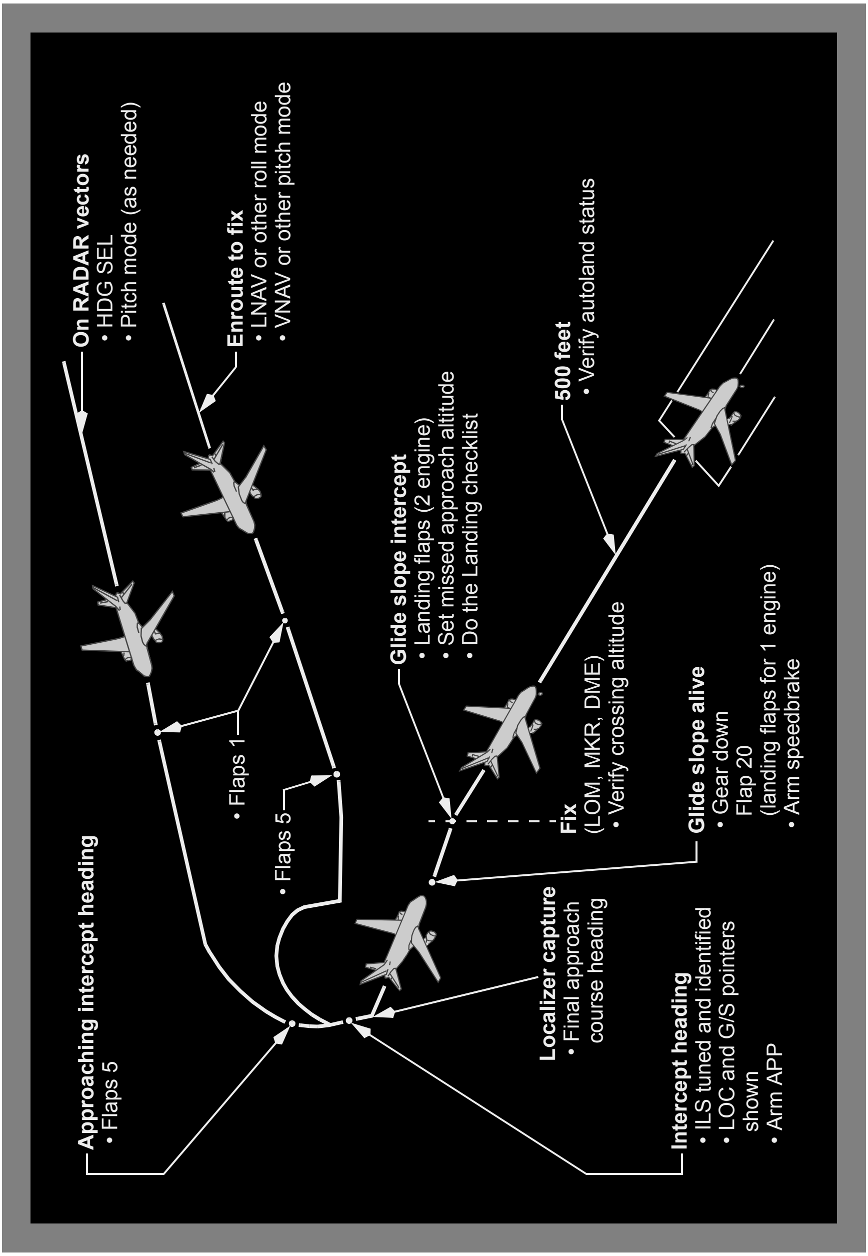
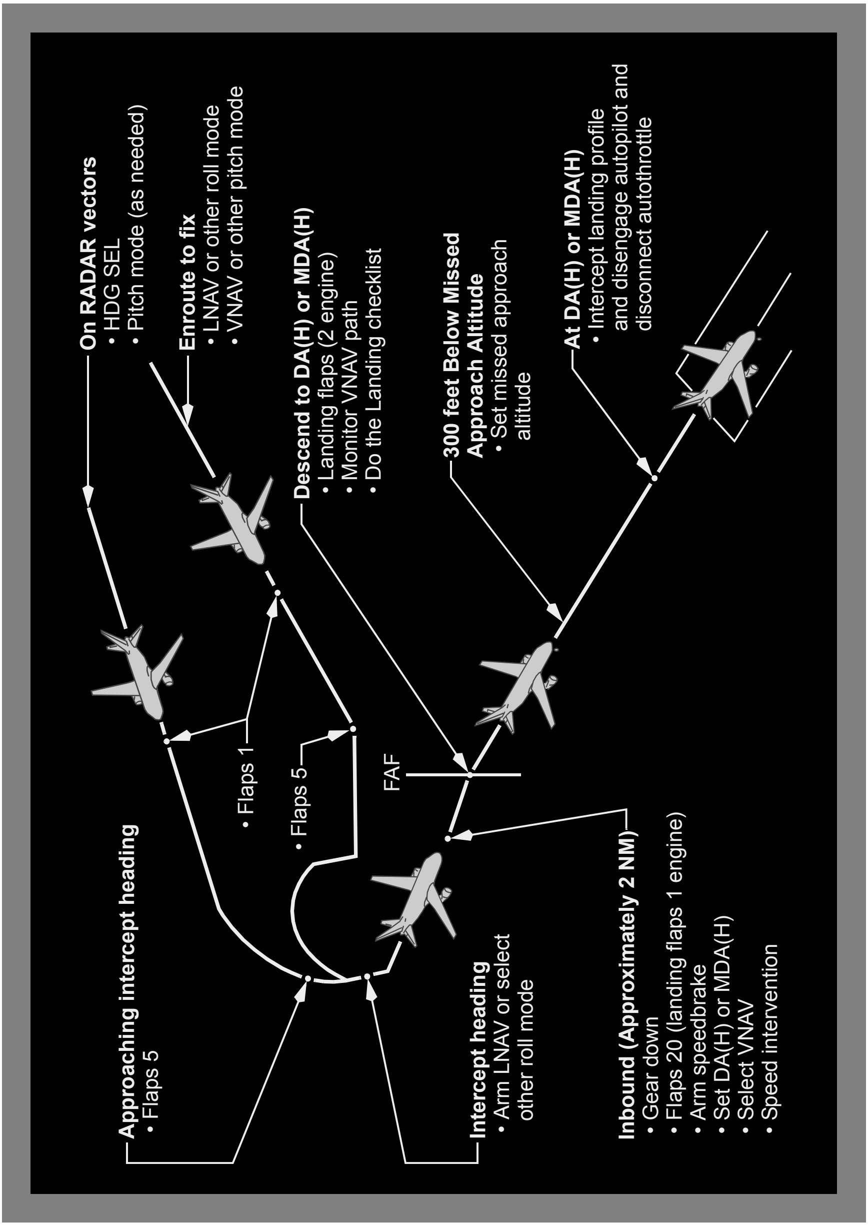
Takeoff


