

747-400

Quick Reference Handbook

Quick Action Index

Aborted Engine Start.....	7.1
Airspeed Unreliable.....	10.1
CABIN ALTITUDE.....	2.1
Ditching	0.1
Driftdown.....	0.5
ENG 1, 2, 3, 4 FAIL.....	7.13
Engine Limit or Surge or Stall	7.6
Engine Severe Damage or Separation	8.2
Evacuation	Back Cover.2
FIRE APU	8.1
FIRE ENG 1, 2, 3, 4.....	8.2
Fire Engine Tailpipe	8.4
IAS DISAGREE	10.1
Multiple Engine Flameout or Stall.....	7.4
Rapid Depressurization	2.1
Smoke, Fire or Fumes	8.6

Revision Number: 20
© 2016 Delta Air Lines, Inc.

Intentionally
Blank

Non-Normal Checklists
Annunciated Checklists

Chapter Annun
Section Index

A

AILERON LOCKOUT	9.1
AIR/GND SYSTEM	14.1
>AIRSPEED LOW	15.1
>ALT CALLOUTS	15.1
ALT DISAGREE	10.12
>ALTITUDE ALERT	15.1
>ANTI-ICE	3.1
ANTISKID	14.3
ANTISKID OFF	14.5
>AOA RIGHT	10.15
APU	7.8
APU DOOR	7.9
APU FUEL	7.10
>ATTITUDE	10.15
AUTOBRAKES	14.7
AUTOMATIC UNLOCK	1.1
>AUTOPILOT DISC	4.1
>AUTOPILOT	4.1
>AUTOTHROT DISC.....	4.1

B

>BARO DISAGREE.....	10.15
>BAT DISCH APU	6.1
>BAT DISCH MAIN	6.1
>BATTERY OFF	6.1
BLD 1, 2, 3, 4 OVHT/PRV	2.9

BLD DUCT LEAK L, C, R	2.2
BLEED 1, 2, 3, 4	2.10
>BLEED 1, 2, 3, 4 OFF	2.12
BLEED HP ENG 1, 2, 3, 4	2.11
>BLEED ISLN APU	2.12
BLEED ISLN L, R	2.12
>BODY GEAR STRG	14.9
>BOTTLE LOW APU	8.11
BRAKE LIMITER	14.9
>BRAKE SOURCE	14.9
BRAKE TEMP	14.10
>BTL LO L ENG A, B	8.11
>BTL LO R ENG A, B	8.11

C

CABIN ALT AUTO	2.13

CABIN ALTITUDE	2.1
>CARGO DET AIR	8.11
>CGO BTL DISCH	8.11
>CONFIG FLAPS	15.1
>CONFIG GEAR CTR	15.2
>CONFIG GEAR	15.2
>CONFIG PARK BRK	15.2
>CONFIG SPOILERS	15.2
>CONFIG STAB	15.2
>CONFIG WARN SY	15.3
>CREW OXY LOW	1.2
CRT DISPLAY BLANKING	10.16

D

>DATALINK AVAIL	5.3
>DATALINK LOST	5.3
>DATALINK SYS	5.3
>DET FIRE APU.....	8.12
>DET FIRE/OHT 1, 2, 3, 4	8.12
DOOR AFT CARGO	1.4
DOOR BULK CARGO	1.7
DOOR ELEC MAIN, CTR	1.8
DOOR ENTRY L, R 1, 2, 3, 4, 5	1.9
DOOR FWD CARGO	1.10
DOOR L, R UPPER DK	1.13
DOOR U/D FLT LK	1.14
DOORS ELEC	1.14
DOORS ENTRY L, R	1.15
DOORS UPR DECK	1.16
>DRIVE DISC 1, 2, 3, 4	6.2

E

>E/E CLNG CARD	2.19
>EEC 1, 2, 3, 4 TEST PWR	7.10
>EFIS CONTROL L, R.....	10.16
>EFIS/EICAS C/P	10.17
>EIU LEFT.....	10.17
ELEC AC BUS 1, 2, 3, 4	6.3
ELEC BUS ISLN 1, 2, 3, 4	6.6
ELEC DRIVE 1, 2, 3, 4	6.7
ELEC GEN OFF 1, 2, 3, 4	6.8

>ELEC SSB OPEN	6.8
ELEC UTIL BUS L, R	6.8
>EMER LIGHTS	1.17
>ENG 1, 2, 3, 4 CONTROL	7.11
ENG 1, 2, 3, 4 EEC MODE	7.11
ENG 1, 2, 3, 4 FAIL	7.13
ENG 1, 2, 3, 4 FUEL FILT	7.16
ENG 1, 2, 3, 4 FUEL VLV	7.17
>ENG 1, 2, 3, 4 LIM PROT	7.17
ENG 1, 2, 3, 4 LOW IDLE	7.18
ENG 1, 2, 3, 4 OIL FILT	7.18
ENG 1, 2, 3, 4 OIL PRESS	7.19
ENG 1, 2, 3, 4 OIL TEMP	7.20
>ENG 1, 2, 3, 4 REVERSER.....	7.20
>ENG 1, 2, 3, 4 RPM LIM	7.21
>ENG 1, 2, 3, 4 SHUTDOWN.....	7.21
ENG 1, 2, 3, 4 START VLV	7.21
>ENG CONTROLS	7.21
ENG IGNITION	7.22
EQUIP COOLING	2.20

F

FIRE APU	8.1
FIRE CARGO AFT	8.15
FIRE CARGO FWD	8.19
FIRE ENG 1, 2, 3, 4.....	8.2
FIRE WHEEL WELL	8.23
>FLAP RELIEF	9.1

FLAPS CONTROL	9.4
FLAPS DRIVE	9.8
FLAPS PRIMARY	9.11
>FLT CONT VLVS	9.11
FMC LEFT, RIGHT	11.1
>FMC MESSAGE.....	11.3
FUEL IMBAL 1-4	12.1
FUEL IMBAL 2-3	12.3
FUEL IMBALANCE	12.5
>FUEL JETT A, B	12.7
FUEL JETT SYS	12.8
>FUEL LOW CTR L, R.....	12.14
>FUEL OVD CTR L, R.....	12.14
FUEL OVRD 2, 3 AFT, FWD	12.15
>FUEL PMP STB L.....	12.16
>FUEL PMP STB R	12.16
FUEL PRES STB L, R	12.17
FUEL PRESS CTR L, R	12.18
FUEL PRESS ENG 1, 2, 3, 4	12.21
FUEL PUMP 1, 4 AFT, FWD	12.23
FUEL PUMP 2, 3 AFT, FWD	12.25
FUEL QTY LOW	12.28
FUEL RES XFR 2, 3	12.31
FUEL STAB XFR	12.32
>FUEL TANK/ENG	12.33
FUEL TEMP LOW	12.34
FUEL TEMP SYS	12.35
FUEL X FEED 1, 4	12.35

FUEL X FEED 2, 3	12.37
>FUEL XFER 1+4	12.38

G

GEAR DISAGREE	14.11
GEAR DOOR	14.19
GEAR DOOR	14.21
GEAR TILT	14.29
GND PROX SYS	15.3
>GPS LEFT, RIGHT	11.4
>GPS	11.3

H

HEAT L, R AOA	3.1
HEAT L, R TAT	3.1
HEAT P/S CAPT, F/O	3.2
HEAT P/S L, R AUX	3.3
HEAT WINDOW L, R	3.4
>HF DATA	5.3
HYD CONTROL 1, 4	13.1
HYD OVHT SYS 1, 2, 3, 4	13.2
HYD PRESS DEM 1, 2, 3, 4	13.14
HYD PRESS ENG 1, 2, 3, 4	13.14
HYD PRESS SYS 1, 2, 3, 4	13.15
>HYD QTY HALF 1, 2, 3, 4	13.25
>HYD QTY LOW 1	13.26
>HYD QTY LOW 2, 3	13.28
>HYD QTY LOW 4	13.29

I

IAS DISAGREE	10.1
>IDLE DISAGREE	7.26
ILS ANTENNA	11.4
>IRS AC CENTER, LEFT, RIGHT	11.5
IRS CENTER, LEFT, RIGHT	11.4
>IRS DC CENTER, LEFT, RIGHT.....	11.5
IRS MOTION	11.6