Note: For an immediate turn after takeoff, maintain initial climb speed with takeoff flaps while maneuvering. Follow AFDS bank limits
Thrust set
• Manually advance thrust to stabilize
• Engage autothrottle
Takeoff roll
• Set takeoff thrust by 80 knots
• Monitor airspeed
• Maintain light forward pressure
V1
VR
• Rotate
Positive rate of climb
• Retract gear
Initial climb speed
• V2+15 to V2+25 knots, or V2 to V2+15 knots (1 engine)
Above 400 feet RA
• Select roll mode
Thrust reduction height
• Select climb thrust (as needed)
Acceleration height
• Select VNAV (2 engine)
• Select V/S 0 to +200 fpm (1 engine)
• Retract flaps on schedule
Flaps up
• At flaps up speed, select FLCH (1 engine)
• Select or verify CON thrust (1 engine)
• Do the NNC (as needed)
• Do the After Takeoff checklist
Engage the autopilot after a roll mode and VNAV (2 engines) or V/S (1 engine) are engaged.

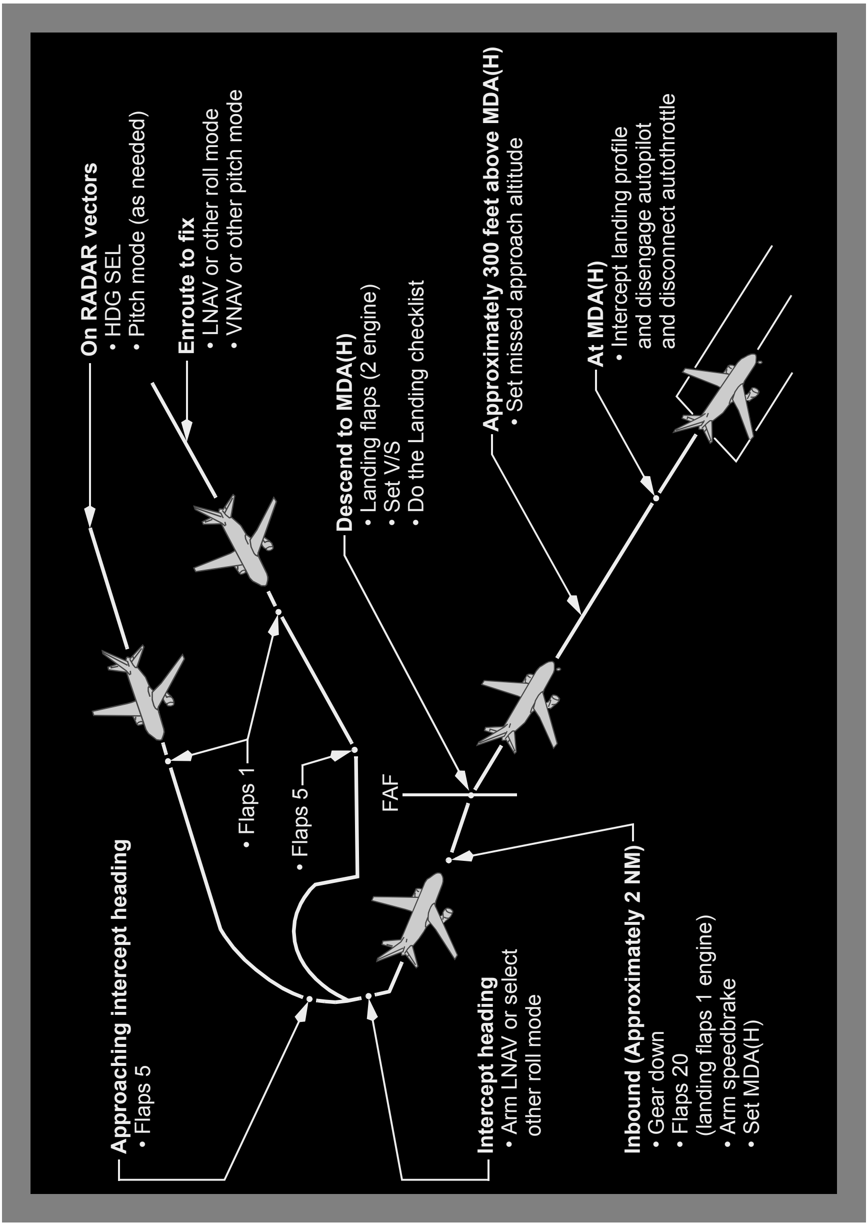
ILS Approach



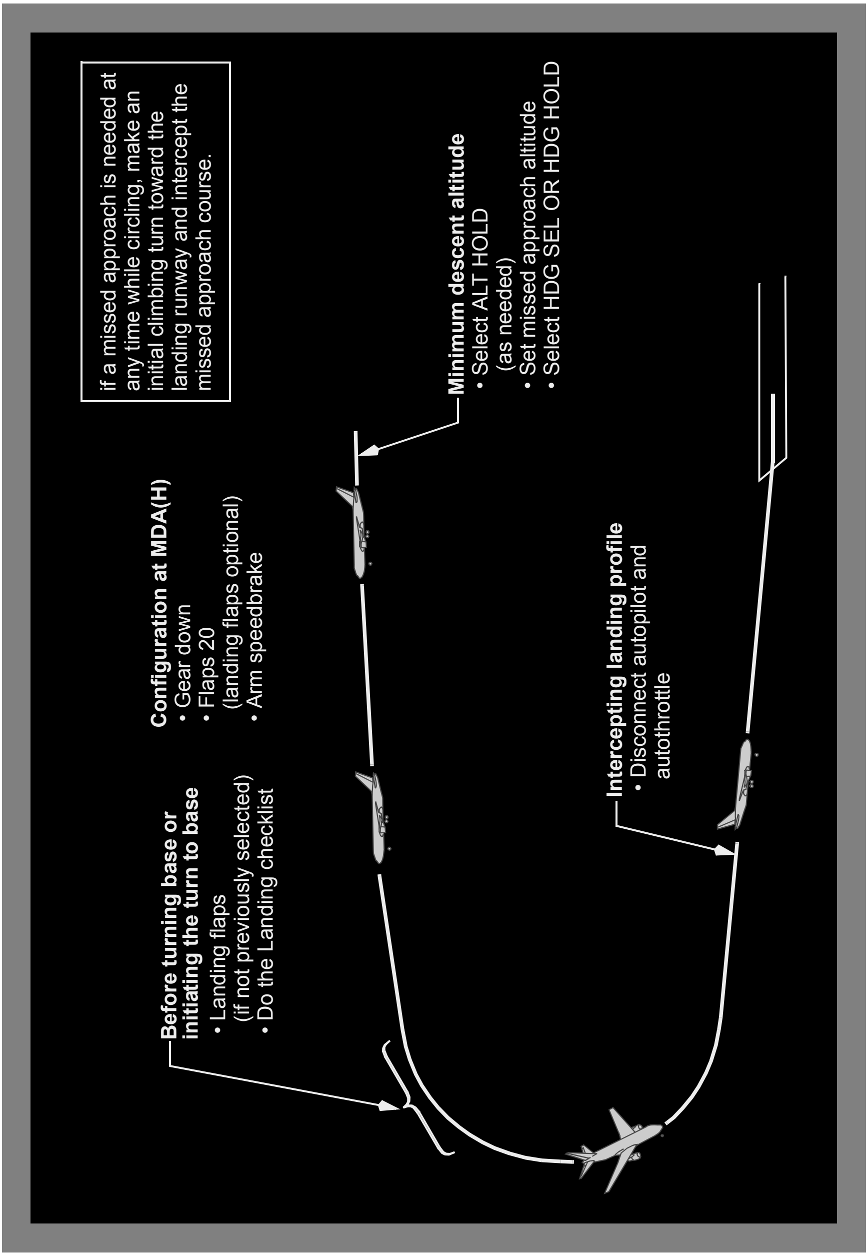
Instrument Approach Using VNAV



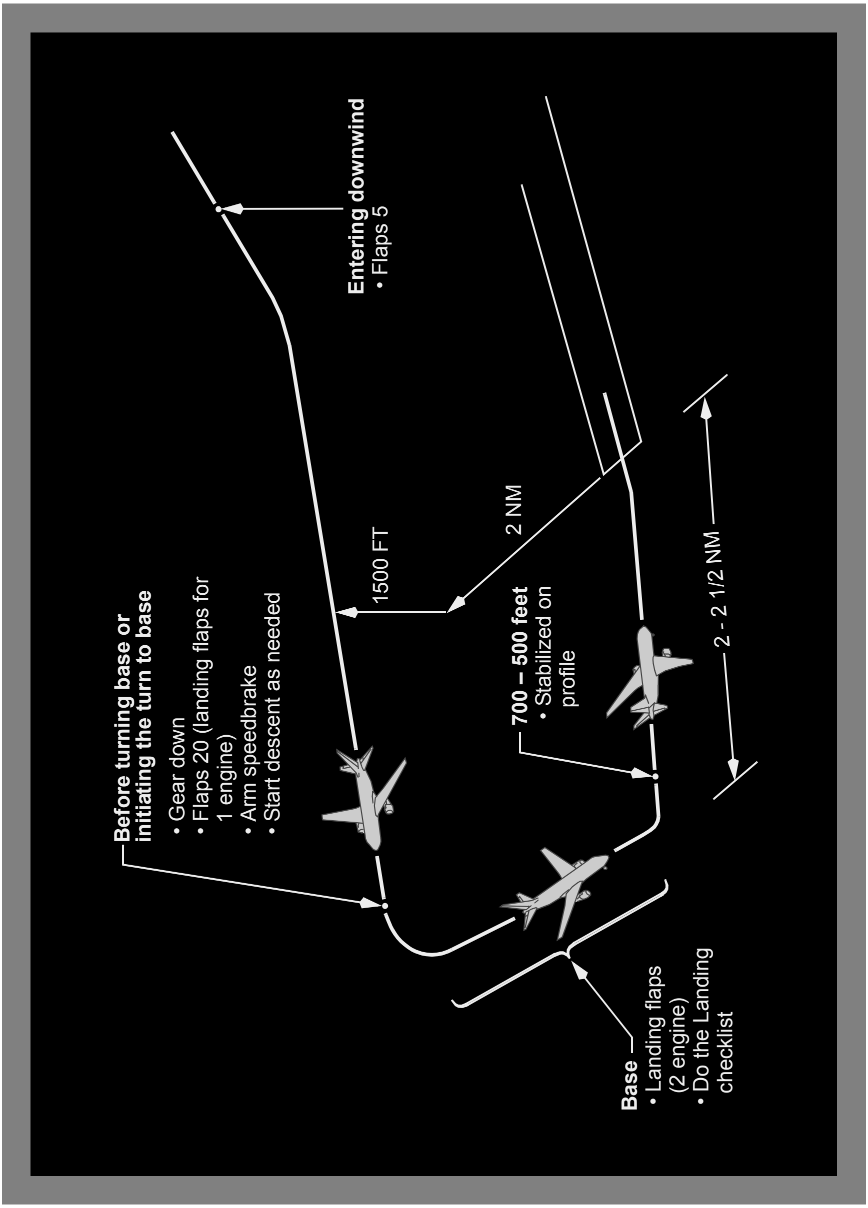
Instrument Approach Using V/S



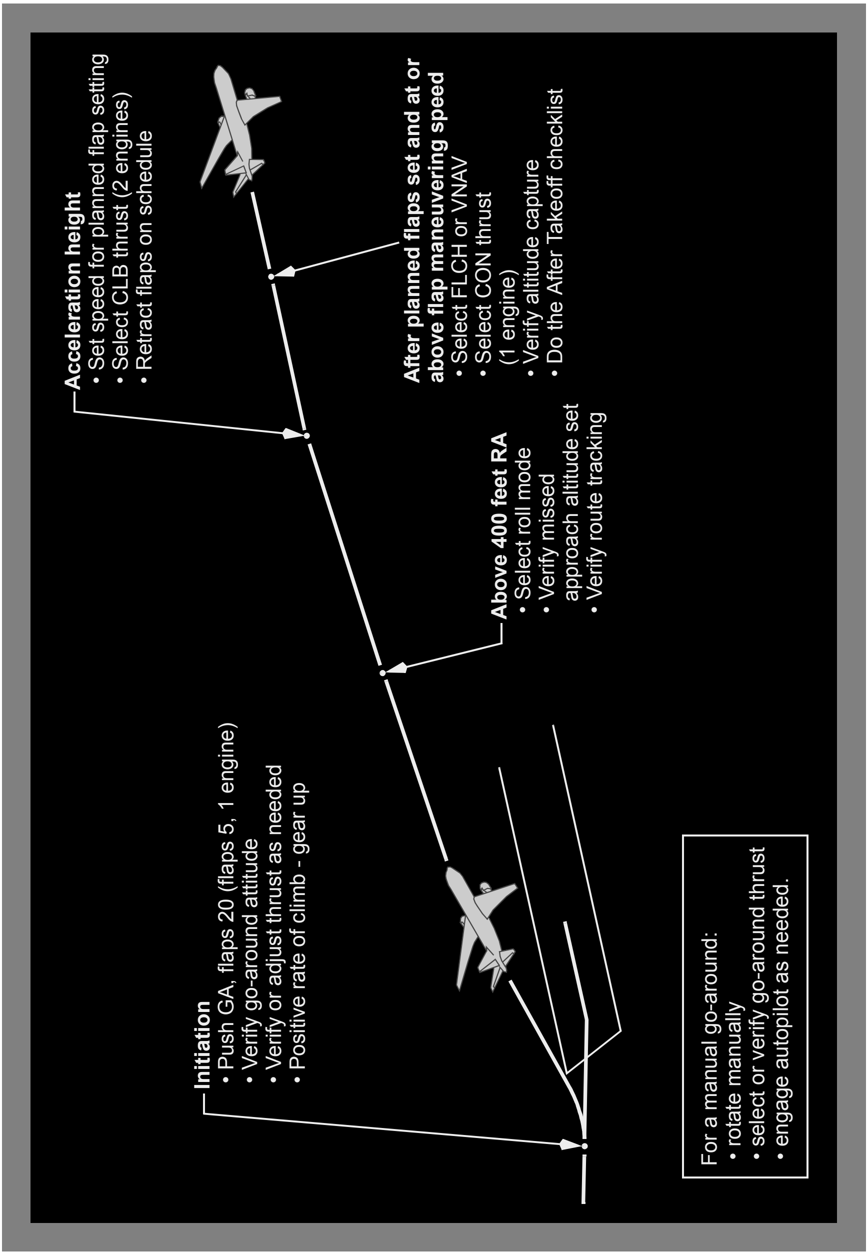
Circling Approach



Visual Traffic Pattern



Go–Around and Missed Approach



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Checklist Instructions — Chapter CI
Table of Contents — Section 0

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Checklist Instructions — Chapter CI
Model Identification — Section ModID