J

>JETT NOZ ON L, R	12.38
>JETT NOZ ON	12.38
>JETT NOZZLE L, R	12.38

L

LANDING ALT	2.21
LOCK FAIL	1.17

N

NAI VALVE 1, 2, 3, 4	3.9
>NO AUTOLAND	4.1
>NO LAND 3	4.1

O

OUTFLOW VLV L, R	2.22
>OVERSPEED	15.3
OVHT ENG 1, 2, 3, 4 NAC	8.25

P

PACK 1, 2, 3	2.23
PACK CONTROL	2.25

PASS OXYGEN ON	1.17
PRESS RELIEF	2.26

R

RADIO TRANSMIT	5.6
RUD RATIO DUAL	9.14
RUD RATIO SNGL	9.15

S

>SATCOM DATA.....	5.7
>SATCOM VOICE	5.8
>SATCOM	5.7
>SATVOICE AVAIL	5.8
>SATVOICE LOST.....	5.8
>SCAV PUMP ON.....	12.39
SMOKE DR 5 REST	8.26
>SMOKE LAVATORY	8.27
>SNGL SOURCE ILS	11.6
>SNGL SOURCE RA	10.17
>SOURCE SEL ADC	10.18
>SOURCE SEL EIU	10.18
>SOURCE SEL F/D	10.18
>SOURCE SEL IRS	10.18
>SOURCE SEL NAV.....	10.18
SPEEDBRAKE AUTO	9.15
>SPEEDBRAKES EXT	9.16
>STAB GREENBAND	9.17
>STAB TRIM 2, 3	9.17
STAB TRIM UNSCHD	9.18

STARTER CUTOUT 1, 2, 3, 4	7.29
>STBY BUS APU.....	6.16
>STBY BUS MAIN.....	6.16
>STBY POWER OFF	6.16

T

>TCAS OFF	15.3
>TCAS RA CAPT, F/O.....	15.3
>TCAS SYSTEM	15.4
TEMP CARGO HEAT	2.27
TEMP ZONE	2.28
>TERR OVRD.....	15.4
TERR POS	15.4
>TIRE PRESSURE.....	14.37
>TRANSPONDER L, R.....	11.6
>TRIM AIR OFF.....	2.29

U

UNABLE RNP	11.7

W

WAI VALVE LEFT, RIGHT	3.10
WINDSHEAR SYS	15.5

X

>X FEED CONFIG	12.39

Y

>YAW DAMPER LWR, UPR	9.21

Intentionally
Blank

Non-Normal Checklists
Unannunciated Checklists

Chapter Unann
Section Index

Aborted Engine Start.....	7.1
Airspeed Unreliable.....	10.1
Cabin Interphone System Inoperative	5.1
Ditching	0.1
Driftdown.....	0.5
EFB Battery Overheat or Fire	8.13
EFB Failure – All.....	0.7
EFB Failure – Single.....	0.11
EFB or Application Unresponsive.....	0.14
Emergency Landing Considerations.....	0.17
Engine In-Flight Start	7.23
Engine Limit or Surge or Stall	7.6
Engine Severe Damage or Separation	8.2
Evacuation	Back Cover.2
Fire Engine Tailpipe	8.4
Flap Indication Disagree.....	9.2
Fuel Jettison	12.8
Fuel Leak Engine.....	12.10
Gear Lever Jammed In Off Position.....	14.11
Gear Lever Jammed In Up Position	14.22
Gear Lever Will Not Move Up	14.28
Ice Crystal Icing.....	3.5
Jammed Or Restricted Flight Controls.....	9.12
Jammed Stabilizer Landing	9.13
Multiple Engine Flameout or Stall.....	7.4
Nose and Body Gear Up	14.30

Overweight Landing Considerations	0.20
Overweight Landing	0.19
Oxygen Low Pressure - Crew	1.3
PA System Inoperative.....	5.4
Rapid Depressurization	2.1
Rejected Takeoff - Post RTO Considerations	0.22
Reverser Unlocked.....	7.26
Smoke or Fumes Removal	8.28
Smoke, Fire or Fumes.....	8.6
Standby Power Approach and Landing.....	6.9
Suspected Electronic Interference.....	10.19
Tail Strike	0.24
Tire Failure(s).....	14.36
Two Engines Inoperative	7.30
Volcanic Ash	0.25
Window Damage	1.18

Non-Normal Checklists

Chapter Alpha

Alphabetical

Section Index

A

Aborted Engine Start.....	7.1
AILERON LOCKOUT	9.1
AIR/GND SYSTEM	14.1
>AIRSPEED LOW	15.1
Airspeed Unreliable.....	10.1
>ALT CALLOUTS	15.1
ALT DISAGREE	10.12
>ALTITUDE ALERT	15.1
>ANTI-ICE	3.1
ANTISKID	14.3
ANTISKID OFF	14.5
>AOA RIGHT	10.15
APU	7.8
APU DOOR	7.9
APU FUEL	7.10
>ATTITUDE	10.15
AUTOBRAKES	14.7
AUTOMATIC UNLOCK	1.1
>AUTOPILOT DISC	4.1
>AUTOPILOT	4.1
>AUTOTHROT DISC.....	4.1

B

>BARO DISAGREE.....	10.15
>BAT DISCH APU	6.1
>BAT DISCH MAIN	6.1

>BATTERY OFF	6.1
BLD 1, 2, 3, 4 OVHT/PRV	2.9
BLD DUCT LEAK L, C, R	2.2
BLEED 1, 2, 3, 4	2.10
>BLEED 1, 2, 3, 4 OFF	2.12
BLEED HP ENG 1, 2, 3, 4	2.11
>BLEED ISLN APU	2.12
BLEED ISLN L, R	2.12
>BODY GEAR STRG	14.9
>BOTTLE LOW APU	8.11
BRAKE LIMITER	14.9
>BRAKE SOURCE	14.9
BRAKE TEMP	14.10
>BTL LO L ENG A, B	8.11
>BTL LO R ENG A, B	8.11

C

CABIN ALT AUTO	2.13

CABIN ALTITUDE..... 2.1

Cabin Interphone System Inoperative	5.1
>CARGO DET AIR.....	8.11
>CGO BTL DISCH.....	8.11
>CONFIG FLAPS.....	15.1
>CONFIG GEAR CTR	15.2
>CONFIG GEAR	15.2
>CONFIG PARK BRK	15.2
>CONFIG SPOILERS	15.2
>CONFIG STAB.....	15.2

>CONFIG WARN SY	15.3
>CREW OXY LOW	1.2
CRT DISPLAY BLANKING	10.16

D

>DATALINK AVAIL	5.3
>DATALINK LOST	5.3
>DATALINK SYS	5.3
>DET FIRE APU.....	8.12
>DET FIRE/OHT 1, 2, 3, 4	8.12

Ditching 0.1

DOOR AFT CARGO	1.4
DOOR BULK CARGO	1.7
DOOR ELEC MAIN, CTR	1.8
DOOR ENTRY L, R 1, 2, 3, 4, 5	1.9
DOOR FWD CARGO	1.10
DOOR L, R UPPER DK	1.13
DOOR U/D FLT LK	1.14
DOORS ELEC	1.14
DOORS ENTRY L, R	1.15
DOORS UPR DECK	1.16

Driftdown.....0.5

>DRIVE DISC 1, 2, 3, 4	6.2

E

>E/E CLNG CARD	2.19
>EEC 1, 2, 3, 4 TEST PWR	7.10
EFB Battery Overheat or Fire	8.13
EFB Failure – All.....	0.7

EFB Failure – Single	0.11
EFB or Application Unresponsive	0.14
>EFIS CONTROL L, R	10.16
>EFIS/EICAS C/P	10.17
>EIU LEFT	10.17
ELEC AC BUS 1, 2, 3, 4	6.3
ELEC BUS ISLN 1, 2, 3, 4	6.6
ELEC DRIVE 1, 2, 3, 4	6.7
ELEC GEN OFF 1, 2, 3, 4	6.8
>ELEC SSB OPEN	6.8
ELEC UTIL BUS L, R	6.8
>EMER LIGHTS	1.17
Emergency Landing Considerations	0.17
>ENG 1, 2, 3, 4 CONTROL	7.11
ENG 1, 2, 3, 4 EEC MODE	7.11
ENG 1, 2, 3, 4 FAIL	7.13
ENG 1, 2, 3, 4 FUEL FILT	7.16
ENG 1, 2, 3, 4 FUEL VLV	7.17
>ENG 1, 2, 3, 4 LIM PROT	7.17
ENG 1, 2, 3, 4 LOW IDLE	7.18
ENG 1, 2, 3, 4 OIL FILT	7.18
ENG 1, 2, 3, 4 OIL PRESS	7.19
ENG 1, 2, 3, 4 OIL TEMP	7.20
>ENG 1, 2, 3, 4 REVERSER	7.20
>ENG 1, 2, 3, 4 RPM LIM	7.21
>ENG 1, 2, 3, 4 SHUTDOWN	7.21
ENG 1, 2, 3, 4 START VLV	7.21
>ENG CONTROLS	7.21

ENG IGNITION	7.22
Engine In-Flight Start	7.23
Engine Limit or Surge or Stall	7.6
Engine Severe Damage or Separation	8.2
EQUIP COOLING	2.20
Evacuation	Back Cover.2

F

FIRE APU	8.1
FIRE CARGO AFT	8.15
FIRE CARGO FWD	8.19
FIRE ENG 1, 2, 3, 4.....	8.2
Fire Engine Tailpipe	8.4
FIRE WHEEL WELL	8.23
Flap Indication Disagree.....	9.2
>FLAP RELIEF.....	9.1
FLAPS CONTROL	9.4
FLAPS DRIVE	9.8
FLAPS PRIMARY	9.11
>FLT CONT VLVS	9.11
FMC LEFT, RIGHT	11.1
>FMC MESSAGE.....	11.3
FUEL IMBAL 1-4	12.1
FUEL IMBAL 2-3	12.3
FUEL IMBALANCE	12.5
>FUEL JETT A, B	12.7
FUEL JETT SYS	12.8
Fuel Jettison	12.8

Fuel Leak Engine	12.10
>FUEL LOW CTR L, R	12.14
>FUEL OVD CTR L, R	12.14
FUEL OVRD 2, 3 AFT, FWD	12.15
>FUEL PMP STB L	12.16
>FUEL PMP STB R	12.16
FUEL PRES STB L, R	12.17
FUEL PRESS CTR L, R	12.18
FUEL PRESS ENG 1, 2, 3, 4	12.21
FUEL PUMP 1, 4 AFT, FWD	12.23
FUEL PUMP 2, 3 AFT, FWD	12.25
FUEL QTY LOW	12.28
FUEL RES XFR 2, 3	12.31
FUEL STAB XFR	12.32
>FUEL TANK/ENG.....	12.33
FUEL TEMP LOW	12.34
FUEL TEMP SYS	12.35
FUEL X FEED 1, 4	12.35
FUEL X FEED 2, 3	12.37
>FUEL XFER 1+4	12.38

G

GEAR DISAGREE	14.11
GEAR DOOR	14.19
GEAR DOOR	14.21
Gear Lever Jammed In Off Position	14.11
Gear Lever Jammed In Up Position	14.22
Gear Lever Will Not Move Up.....	14.28

GEAR TILT	14.29
GND PROX SYS	15.3
>GPS LEFT, RIGHT	11.4
>GPS	11.3

H

HEAT L, R AOA	3.1
HEAT L, R TAT	3.1
HEAT P/S CAPT, F/O	3.2
HEAT P/S L, R AUX	3.3
HEAT WINDOW L, R	3.4
>HF DATA.....	5.3
HYD CONTROL 1, 4	13.1
HYD OVHT SYS 1, 2, 3, 4	13.2
HYD PRESS DEM 1, 2, 3, 4	13.14
HYD PRESS ENG 1, 2, 3, 4	13.14
HYD PRESS SYS 1, 2, 3, 4	13.15
>HYD QTY HALF 1, 2, 3, 4.....	13.25
>HYD QTY LOW 1	13.26
>HYD QTY LOW 2, 3.....	13.28
>HYD QTY LOW 4	13.29

I

IAS DISAGREE	10.1
Ice Crystal Icing.....	3.5
>IDLE DISAGREE	7.26
ILS ANTENNA	11.4
>IRS AC CENTER, LEFT, RIGHT	11.5
IRS CENTER, LEFT, RIGHT	11.4

>IRS DC CENTER, LEFT, RIGHT	11.5
IRS MOTION	11.6

J

Jammed Or Restricted Flight Controls.....	9.12
Jammed Stabilizer Landing	9.13
>JETT NOZ ON L, R	12.38
>JETT NOZ ON	12.38
>JETT NOZZLE L, R	12.38

L

LANDING ALT	2.21
LOCK FAIL	1.17

M

Multiple Engine Flameout or Stall.....	7.4

N

NAI VALVE 1, 2, 3, 4	3.9
>NO AUTOLAND.....	4.1
>NO LAND 3.....	4.1
Nose and Body Gear Up	14.30

O

OUTFLOW VLV L, R	2.22
>OVERSPEED	15.3
Overweight Landing Considerations	0.20
Overweight Landing	0.19
OVHT ENG 1, 2, 3, 4 NAC	8.25
Oxygen Low Pressure - Crew	1.3

P

PA System Inoperative.....	5.4
PACK 1, 2, 3	2.23
PACK CONTROL	2.25
PASS OXYGEN ON	1.17
PRESS RELIEF	2.26

R

RADIO TRANSMIT	5.6

Rapid Depressurization 2.1

Rejected Takeoff - Post RTO Considerations	0.22
Reverser Unlocked	7.26
RUD RATIO DUAL	9.14
RUD RATIO SNGL	9.15

S

>SATCOM DATA.....	5.7
>SATCOM VOICE	5.8
>SATCOM	5.7
>SATVOICE AVAIL	5.8
>SATVOICE LOST	5.8
>SCAV PUMP ON.....	12.39
SMOKE DR 5 REST	8.26
>SMOKE LAVATORY	8.27
Smoke or Fumes Removal	8.28
Smoke, Fire or Fumes 8.6	
>SNGL SOURCE ILS	11.6
>SNGL SOURCE RA	10.17
>SOURCE SEL ADC	10.18

>SOURCE SEL EIU	10.18
>SOURCE SEL F/D	10.18
>SOURCE SEL IRS	10.18
>SOURCE SEL NAV.....	10.18
SPEEDBRAKE AUTO	9.15
>SPEEDBRAKES EXT	9.16
>STAB GREENBAND	9.17
>STAB TRIM 2, 3	9.17
STAB TRIM UNSCHD	9.18
Standby Power Approach and Landing.....	6.9
STARTER CUTOUT 1, 2, 3, 4	7.29
>STBY BUS APU.....	6.16
>STBY BUS MAIN.....	6.16
>STBY POWER OFF	6.16
Suspected Electronic Interference.....	10.19

T

Tail Strike	0.24
>TCAS OFF	15.3
>TCAS RA CAPT, F/O	15.3
>TCAS SYSTEM.....	15.4
TEMP CARGO HEAT	2.27
TEMP ZONE	2.28
>TERR OVRD	15.4
TERR POS	15.4
Tire Failure(s).....	14.36
>TIRE PRESSURE	14.37
>TRANSPONDER L, R.....	11.6

>TRIM AIR OFF	2.29
Two Engines Inoperative	7.30

U

UNABLE RNP	11.7

V

Volcanic Ash	0.25

W

WAI VALVE LEFT, RIGHT	3.10
Window Damage	1.18
WINDSHEAR SYS	15.5

X

>X FEED CONFIG	12.39

Y

>YAW DAMPER LWR, UPR	9.21

Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Miscellaneous

Section 0

Table of Contents

Ditching	0.1
Driftdown.....	0.5
- - - - -	
Ditching	0.1
Driftdown.....	0.5
EFB Battery Overheat or Fire	▶▶ 8.13
EFB Failure – All.....	0.7
EFB Failure – Single.....	0.11
EFB or Application Unresponsive.....	0.14
Emergency Landing Considerations.....	0.17
Ice Crystal Icing.....	▶▶ 3.5
Overweight Landing.....	0.19
Overweight Landing Considerations	0.20
Rejected Takeoff - Post RTO Considerations	0.22
Suspected Electronic Interference	▶▶ 10.19
Tail Strike	0.24
Volcanic Ash	0.25

Table of Contents

Intentionally
Blank

Ditching

Condition: Airplane ditching and evacuation are needed.

- 1 Transmit a distress message by the appropriate means:

ATC

VHF (121.5)

HF

SATCOM

ACARS

USCG HF (4125kHz)

Navy HF (2182kHz)

State the:

Nature of the emergency.

Aircraft's position.

Aircraft's course, speed, and altitude.

- 2 Transponder. 7700 (if required)
- 3 Brief the crew and passengers.
- 4 If possible, reduce fuel load before ditching.

▼ Continued on next page ▼

▼ **Ditching continued** ▼

- 5 Do **not** arm the autobrake.
- 6 Plan to ditch with the landing gear up.
- 7 Use flaps 30 and VREF 30.
- 8 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
Minimums	____, ____, xckd	C&F
Landing data	Flaps 30, VREF ____	C&F
Approach briefing	complete	PM
Autobrakes	OFF	PM
Seat belt signs	ON	PM
Recall	ckd	PM

Approach Checklist

Flight & nav instruments	verified	C&F
Altimeters (trans lvl)	____, xckd	C&F
Cabin notification	complete	C

▼ **Continued on next page** ▼

▼ Ditching continued ▼

Below 5,000 feet:

- GND PROX CONFIG GR OVRD switch . . . OVRD
- GND PROX TERR OVRD switch OVRD
- PACK control selectors (all) OFF
- OUTFLOW VALVES MAN switches (both) . . . ON
- OUTFLOW VALVES
manual control. . . Hold in CLOSE until outflow
valve indications show fully closed

Do **not** accomplish the following checklists:

- CABIN ALT AUTO
- OUTFLOW VLV L, R

Landing Checklist

Landing gear	up	C&F
Flaps	30, 30	C&F
Speedbrake	DOWN	PM

At 1,000 feet:

Advise the cabin of imminent touchdown.