General

The airplanes listed in the table below are covered in the Quick Reference Handbook. The numbers are used to distinguish data peculiar to one or more, but not all of the airplanes. Where data applies to all airplanes listed, no reference is made to individual airplane numbers.

The table permits flight crew correlation of configuration differences by Registry Number in alpha/numeric order within an operator’s fleet for airplanes covered in this manual. Configuration data reflects the airplane as delivered configuration and is updated for service bulletin incorporations in conformance with the policy stated in the introduction section of this chapter.

Registry number is supplied by the national regulatory agency. Serial and tabulation numbers are supplied by Boeing.

Registry Number	Serial Number	Tabulation Number
TBC-01	BC001	BC001
TBC-02	BC002	BC002

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Checklist Instructions — Chapter CI
Revision Record — Section RR

Revision Transmittal Letter

To: All holders of The Boeing Company 757 Flight Crew Operations Manual (FCOM), Boeing Document Number D632N001-200.

Subject: Flight Crew Operations Manual Revision.

CAUTION. Before inserting this FCOM revision check for the presence of the Evacuation Checklist. If the Evacuation Checklist is part of this QRH revision, this QRH has been completely reprinted for customer convenience due to the large number of changed pages.

This revision reflects the most current information available to The Boeing Company 45 days before the subject revision date. The following revision highlights explain changes in this revision. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed
0	May 17, 2007	
2	May 15, 2008	
4	May 19, 2009	
6	May 14, 2010	

No.	Revision Date	Date Filed
1	November 20, 2007	
3	November 18, 2008	
5	November 13, 2009	

General

The Boeing Company issues flight crew operations manual revisions to provide new or revised procedures and information. Formal revisions also incorporate appropriate information from previously issued flight crew operations manual bulletins.

The revision date is the approximate date the manual is mailed to the customer.

Formal revisions include a Transmittal Letter, a new Revision Record, Revision Highlights, and a current List of Effective Pages. Use the information on the new Revision Record and List of Effective Pages to verify the manual content.

Pages containing revised material have revision bars and highlights associated with the changed text or illustration. Revision bars associated with revised effectivity due to additions, deletions of airplanes or changes to previous registration numbers will not have highlights. Changes associated with redirect instructions will also have revision bars without highlights.

The record above should be completed by the person incorporating the revision into the manual.

Filing Instructions

Consult the List of Effective Pages (CI.LEP). Pages identified with an asterisk (*) are either replacement pages or new (original) issue pages. Remove corresponding old pages and replace or add new pages. Remove pages that are marked DELETED; there are no replacement pages for deleted pages.

Revision Highlights

This section (CI.RR) replaces the existing section CI.RR in your manual.

Be careful when inserting changes not to throw away pages from the manual that are not replaced. Using the List of Effective Pages (CI.LEP) can help determine the correct content of the manual.

Throughout the manual, airplane effectivity may be updated to reflect coverage as listed on the Preface - Model Identification page, or to show service bulletin airplane effectivity. Highlights are not supplied.

This manual is published from a database; the text and illustrations are marked with configuration information. Occasionally, because the editors rearrange the database markers, or mark items with configuration information due to the addition of new database content, some customers may receive revision bars on content that appears to be unchanged. Pages may also be republished without revision bars due to slight changes in the flow of the document.

Chapter NNC - Non-Normal Checklists

Section 2 - Air Systems

EQUIPMENT OVERHEAT

2.10 - Added missing end of checklist symbol, there is no procedural change.