▼ Continued on next page ▼

▼ Ditching continued ▼**Just prior to ditching:**

Maintain airspeed at VREF 30.

Rotate to a touchdown attitude of 10 to 12 degrees.

After ditching:

Notify the flight attendants: "EASY VICTOR" three times.

FUEL CONTROL switches (all). CUTOFF

Notify the flight attendants: "THIS IS THE CAPTAIN EVACUATE, EVACUATE".

Engine fire switches (all) . . . Pull, rotate to the stop and hold for 1 second



Additional Information

- Don life vests.
- Stow loose articles.
- Open the flight deck door.
- Fasten seat belt and shoulder harness and lock.
- Take the ELT, if able.

Driftdown

Condition: Engine failure or shutdown during cruise.

Caution! If two engines have failed, the autothrottle is inoperative. The flight crew controls the thrust manually.

- 1 FMS VNAV key Select
ECON CRZ page is displayed.
- 2 ENG OUT prompt Select
- 3 EXEC key. Select
ACT LRC D/D page is displayed.
The reference thrust limit becomes CON.
- 4 MCP ALT selector Set
Set altitude at or below the FMS displayed MAX altitude.
- 5 MCP ALT selector Push
The aircraft will begin a shallow driftdown descent at the E/O LRC speed.



▼ Continued on next page ▼

▼ Engine failure Driftdown continued ▼**Additional Information**

- If an additional engine fails after the FMS is in the engine out mode (ENG OUT prompt has been selected and executed), no initial FMS selections are necessary. The FMS will automatically calculate new performance and driftdown values. (The FMS may take up to 5 minutes to calculate the new values.)
- If terrain, turbulence, or icing is a factor at the computed MAX engine out altitude, select the E/O SPD prompt. Selecting E/O SPD will command a lower airspeed, which will compute a higher MAX altitude.

EFB Failure – All

Condition: One of the following occurs:

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

1 Choose one:

◆ Failure occurs **on the ground**:

▶▶ **Go to step 2**

◆ Failure occurs **in flight**:

▶▶ **Go to step 6**

2 If not at gate, return to gate.

3 Attempt to obtain spare EFBs.

4 Choose one:

◆ **Two** EFBs available:

Proceed normally.



◆ Only **one** EFB available:

▶▶ **Go to the EFB Failure – Single
checklist on page 0.11**



◆ **No** spare EFBs available:

▶▶ **Go to step 5**

▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

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

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

Caution! No dangerous goods allowed.



▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

6 Contact Dispatch.

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

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

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

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

Program the FMS for approach (if available).

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

From the LEGS page, review approach/missed approach segments and altitude restrictions.

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

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



▼ Continued on next page ▼

▼ EFB Failure - All continued ▼**Additional Information****Terminal chart unavailable:**

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

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

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

EFB Failure – Single

Condition: One of the following occurs:

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

1 Choose one:

◆ Failure occurs **before** pushback:

Attempt to obtain spare EFB.

Utilize EFB loaner cart if station is equipped.

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

▶▶ **Go to step 2**

◆ Failure occurs **after** pushback:

Attempt to obtain spare EFB.

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

▶▶ **Go to step 2**

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

2 Choose one:

◆ Spare EFB **available**:

Utilize spare EFB.

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

Coordinate with Dispatch to determine future need of replacement EFB.



◆ Spare EFB **unavailable**:

►► **Go to step 3**

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

Note: Use powered keyboard or approved charging device.

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

5 Choose one:

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

Continue operation with one operative EFB.



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

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

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

► ► **Go to the EFB Failure – All checklist on page 0.7**



EFB or Application Unresponsive

Condition: One of the following occurs:

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

- 1 Choose one:
- ◆ **EFB** is unresponsive:
 - ▶▶ **Go to step 3**
 - ◆ **Application** within EFB is unresponsive:
 - Close and restart application.
 - ▶▶ **Go to step 2**
- 2 Choose one:
- ◆ Application operates **normally**:
 - Continue normal operation.
 - ■ ■ ■
 - ◆ Application within EFB remains **unresponsive**:
 - ▶▶ **Go to the EFB Failure – Single checklist on page 0.11**
- 3 Battery power Check
- If able, verify EFB battery status indicator displays at least 10% battery power available. Connect power source, if necessary.

▼ **Continued on next page ▼**

▼ EFB or Application Unresponsive continued ▼

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

Power button Press and hold

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

Power button Press and release

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

5 Choose one:

◆ EFB normal operation is **restored**:

Accomplish normal logon procedure.



◆ EFB **fails** to restart:

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

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ EFB or Application Unresponsive continued ▼

6 Choose one:

◆ EFB normal operation is **restored**:

Accomplish normal logon procedure.



◆ EFB **fails** to restart:

Refer to applicable EFB Non-Normal Checklist.



Condition: The captain has determined a red emergency exists.

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

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

GND PROX CONFIG GR OVRD switch . . . OVRD

GND PROX TERR OVRD switch OVRD

PACK control selectors (all) OFF

OUTFLOW VALVES MAN

switches (both) ON

OUTFLOW VALVES

manual control. Hold in OPEN
until outflow valve
indications show fully open
to depressurize the airplane

- When at 1,000 feet:

Advise the cabin of imminent touchdown.

Announce "BRACE FOR LANDING" over the PA.

▼ Continued on next page ▼

▼ Emergency Landing Considerations continued ▼**• After landing:**

Evaluate the need for emergency evacuation.

If emergency evacuation is appropriate:

Perform the EVACUATION checklist (back cover).

If emergency evacuation is NOT appropriate:

Make the following PA:

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



Overweight Landing

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

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



Overweight Landing Considerations

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

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

Note: When considering an immediate return to the takeoff runway, the landing distance is generally less than the takeoff distance at all gross weights when landing with flaps 25 or 30 and the runway is dry.

Approach:

- Consider landing on the longest available runway.
- Review landing distance required in the Approach/Landing or Abnormal section of the ODM (normal or reduced landing flap configuration).
- If landing distance is a concern, consider jettisoning fuel or holding to reduce weight.
- If landing distance is not an issue, jettisoning fuel or holding to reduce weight is not necessary.
- Use an autobrake setting commensurate with runway length and conditions. Refer to the Operational Landing Distances table in the ODM.
- If approach VREF (including additives) is within 10 KIAS of the flaps 30 placard speed, use flaps 25 and VREF 25 (plus additives) for landing.

▼ Continued on next page ▼

▼ Overweight Landing Considerations continued ▼

- The aircraft is not certified to autoland at greater than maximum landing weight. If the captain determines that an autoland is the safest course of action, the approach, flare, and landing must be closely monitored at all times.
- The vertical speed required to maintain glidepath may be significantly higher than normal. The captain should brief contingencies if "SINK RATE" cautions are received on short final.

Landing:

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

After Landing:

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



Rejected Takeoff - Post RTO Considerations

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

Following the RTO:

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

Prior to a subsequent takeoff:

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

▼ Continued on next page ▼

▼ Rejected Takeoff - Post RTO Considerations continued ▼

Return to the gate:

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



Tail Strike

Condition: A tail strike is suspected or confirmed.

Caution! Continued pressurization of the airplane can cause further structural damage.

1 OUTFLOW VALVES MAN switches (both) ON

Use momentary actuation of the outflow valves manual control to avoid large and rapid pressurization changes.

2  OUTFLOW VALVES manual control Move to OPEN until the outflow valve indications show fully OPEN to depressurize the airplane.

3 Plan to land at the nearest suitable airport.

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

CABIN ALT AUTO

OUTFLOW VLV L, R



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. Consider a descending turn.

6301-6314

- 1 Don oxygen masks and smoke goggles, as needed.

6315-6316

- 2 Don oxygen masks, as needed.
- 3 Establish crew communications, as needed.
- 4 Do not deploy passenger oxygen if cabin pressure is normal.
- 5 Autothrottle disconnect switch Push
This step allows the thrust levers to stay where manually positioned.

If conditions allow, run the engines at idle

- 6  Thrust levers. Idle
This step reduces possible engine damage or flameout, or both, by decreasing EGT.

- 7 CON IGNITION switch ON

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

- 8 PACK control selectors (all) NORM
- 9 HI FLOW switch ON
- 10 NACELLE ANTI-ICE switches ON

This step increases bleed air extraction to improve engine stall margins.

- 11 WING ANTI-ICE switch ON

This step increases bleed air extraction to improve engine stall margins.

12 Choose one:

◆ **All engines run normally:**

▶▶ **Go to step 16**

◆ **Any engine is flamed out or stalled or EGT is rapidly approaching or exceeding limits:**

▶▶ **Go to step 13**

- 13 Engines can accelerate to idle very slowly, especially at high altitudes. If N2 is steadily increasing, and EGT stays within limits, do not interrupt the start.
- 14 FUEL CONTROL switch
(affected engines) . . Confirm CUTOFF,
then RUN

▼ Continued on next page ▼

▼ Volcanic Ash continued ▼

15 Choose one:

◆ Airspeed is **equal to or more than** 200 KIAS:

▶▶ **Go to step 16**

◆ Airspeed is **less than** 200 KIAS:

PACK control selectors . . . Set a maximum
of one pack on

ENGINE START switch
(affected engines) Pull

▶▶ **Go to step 16**

16 AUTO IGNITION selector BOTH

17 Volcanic ash can cause abnormal system operation
such as:

Engine malfunctions, increasing EGT, unusually
high EGT, compressor stall, or flameout.

Decreased or complete loss of airspeed
indications.

Equipment cooling system malfunctions.

Cargo fire indications.

18 Plan to land at nearest suitable airport.



Intentionally
Blank

Non-Normal Checklists

Chapter NNC

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

Section 1

Table of Contents

AUTOMATIC UNLOCK	1.1
>CREW OXY LOW	1.2
Oxygen Low Pressure - Crew	1.3
DOOR AFT CARGO	1.4
DOOR BULK CARGO	1.7
DOOR ELEC MAIN, CTR	1.8
DOOR ENTRY L, R 1, 2, 3, 4, 5	1.9
DOOR FWD CARGO	1.10
DOOR L, R UPPER DK	1.13
DOOR U/D FLT LK	1.14
DOORS ELEC	1.14
DOORS ENTRY L, R	1.15
DOORS UPR DECK	1.16
>EMER LIGHTS	1.17
LOCK FAIL	1.17
PASS OXYGEN ON	1.17
Window Damage	1.18

Table of Contents

Intentionally
Blank

**AUTO
UNLK****AUTOMATIC UNLOCK**

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



>CREW OXY LOW

Condition: Crew oxygen pressure is low.

Note: If oxygen supply is low or depleted:

▶▶ **Go to the Oxygen Low Pressure -
Crew checklist on page 1.3**



Oxygen Low Pressure - Crew

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

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

- 1 Position a cabin portable oxygen bottle/mask and a PBE near each pilot.
- 2 Consider a descent to 10,000 feet or MEA which ever is higher, if conditions permit.
- 3 Review rapid depressurization and smoke/fire/fumes procedures.

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



DOOR AFT CARGO

Condition: The aft cargo door is not closed and secure.

Objective: To reduce cabin differential pressure to decrease risk of door separation.

- 1 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.
- 2 LDG ALT selector . . . Set between 8000 and 8500
- 3 Choose one:
 - ◆ Airplane altitude is **at or below** 8,000 feet:
Level off at the lowest safe altitude.
▶▶ Go to step 4
 - ◆ Airplane altitude is **above** 8,000 feet:
Descend to 8,000 feet or the lowest safe altitude, whichever is higher.
▶▶ Go to step 4
- 4 **After** level off, allow sufficient time for cabin altitude to stabilize. This minimizes discomfort when the airplane is depressurized.

▼ Continued on next page ▼

▼ DOOR AFT CARGO continued ▼

5 Choose one:

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

▶▶ **Go to step 6**

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

Don the oxygen masks.

Establish crew communications.

If needed:

Select passenger oxygen ON.

Select passenger signs ON.

▶▶ **Go to step 6**

6 OUTFLOW VALVES MAN switches (both) ON

Use momentary actuation of the outflow valves manual control to avoid large and rapid pressurization changes.

7  OUTFLOW VALVES

manual control Move to OPEN until the outflow valve indications show fully OPEN to depressurize the airplane.

8 After the airplane is depressurized, the crew may change altitude as needed.

▼ Continued on next page ▼

▼ DOOR AFT CARGO continued ▼

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

CABIN ALTITUDE

CABIN ALT AUTO

LANDING ALT

OUTFLOW VLV L, R



DOOR BULK CARGO

Condition: The bulk cargo door is not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.

Continue normal operation.



◆ Pressurization is **not** normal:

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

►► **Go to step 2**

2 **If** the CABIN ALTITUDE message shows:

►► **Go to the CABIN ALTITUDE checklist on page 2.1**



DOOR ELEC MAIN, CTR

Condition: The electrical equipment door is not closed and secure.

1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.

Continue normal operation.



◆ Pressurization is **not** normal:

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

►► **Go to step 2**

2 **If** the CABIN ALTITUDE message shows:

►► **Go to the CABIN ALTITUDE checklist on page 2.1**



DOOR ENTRY L, R 1, 2, 3, 4, 5

Condition: A main deck entry door is not closed and secure.

- 1 Instruct a cabin crew member to check the door handle.
- 2 Choose one:
 - ◆ Door handle is **in closed position**:
 - ▶▶ **Go to step 3**
 - ◆ Door handle is **not** in closed position:
 - Instruct the cabin crew member to move the handle to the closed position.
 - ▶▶ **Go to step 3**
- 3 Choose one:
 - ◆ Pressurization is **normal**:
 - The door is in a safe configuration.
 - Continue normal operation.
 - ■ ■ ■
 - ◆ Pressurization is **not** normal:
 - ▶▶ **Go to step 4**
- 4 Descend to 10,000 feet or the lowest safe altitude, whichever is higher.
- 5 **If** the CABIN ALTITUDE message shows:
 - ▶▶ **Go to the CABIN ALTITUDE checklist on page 2.1**
 - ■ ■ ■

DOOR FWD CARGO

Condition: The forward cargo door is not closed and secure.

Objective: To reduce cabin differential pressure to decrease risk of door separation.

- 1 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.
- 2 LDG ALT selector . . . Set between 8000 and 8500
- 3 Choose one:
 - ◆ Airplane altitude is **at or below** 8,000 feet:
Level off at the lowest safe altitude.
▶▶ Go to step 4
 - ◆ Airplane altitude is **above** 8,000 feet:
Descend to 8,000 feet or the lowest safe altitude, whichever is higher.
▶▶ Go to step 4
- 4 **After** level off, allow sufficient time for cabin altitude to stabilize. This minimizes discomfort when the airplane is depressurized.

▼ Continued on next page ▼

▼ DOOR FWD CARGO continued ▼

5 Choose one:

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

▶▶ **Go to step 6**

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

Don the oxygen masks.

Establish crew communications.

If needed:

Select passenger oxygen ON.

Select passenger signs ON.

▶▶ **Go to step 6**

6 OUTFLOW VALVES MAN switches (both) ON

Use momentary actuation of the outflow valves manual control to avoid large and rapid pressurization changes.

7  OUTFLOW VALVES

manual control Move to OPEN until the outflow valve indications show fully OPEN to depressurize the airplane.

8 After the airplane is depressurized, the crew may change altitude as needed.

▼ Continued on next page ▼

▼ DOOR FWD CARGO continued ▼

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

CABIN ALTITUDE

CABIN ALT AUTO

LANDING ALT

OUTFLOW VLV L, R



DOOR L, R UPPER DK

Condition: An upper deck door is not closed and secure.

- 1 Instruct the cabin crew member to check door handle.
- 2 Choose one:
 - ◆ Door handle is **in closed position**:
 - ▶▶ **Go to step 3**
 - ◆ Door handle is **not** in closed position:
 - Instruct the cabin crew member to move the handle to the closed position.
 - ▶▶ **Go to step 3**
- 3 Choose one:
 - ◆ Pressurization is **normal**:
 - The door is in a safe configuration.
 - Continue normal operation.
 - ■ ■ ■
 - ◆ Pressurization is **not** normal:
 - Descend to 10,000 feet or the lowest safe altitude, whichever is higher.
 - ▶▶ **Go to step 4**
- 4 **If** the CABIN ALTITUDE message shows:
 - ▶▶ **Go to the CABIN ALTITUDE checklist on page 2.1**
 - ■ ■ ■

DOOR U/D FLT LK

Condition: The upper deck door automatic lock failed to lock after takeoff.

- 1 Any time differential pressure is less than 3 psi, station a cabin crew member by the door to ensure no one opens the door.



DOORS ELEC

Condition: Both electrical equipment doors are not closed and secure.

- 1 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.

Continue normal operation.



Pressurization is **not** normal:

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

▶▶ **Go to step 2**

- 2 **If** the CABIN ALTITUDE message shows:

▶▶ **Go to the CABIN ALTITUDE checklist on page 2.1**



DOORS ENTRY L, R

Condition: Two or more main deck entry doors on the same side are not closed and secure.