Section 6 - Electrical

STANDBY BUS OFF

6.10 - Added revised Standby Bus Off procedure for airplanes with unmodified standby power system and electric alternate stab trim switches.

Section 7 - Engines, APU

Engine Limit or Surge or Stall

7.10 - Revised the condition statement to make it clear that this checklist applies to partial loss of engine thrust control malfunctions.

Section 8 - Fire Protection

Smoke, Fire or Fumes

8.8 - Revised the condition statement to clarify that the checklist should be done whenever smoke, fire or fumes occurs.

CARGO FIRE

8.13 - Added PACK OFF to the list of checklists to not accomplish.

Section 10 - Flight Instruments, Displays

Airspeed Unreliable

10.1 - Revised note to clarify that the Flight With Unreliable Airspeed table is located in the Performance Inflight section of the QRH.

10.2 - Reformatted steps for cross model standardization.

ALTITUDE DISAGREE

10.4 - Reformatted steps for cross model standardization.

10.4 - Reformatted steps for cross model standardization.

Section 12 - Fuel

Engine Fuel Leak

12.2,5 - Format change, no change to technical content.

FUEL CONFIGURATION

12.9 - Format change, no change to technical content.

FUEL PUMP

12.11 - Format change, no change to technical content.

FUEL SYSTEM PRESSURE

12.12 - Revised wording for cross-model standardization. No technical change.

LOW FUEL

12.15 - Format change, no change to technical content.

Section 14 - Landing Gear

GEAR DISAGREE

14.12 - Added requirement not to use reverse thrust to standardize with Flight Crew Training manual.

Chapter PI-QRH - Performance Inflight - QRH

Section 10 - Table of Contents

PI-QRH.TOC.10.1 - 757-200 535E4 LB FAA was added as Section 10.

Section 11 - Advisory Information

Non-Normal Configuration Landing Distance

PI-QRH.11.4,6,8,10 - Added the LE SLAT ASYMMETRY 5 <= FLAPS < 20 landing configuration to reflect the revised Non-Normal Checklist. This addition alters the existing LE SLAT ASYMMETRY data for FLAPS >20 and FLAPS=20.

Section 20 - Table of Contents

PI-QRH.TOC.20.1 - 757-200 PW2037 LB FAA was added as Section 20.

Section 21 - Advisory Information

Non-Normal Configuration Landing Distance

PI-QRH.21.4,6,8,10 - Added the LE SLAT ASYMMETRY 5 <= FLAPS < 20 landing configuration to reflect the revised Non-Normal Checklist. This addition alters the existing LE SLAT ASYMMETRY data for FLAPS >20 and FLAPS=20.

Chapter Man - Maneuvers

Section 2 - Flight Patterns

Circling Approach

Man.2.5 - Changed "ALT HLD" to "ALT HOLD" to match the actual nomenclature. Added "HDG HOLD" to the recommended lateral modes for the maneuvering portion of the circling approach.

Chapter CI - Checklist Instructions

Section 2 - Non-Normal Checklists

Non–Normal Checklist Operation

CI.2.2 - Added information on flight crew troubleshooting for cross model standardization.

Checklist Instructions — Chapter CI
QRH List of Effective Pages — Section LEP

* = Revised, Added, or Deleted

* = Revised, Added, or Deleted

Page	Date
12 Fuel (tab)	
* 12.TOC.1-2	May 14, 2010
* 12.1-5	May 14, 2010
12.6	November 18, 2008
12.7-8	May 15, 2008
* 12.9-12	May 14, 2010
12.13	May 15, 2008
* 12.14-16	May 14, 2010
13 Hydraulics (tab)	
13.TOC.1-2	May 15, 2008
13.1-3	May 15, 2008
13.4	May 19, 2009
13.5	May 15, 2008
13.6	May 19, 2009
13.7	May 15, 2008
13.8	November 18, 2008
13.9	May 15, 2008
13.10	November 13, 2009
13.11	May 15, 2008
13.12-16	May 19, 2009
13.17	November 18, 2008
13.18-19	May 19, 2009
13.20-21	May 15, 2008
13.22-24	May 19, 2009
14 Landing Gear (tab)	
* 14.TOC.1-2	May 14, 2010
14.1	May 19, 2009
14.2	May 15, 2008
14.3-10	May 19, 2009
* 14.11-16	May 14, 2010