1 Instruct the cabin crew member to check door handles.

2 Choose one:

◆ Door handles are **in closed position**:

▶▶ **Go to step 3**

◆ Door handles are **not** in closed position:

Instruct the cabin crew member to move the handles to the closed position.

▶▶ **Go to step 3**

3 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.

Continue normal operation.



Pressurization is **not** normal:

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

▶▶ **Go to step 4**

4 **If** the CABIN ALTITUDE message shows:

▶▶ **Go to the CABIN ALTITUDE checklist on page 2.1**



DOORS UPR DECK

Condition: Both upper deck doors are not closed and secure.

1 Instruct the cabin crew member to check door handles.

2 Choose one:

◆ Door handles are **in closed position**:

▶▶ **Go to step 3**

◆ Door handles are **not** in closed position:

Instruct the cabin crew member to move the handles to the closed position.

▶▶ **Go to step 3**

3 Choose one:

◆ Pressurization is **normal**:

The door is in a safe configuration.

Continue normal operation.



Pressurization is **not** normal:

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

▶▶ **Go to step 4**

4 **If** the CABIN ALTITUDE message shows:

▶▶ **Go to the CABIN ALTITUDE checklist on page 2.1**



>EMER LIGHTS

Condition: One of these occurs:

- The emergency lights switch is ARMED and emergency lights are on
- The emergency lights switch is not ARMED



LOCK
FAIL

LOCK FAIL

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 if system is on.

1 **If** conditions allow:

FLIGHT DECK ACCESS SYSTEM switch . . . OFF

The door can be locked with the dead bolt.

Note: A second crewmember is required to secure the flight deck door when a crewmember leaves the flight deck. Refer to the FOM for flight deck entry/exit procedures.



PASS OXYGEN ON

Condition: Passenger oxygen system is on.

1 **When** passenger oxygen is no longer needed:

PASS OXYGEN

switch. RESET, release to NORM



Window Damage

Condition: A flight deck window has one or more of these:

- An electrical arc
- A delamination
- A crack
- Is shattered

Objective: To remove electrical power, if needed, to prevent arcing. To reduce pressure and descend if an inner pane is shattered or cracked.

- 1 Don the seat belts and shoulder harnesses.
- 2 **If** the forward window has an arc, a crack, or is shattered:
WINDOW HEAT switch (affected side) Off
WSHLD AIR switch (affected side) ON
- 3 Choose one:
 - ◆ **Outer** glass pane is shattered or cracked and the inner glass pane is **not** shattered or cracked:
▶▶ **Go to step 4**
 - ◆ **Inner** glass pane is shattered or cracked:
▶▶ **Go to step 7**
- 4 Continue normal operation.
- 5 Shoulder harnesses may be removed.

▼ Continued on next page ▼

▼ Window Damage continued ▼

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

HEAT WINDOW



7 Don the oxygen masks.

8 Establish crew communications.

9 Passenger signs ON

10 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.

11 LDG ALT selector Set 9000

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

LANDING ALT

13 Start a normal descent to below 14,000 feet or the lowest safe altitude, whichever is higher.

14 Plan to land at nearest suitable airport.

15 When cabin differential pressure is 2 psi or less, oxygen masks and shoulder harnesses may be removed.

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

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

HEAT WINDOW

▼ Continued on next page ▼

▼ **Window Damage continued** ▼

18 Choose one:

◆ Landing field elevation is **above 8,000 feet:**

When below 13,000 feet:

LDG ALT selector. . . . Push to AUTO

AUTO landing altitude mode
shows on EICAS.



◆ Landing field elevation is **at or above 4,000 feet
and at or below 8,000 feet:**

When less than 5,000 feet above the
landing field elevation:

LDG ALT selector. . . . Push to AUTO

AUTO landing altitude mode
shows on EICAS.



◆ Landing field elevation is **below 4,000 feet:**

►► **Go to step 19**

19 **When** below 9,000:

LDG ALT selector Set between
4000 and 4500

▼ **Continued on next page** ▼

▼Window Damage continued▼

20 **When** less than 4,000 feet above the landing field elevation:

LDG ALT selector Push to AUTO

AUTO landing altitude mode shows on EICAS.



Intentionally
Blank

Table of Contents

**CABIN ALTITUDE or Rapid
Depressurization 2.1**

BLD DUCT LEAK L, C, R.....	2.2
BLD 1, 2, 3, 4 OVHT/PRV	2.9
BLEED 1, 2, 3, 4	2.10
BLEED HP ENG 1, 2, 3, 4.....	2.11
BLEED ISLN L, R	2.12
>BLEED ISLN APU	2.12
>BLEED 1, 2, 3, 4 OFF	2.12
CABIN ALT AUTO.....	2.13

**CABIN ALTITUDE or Rapid
Depressurization 2.1**

>E/E CLNG CARD	2.19
EQUIP COOLING	2.20
LANDING ALT	2.21
OUTFLOW VLV L, R.....	2.22
PACK 1, 2, 3.....	2.23
PACK CONTROL	2.25
PRESS RELIEF.....	2.26
TEMP CARGO HEAT	2.27
TEMP ZONE	2.28
>TRIM AIR OFF.....	2.29

Table of Contents

Intentionally
Blank

CABIN ALTITUDE or Rapid Depressurization

Condition: A cabin altitude exceedance occurs.

- 1 Don the oxygen masks.
- 2 Establish crew communications.

-
- 3 Check the cabin altitude and rate.

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

To descend:

Select lower altitude on MCP and select FL CH.

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 **If** the cabin altitude exceeds 14,000 feet:

PASS OXY switch Push to ON and

hold for 1 second
- 5 Advise the cabin by PA when the descent is complete and use of the oxygen system can be discontinued. Request passenger and cabin status.

▼ Continued on next page ▼

▼ **CABIN ALTITUDE or Rapid Depressurization continued** ▼

6 **If** OUTFLOW VLV L, OUTFLOW VLV R, **and** CABIN ALT AUTO messages are shown:

Do **not** accomplish the following checklists:

CABIN ALT AUTO

OUTFLOW VLV L, R



BLD DUCT LEAK L, C, R

Condition: A bleed air leak occurs in the left, center, or right duct.

Objective: To isolate the bleed duct leak.

1 Choose one:

◆ **BLD DUCT LEAK C** message is shown:

▶▶ **Go to step 2**

◆ **BLD DUCT LEAK L or R** message is shown:

▶▶ **Go to step 11**

- 2 ISLN valve switches (both) Off
- 3 PACK 2 control selector OFF
- 4 APU selector OFF
- 5 AFT CARGO HT switch Off
- 6 TRIM AIR switch Off
- 7 PASS TEMP selector Set

▼ **Continued on next page** ▼

▼BLD DUCT LEAK L, C, R continued▼

8 Cargo smoke detection is no longer available.

9 Do not use ground pneumatic air.

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

CARGO DET AIR

TEMP ZONE

TRIM AIR OFF



11 ISLN valve switch (unaffected side) On

12 ISLN valve switch (affected side) Off

13 ENGINE BLEED air switches (affected side) . . . Off

This isolates the air source and maintains pressure on the unaffected side.

14 PACK control selector (affected side) OFF

15 Hydraulic DEMAND PUMP 1 or 4
selector (affected side) OFF

16 WING ANTI-ICE switch Off

Do **not** use wing anti-ice.

▼ Continued on next page ▼

▼BLD DUCT LEAK L, C, R continued▼

Note: For nacelle anti-ice operation:

- At or above 10,000 feet, maintain affected engine N1 at or above 70%.
- Below 10,000 feet, maintain affected engine N1 at or above 55%.
- Plan for a lower than normal descent rate.

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

BLEED OFF

HYD PRESS DEM 1 or 4 (affected side)

18 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ BLD DUCT LEAK L, C, R continued ▼

Deferred Items

When at the top of descent:

Pre-NGS Modification

PACK control selectors One pack on,
two packs OFF

This maintains bleed air extraction within limits.

Post-NGS Modification

Choose one:

◆ Pack 3 is **on**:

PACK 1 and 2
control selectors (both) OFF
This maintains bleed air extraction
within limits.

▶▶ Go to Descent Checklist

◆ Pack 3 is **off**:

PACK 1 and 2
control selectors One pack on,
one pack OFF
This maintains bleed air extraction
within limits.

▶▶ Go to Descent Checklist

▼ Continued on next page ▼

▼BLD DUCT LEAK L, C, R continued▼

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____, ____, xckd	C&F
■Landing data	____, ____	C&F
■Approach briefing	complete	PM
■Autobrakes	as reqd	PM
Seatbelt Signs	ON	PM
Recall	ckd	PM

Flap Extension

LE flaps move in secondary mode. During approach, LE flaps may take as long as 2 minutes to fully extend.