Page	Date
15 Warning Systems (tab)	
15.TOC.1-2	May 15, 2008
15.1-6	May 15, 2008
Ops Info (tab)	
OI.TOC.1-2	May 15, 2008
OI.1.1-2	May 15, 2008
Performance - Inflight (tab)	
PI-QRH.TOC.1-2	November 18, 2008
* PI-QRH.TOC.10.1-2	May 14, 2010
PI-QRH.10.1-6	November 18, 2008
PI-QRH.11.1-3	November 18, 2008
* PI-QRH.11.4	May 14, 2010
PI-QRH.11.5	November 18, 2008
* PI-QRH.11.6	May 14, 2010
PI-QRH.11.7	November 18, 2008
* PI-QRH.11.8	May 14, 2010
PI-QRH.11.9	November 18, 2008
* PI-QRH.11.10	May 14, 2010
PI-QRH.11.11-12	November 13, 2009
PI-QRH.12.1-8	November 18, 2008
PI-QRH.13.1-4	May 19, 2009
PI-QRH.14.1-4	May 19, 2009
PI-QRH.15.1-6	May 19, 2009
* PI-QRH.TOC.20.1-2	May 14, 2010
PI-QRH.20.1-6	November 18, 2008
PI-QRH.21.1-3	November 18, 2008
* PI-QRH.21.4	May 14, 2010
PI-QRH.21.5	November 18, 2008
* PI-QRH.21.6	May 14, 2010
PI-QRH.21.7	November 18, 2008
* PI-QRH.21.8	May 14, 2010

* = Revised, Added, or Deleted

Page	Date
Performance - Inflight (cont)	
PI-QRH.21.9	November 18, 2008
* PI-QRH.21.10	May 14, 2010
PI-QRH.21.11-12	November 13, 2009
PI-QRH.22.1-8	November 18, 2008
PI-QRH.23.1-4	May 19, 2009
PI-QRH.24.1-4	May 19, 2009
PI-QRH.25.1-6	May 19, 2009
Maneuvers (tab)	
* Man.TOC.0.1-2	May 14, 2010
Man.05.1-2	May 15, 2008
Man.1.1	November 18, 2008
Man.1.2-3	November 13, 2009
Man.1.4	May 19, 2009
Man.1.5-14	November 18, 2008
Man.2.1-4	May 15, 2008
* Man.2.5	May 14, 2010
Man.2.6-8	May 15, 2008
Checklist Instructions (tab)	
* CI.TOC.0.1-2	May 14, 2010
* CI.ModID.1-2	May 14, 2010
* CI.RR.1-4	May 14, 2010
* CI.LEP.1-4	May 14, 2010
CI.1.1	May 15, 2008
CI.1.2	May 19, 2009
CI.2.1	May 19, 2009
* CI.2.2-6	May 14, 2010
CI.2.7-8	November 18, 2008
Evacuation	
Back Cover.1-2	May 15, 2008

* = Revised, Added, or Deleted

Introduction

This introduction gives guidelines for use of the Normal Checklist (NC).

The NC is organized by phase of flight.

The NC is used to verify that critical items have been done.

Normal Checklist Operation

Normal checklists are used after doing all respective procedural items.

The following table shows which pilot calls for the checklist and which pilot reads the checklist. Both pilots visually verify that each item is in the needed configuration or that the step is done. The far right column shows which pilot gives the response. This is different than the normal procedures where the far right column can show which pilot does the step.

Checklist	Call	Read	Verify	Respond
PREFLIGHT	Captain	First officer	Both	Area of responsibility
BEFORE START	Captain	First officer	Both	Area of responsibility
BEFORE TAXI	Captain	First officer	Both	Area of responsibility
BEFORE TAKEOFF	Pilot flying	Pilot monitoring	Both	Pilot flying
AFTER TAKEOFF	Pilot flying	Pilot monitoring	Both	Pilot monitoring
DESCENT	Pilot flying	Pilot monitoring	Both	Area of responsibility
APPROACH	Pilot flying	Pilot monitoring	Both	Area of responsibility
LANDING	Pilot flying	Pilot monitoring	Both	Pilot flying
SHUTDOWN	Captain	First officer	Both	Area of responsibility
SECURE	Captain	First officer	Both	Area of responsibility

If the airplane configuration does not agree with the needed configuration:

- stop the checklist
- complete the respective procedure steps
- continue the checklist

If it becomes apparent that an entire procedure was not done:

- stop the checklist
- complete the entire procedure
- do the checklist from the start

Try to do checklists before or after high work load times. The crew may need to stop a checklist for a short time to do other tasks. If the interruption is short, continue the checklist with the next step. If a pilot is not sure where the checklist was stopped, do the checklist from the start. If the checklist is stopped for a long time, also do the checklist from the start.

After completion of each checklist, the pilot reading the checklist calls, "________ CHECKLIST COMPLETE."

Checklist Content

The checklist has the minimum items needed to operate the airplane safely.

Normal checklists have items that meet any of the following criteria:

- items essential to safety of flight that are not monitored by an alerting system, or
- items essential to safety of flight that are monitored by an alerting system but if not done, would likely result in a catastrophic event if the alerting system fails, or
- needed to meet regulatory requirements, or
- items needed to maintain fleet commonality between the 737, 747-400, 757, 767, and 777, or
- items that enhance safety of flight and are not monitored by an alerting system (for example the autobrake), or
- during shutdown and secure, items that could result in injury to personnel or damage to equipment if not done

Checklist Construction

When a checklist challenge does not end with “switch or lever”, then the challenge refers to system status. For example, “Landing Gear...Down”, refers to the status of the landing gear, not just the position of the lever.

When a checklist challenge ends with “switch or lever”, then the challenge refers to the position of the switch or lever. For example, “FUEL CONTROL switches...CUTOFF” refers to the position of the switches.