Do **not** accomplish the following checklist:

FLAPS PRIMARY

Note: When the LE flaps are extended or retracted, a temporary LE flap asymmetry occurs. This causes a mild rolling moment.

▼ Continued on next page ▼

▼BLD DUCT LEAK L, C, R continued▼

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Caution! Do not deploy the thrust reversers until the nose gear contacts the runway.

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	.ARMED	PM

After landing

Note: If the BLD DUCT LEAK L message is shown, do not shut down engine 1 when towed into a gate. Shutting down engine 1 depressurizes hydraulic system 1, and body gear steering is inoperative. Tight turns may cause tire scrubbing.



▼ Continued on next page ▼

▼BLD DUCT LEAK L, C, R continued▼**Additional Information**

When the thrust reversers are deployed, the inboard and midspan LE flaps retract, resulting in a LE flap asymmetry. If the thrust reversers are deployed before the nose gear contacts the runway, immediate and significant control wheel input, approximately 25 to 65 degrees, may be needed to counter the LE flap asymmetry.

BLD 1, 2, 3, 4 OVHT/PRV

Condition: One or more of these occur:

- An engine bleed air overheat
- A PRV is failed closed

- 1 **If** three or more BLD OVHT/PRV messages show:
 Engine Bleed air switches
 (affected engines) Off, then ON

■ ■ ■ ■
- 2 ENGINE BLEED air switch (affected engine) . . . Off
- 3 **When** thrust is reduced in cruise:
 ENGINE BLEED air switch
 (affected engine) ON
- 4 Choose one:
 - ◆ BLD OVHT/PRV message **stays shown or shows again:**

Nacelle anti-ice is not available for the affected engine.

■ ■ ■ ■
 - ◆ BLD OVHT/PRV message **stays blank:**

Continue normal operation.

■ ■ ■ ■

**SYS
FAULT**

BLEED 1, 2, 3, 4

Condition: One of these occurs:

- A high pressure bleed valve failed open
- An engine bleed overpressure
- A PRV failed open

Objective: To turn the engine bleed air switch off and then determine whether nacelle anti-ice is available.

- 1 ENGINE BLEED air switch (affected engine) Off
- 2 NACELLE ANTI-ICE switch (affected engine) ON
- 3 Choose one:

- ◆NAI VALVE message for the affected engine **is shown**:

Nacelle anti-ice for the affected engine is not available.

ANTI-ICE message may be shown.

NACELLE ANTI-ICE switch (affected engine) Off

▶▶ **Go to step 5**
- ◆NAI VALVE message for the affected engine is **not shown**:

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ BLEED 1, 2, 3, 4 continued ▼

4 Use the nacelle anti-ice normally.

Note: For nacelle anti-ice operation:

- At or above 10,000 feet, maintain affected engine N1 at or above 70%.
- Below 10,000 feet, maintain affected engine N1 at or above 55%.
- Plan for a lower than normal descent rate.

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

BLEED OFF



BLEED HP ENG 1, 2, 3, 4

Condition: The high pressure bleed valve is failed closed.

Note: For nacelle anti-ice operation:

- At or above 10,000 feet, maintain affected engine N1 at or above 70%.
- Below 10,000 feet, maintain affected engine N1 at or above 55%.
- Plan for a lower than normal descent rate.



VALVE

BLEED ISLN L, R

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

1 Choose one:

◆ ISLN valve switch (affected side) is **off**:

ISLN valve switch (unaffected side) . . . Off

PACK 2 control selector OFF



◆ ISLN valve switch (affected side) is **on**:



VALVE

>BLEED ISLN APU

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



OFF

>BLEED 1, 2, 3, 4 OFF

Condition: All of these occur:

- Engine bleed air switch is OFF
- Engine is running
- Engine bleed air valve is closed



CABIN ALT AUTO

Condition: One of these occurs:

- The automatic pressurization control is failed
- Both outflow valve manual switches are on

Objective: To manually control the cabin altitude.

- 1 OUTFLOW VALVES MAN switches (both) ON

Pre-NGS Modification

- 2 PACK control selectors Two packs on,
one pack OFF

This reduces the incoming volume of air to ease manual operation.

Post-NGS Modification

- 3 Choose one:

◆ Pack 3 is **on**:

PACK 1 and 2
control selectors One pack on,
one pack OFF

This maintains bleed air extraction within limits.

▶▶ **Go to step 4**

◆ Pack 3 is **off**:

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ CABIN ALT AUTO continued ▼**4 OUTFLOW VALVES**

manual control Move to OPEN or CLOSE
momentarily to check for
correct outflow valve movement

5 Choose one:

◆ Outflow valves **move**:

▶▶ **Go to step 6**

◆ Outflow valves **do not** operate manually:

▶▶ **Go to step 7**

▼ Continued on next page ▼

▼ CABIN ALT AUTO continued ▼

Use momentary actuation of the outflow valves manual control to avoid large and rapid pressurization changes.

- 6  **OUTFLOW VALVES**
manual control Move to OPEN or CLOSE
as needed to control
cabin rate and altitude

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

Note: Recommended cabin altitude in cruise is:

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

►► **Go to step 11**

- 7 Pressurization control is lost. Check cabin altitude, cabin rate, and cabin differential pressure regularly.
- 8 Do not climb to higher altitudes. Cabin altitude can only be maintained with packs and airplane altitude.
- 9 Recalculate fuel requirements for destination.

▼ Continued on next page ▼

▼ **CABIN ALT AUTO continued** ▼

- 10 **If** cabin altitude increases to 10,000 feet or differential pressure exceeds 9 psi:
- Don the oxygen masks.
 - Establish crew communications.
 - PASS OXYGEN switch ON
 - Descend to maintain cabin altitude at or below 10,000 feet and cabin differential pressure at or below 9 psi.

11 **Checklist Complete Except Deferred Items**

▼ **Continued on next page** ▼

▼ CABIN ALT AUTO continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____ xckd	C&F
■ Landing data	____, ____,	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt Signs	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ CABIN ALT AUTO continued ▼

Choose one:

◆ Outflow valves **operate manually**:

When at pattern altitude:

Use momentary actuation of the outflow valves manual control to avoid large and rapid pressurization changes.



OUTFLOW VALVES
manual control Move to OPEN
until the outflow valve
indications show fully open
to depressurize the airplane

▶▶ Go to Landing Checklist

◆ Outflow valves **do not** operate manually:

▶▶ Go to Passing 15,000 feet

Passing 15,000 feet

PACK control selectors One pack on,
two packs OFF

Passing 10,000 feet

PACK control selectors All packs OFF

Landing Checklist

Landing gear down	C&F
Flaps ____, __	C&F
Speedbrake ARMED	PM



>E/E CLNG CARD

Condition: A fault occurs in the equipment cooling system.



EQUIP COOLING

Condition: One of these occurs:

- On the ground, the ground exhaust valve is not in the commanded position
- With Equipment Cooling selector in NORM or STBY, one or more of these occur:
 - Airflow is insufficient
 - An overheat is sensed
 - Smoke is sensed
- With Equipment Cooling selector in OVRD, differential pressure for reverse flow cooling is not sufficient.

1 Avionics/electronic equipment and displays may become unreliable or fail.

2 Choose one:

◆ On the **ground**:

EQUIP COOLING selector STBY



◆ In **flight**:

▶▶▶ **Go to step 3**

3 EQUIP COOLING selector OVRD

▼ Continued on next page ▼

4 Choose one:

- ◆ EQUIP COOLING message **stays blank:**
- ■ ■ ■
- ◆ EQUIP COOLING message **stays shown or shows again:**

Plan to land at the nearest suitable airport.

Condition: One of these occurs:

- The FMC does not supply a landing altitude
- The landing altitude is selected to the manual mode

- 1 Choose one:

- ◆ **Manual** landing altitude control is selected:
- ▶▶ **Go to step 2**
- ◆ **Automatic** landing altitude control is selected:
- LDG ALT switch Actuate to MAN
- MAN landing altitude mode shows on EICAS.
- ▶▶ **Go to step 2**

- 2 LDG ALT selector Set the
landing altitude

OUTFLOW VLV L, R

Condition: One of these occurs:

- Automatic outflow valve control is inoperative
- The outflow valve manual switch is on

Objective: To allow the operating outflow valve to control cabin pressure.

1 OUTFLOW VALVES MAN
switch (affected valve) ON

Pre-NGS Modification

2 PACK control selector Two packs on,
one pack OFF

Post-NGS Modification

3 Choose one:

◆ Pack 3 is **on**:

PACK 1 and 2
control selectors One pack on,
one pack OFF

▶▶ **Go to step 4**

◆ Pack 3 is **off**:

▶▶ **Go to step 4**

4 OUTFLOW VALVES
manual control Hold in CLOSE
until the outflow
valve indications show fully closed

■ ■ ■ ■

PACK 1, 2, 3

**SYS
FAULT**

May or may not be illuminated

Condition: One or more of these occur:

- A pack controller fault
- A pack operation fault
- A pack overheat
- A pack 2 shutdown and a cabin pressure relief valve is open

Objective: To switch to a functioning controller, or turn off the pack.