Checklist Instructions — Chapter CI
Non-Normal Checklists — Section 2

Introduction

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

Most checklists correspond to an EICAS alert message. The EICAS alert message indicates a non-normal condition and is the cue to select and do the associated checklist.

Checklists without an EICAS alert message (such as Ditching Preparation) 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 are in section 0, Miscellaneous.

All checklists have condition statements. The condition statement briefly describes the situation that caused the EICAS alert message. 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. The last memory item is followed by a dashed horizontal line. Reference items are actions to be done while reading the checklist.

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 checklists 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 AUTOBRAKES) are annunciated by an EICAS alert message or other indication. Checklist titles in upper and lower case (such as Window Damage) are not annunciated.

Non–Normal Checklist Operation

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 Maneuvers chapter and show the sequence of configuration changes.

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.

It should be noted that, in determining the safest course of action, troubleshooting, i.e., taking steps beyond published non-normal checklist steps, may cause further loss of system function or system failure. Troubleshooting should only be considered when completion of the published non-normal checklist results in an unacceptable situation.

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.

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 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 an EICAS alert message shows or a limit is exceeded.

Non–normal checklists also assume:

- During engine start and before takeoff, the associated non–normal checklist is done if an EICAS alert message is shown or a non-normal situation is identified. After completion of the checklist, the Dispatch Deviations Guide or operator equivalent is consulted to determine if Minimum Equipment List dispatch relief is available.
- System controls are in the normal configuration for the phase of flight before the start of the non–normal checklist.
- Aural alerts are silenced and the system is reset by the flight crew as soon as the cause of the alert is recognized.
- The EICAS message list is cancelled after all checklists are complete or on hold so that future messages are more noticeable.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks and goggles 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.
- Flight crew reset of a tripped fuel pump circuit breaker is prohibited. In flight, reset of any other tripped circuit breaker is not recommended. However, these other tripped circuit breakers may be reset once, after a short cooling period (approximately 2 minutes), if in the judgment of the captain, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. On the ground, flight crew reset of any other tripped circuit breaker should only be done after maintenance has determined that it is safe to reset the circuit breaker.
- Flight crew cycling (pulling and resetting) of circuit breakers to clear a non-normal condition is not recommended, unless directed by a non-normal checklist.

Non–Normal Checklist Use

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 airplane number, registry number, serial number or tabulation number. 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.

Non–normal checklist use starts when the airplane flight path and configuration are correctly established. Only a few situations need an immediate response (such as CABIN ALTITUDE or Rapid Depressurization). 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.

When a non–normal situation occurs, at the direction of the pilot flying, both crewmembers do all memory items in their areas of responsibility without delay.

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.

The pilot monitoring reads aloud:

- the checklist title
- messages (if applicable)
- 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.

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 for::

- an engine thrust lever
- a fuel control switch
- an engine or APU fire switch, or a cargo fire arm switch
- a generator drive disconnect switch.

This does not apply to the Dual Engine Failure checklist.

With the airplane stationary on the ground:

- the captain and the first officer take action based on preflight and postflight areas of responsibility.

With the airplane in flight or in motion on the ground:

- the pilot flying and the pilot monitoring take action based on each crewmember's Areas of Responsibility.

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

The pilot flying 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.

Checklists include an Inoperative Items table only when the condition of the items is needed for planning the rest of the flight and the condition is not shown on EICAS. 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.

Consequential EICAS alert messages can show as a result of a primary failure condition (such as RUDDER RATIO as a result of HYDRAULIC SYSTEM PRESSURE (L Only)) or as a result of doing a non–normal checklist (such as L PACK OFF or R PACK OFF as a result of doing the Smoke, Fire or Fumes checklist). The flight crew should do the checklists for consequential EICAS alert messages, unless the statement "Do not accomplish the following checklists:" is included. All consequential EICAS alert messages may not show while doing the primary checklist, depending on operational circumstances.

After completion of the non–normal checklist, normal procedures are used to configure the airplane for each phase of flight.

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.

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 pilot flying or the pilot monitoring takes action based on each crewmember's area of responsibility. After moving the control, the crewmember taking the action also 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. The pilot flying or the pilot monitoring responds to the deferred normal checklist items based on each crewmember's area of responsibility. However, during the deferred Landing normal checklist, the pilot flying responds to all deferred normal checklist items.

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.

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 the Table of Contents of a system section, to separate the Quick Action Index checklists from the checklists that are not in the Quick Action Index.
- 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.

Intentionally
Blank

Evacuation Checklist is on the reverse side of this page.

Evacuation

Condition: Evacuation is needed.

1 Parking brake . . . . Set

2 Cabin altitude MODE SELECT . . . . MAN

3 CABIN ALTITUDE
MANUAL control . . . . Hold in CLIMB until the outflow valve is fully open

4 FUEL CONTROL switches (both) . . . . CUTOFF

5 Advise the cabin to evacuate.

6 Advise the tower.

7 Engine and APU
fire switches (all) . . . . Override and pull

8 **If** an engine or APU fire warning occurs:

Related fire switch . . . . Rotate to the stop and hold for 1 second

■ ■ ■ ■