- 1 TRIM AIR switch ON
- 2 PACK control selector (affected pack(s)) A
- 3 PACK RST switch Push
- 4 Choose one:

◆ PACK message(s) **blanks:**



◆ PACK message(s) **stays shown or shows again:**

▶▶ **Go to step 5**

- 5 PACK control selector (affected pack(s)) B
- 6 PACK RST switch Push

▼ Continued on next page ▼

▼PACK 1, 2, 3 continued▼

7 Choose one:

◆ PACK message(s) **blanks:**

■ ■ ■ ■

◆ PACK message(s) **stays shown or shows again:**

PACK control
selector (affected pack(s)) OFF

■ ■ ■ ■

PACK CONTROL

Condition: Automatic control of the outlet temperature of all packs is inoperative.

1 PACK RST switch Push

2 Choose one:

◆ PACK CONTROL message **blanks**:



◆ PACK CONTROL message **stays shown or shows again**:

▶▶ **Go to step 3**

3 TRIM AIR switch ON

Note: The pack outlet temperature is not controlled, but the packs continue to run.

4 Packs may overheat and automatically shut down at lower altitudes during descent.

5 Choose one:

◆ TEMP ZONE message is **shown**:

The cabin temperature cannot be controlled.



◆ TEMP ZONE message is **not** shown:

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ **PACK CONTROL continued** ▼

6 Pack outlet temperature cannot be reduced to decrease cabin temperature.

Note: Cabin temperatures may be controlled with passenger temperature selector and cabin temperature panel.



PRESS RELIEF

Condition: One or more pressure relief valves open with all packs on.

1 PACK 2 control selector OFF



TEMP CARGO HEAT

Condition: An aft cargo compartment overheat occurs.

1 Choose one:

◆ Aft cargo heat is **not** needed:

AFT CARGO HEAT switch. Off

On extended flights, the aft cargo compartment temperature may decrease to below freezing.



◆ Aft cargo heat is **needed**:

▶▶ **Go to step 2**

2 Cargo heat will intermittently:

Overheat,

Shutdown,

Show the TEMP CARGO HEAT message, and

Cool and restart.

3 The system cycles at a higher temperature than normal.



**SYS
FAULT**

TEMP ZONE

Condition: One or more of these occur:

- A zone duct overheat
- The master trim air valve fails closed
- The zone temperature controller fails

1 ZONE RST switch Push

2 Choose one:

◆ TEMP ZONE message **blanks**:



◆ TEMP ZONE message **stays shown or shows again within five minutes**:

►► **Go to step 3**

3 PASS TEMP selector Set

If the zone temperature controller is operative, passenger zone temperatures can be controlled with the PASS TEMP selector.

If the zone temperature controller is failed, passenger zone temperatures cannot be controlled with the PASS TEMP selector. All passenger zone temperatures are maintained at a moderate temperature.

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

TRIM AIR OFF



>TRIM AIR OFF

Condition: The master trim air valve is closed. The backup mode controls flight deck and passenger cabin temperature.



Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Anti-Ice, Rain

Section 3

Table of Contents

>ANTI-ICE	3.1
HEAT L, R AOA.....	3.1
HEAT L, R TAT	3.1
HEAT P/S CAPT, F/O	3.2
HEAT P/S L, R AUX	3.3
HEAT WINDOW L, R.....	3.4
Ice Crystal Icing.....	3.5
NAI VALVE 1, 2, 3, 4	3.9
WAI VALVE LEFT, RIGHT	3.10

Table of Contents

Intentionally
Blank

>ANTI-ICE

Condition: All of these occur:

- A nacelle or wing anti-ice system is on
- TAT is above 12°C



HEAT L, R AOA

Condition: An AOA probe heat is failed.

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



HEAT L, R TAT

Condition: One of these occurs:

- TAT probe heat is failed
- The TAT probe is heated on the ground due to an air/ground logic failure

- 1 Flight in icing conditions may result in unreliable performance calculations.



HEAT P/S CAPT, F/O

Condition: A pitot static probe heat is failed.

Objective: To isolate the failed probe to prevent erroneous flight instrument indications.

1 Disengage the autopilot.

2 Choose one:

◆ HEAT P/S **CAPT** message is shown:

AIR DATA SOURCE selector (captain) . . . R

AIR DATA SOURCE selector
(first officer) C

Engage the R autopilot, if needed.

L and C autopilots are unreliable.



◆ HEAT P/S **F/O** message is shown:

▶▶ **Go to step 3**

3 AIR DATA SOURCE selector (captain) C

4 AIR DATA SOURCE
selector (first officer) L

5 Engage the L or C autopilot, if needed.

6 R autopilot is unreliable.



HEAT P/S L, R AUX

Condition: A pitot static probe heat is failed.

Objective: To isolate the failed probe to prevent erroneous flight instrument indications.

1 Disengage the autopilot.

2 Choose one:

◆ HEAT P/S **R** AUX message is shown:

AIR DATA SOURCE selector (captain) . . . R

AIR DATA SOURCE selector
(first officer) C

Engage the R autopilot, if needed.

L and C autopilots are unreliable.



◆ HEAT P/S **L** AUX message is shown:

►► **Go to step 3**

3 AIR DATA SOURCE selector (captain) C

4 AIR DATA SOURCE selector
(first officer) L

5 Engage the L or C autopilot, if needed.

6 R autopilot is unreliable.



INOP

HEAT WINDOW L, R

Condition: One or more of these occur:

- The window heat switch is off
- The window heat is failed

Objective: To reset the window heat.

1 WINDOW HEAT switch
(affected window). Off 10 seconds, then ON

2 Choose one:

◆HEAT WINDOW message **stays shown**:

WINDOW HEAT switch
(affected window) Off

WSHLD AIR switch (affected side) ON



◆HEAT WINDOW message **blanks**:

Continue normal operation.



Ice Crystal Icing

Condition: Engine ice crystal or TAT probe icing is suspected. The following are possible indications:

- In visible moisture with amber or red weather radar returns below the airplane
- Appearance of liquid water on the windshield at temperatures too cold for rain (the sound is different than rain)
- The autothrottle is unable to maintain the selected airspeed
- TAT indication on EICAS stays near 0°C

(Additional items that may indicate ice crystal icing are listed in the Additional Information section).

Objective: To exit the ice crystal icing conditions and reduce the operational effects of the icing.

Note: TAT probe icing may cause one or more of the following non-normal engine indications:

- Maximum EPR lines (amber) or reference EPR indicators decrease while flying at constant altitude and airspeed
- EPR indications are not aligned
- Unable to achieve maximum continuous thrust or maximum climb thrust

- 1 Minimize time above amber and red weather radar returns. If conditions allow, exit the ice crystal icing conditions.

▼ Continued on next page ▼

▼ Ice Crystal Icing continued ▼

2 Choose one:

◆ TAT **or** engine indications are **normal**:

▶▶ **Go to step 12**

◆ TAT indication stays near 0°C **and** engine indications are **not** normal:

▶▶ **Go to step 3**

3 A/T ARM switch OFFC

4 Thrust levers (all) Set to maintain
airspeed and
airplane flight path

5 Choose one:

◆ Airspeed and airplane flight path **can** be maintained with manual thrust:

▶▶ **Go to step 12**

◆ Airspeed and airplane flight path **can not** be maintained with manual thrust:

▶▶ **Go to step 6**

6 For each operating engine, do these steps, one engine at a time:

Thrust lever Retard to mid position

ELEC ENG CONTROL switch ALTN

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

ENG EEC MODE

▼ Continued on next page ▼

▼ Ice Crystal Icing continued ▼

- 8 Maximum thrust limiting is not available. N1 may be used to set thrust.
- 9 The autothrottle is not available.
- 10 The ENG LIM PROT message may show due to incorrect maximum EPR line. Set thrust to maintain the needed airspeed and airplane flight path. Maintain EGT below the amber band.
- 11 Do **not** accomplish the following checklists:
ENG LIM PROT
- 12 When in ice crystal icing conditions, the following may be unreliable:
Reference EPR indicators and reference EPR
Maximum EPR lines (amber)
TAS, TAT, SAT, ECON SPD, and LRC
- 13 **When** ice crystal icing conditions are no longer present:
ELEC ENG CONTROL switches (all) NORM
The autothrottle is available and may be re-engaged, if needed.



▼ Continued on next page ▼

▼ Ice Crystal Icing continued ▼**Additional Information**

One or more of the following can indicate ice crystal icing:

- Light to moderate turbulence
- Static discharge around the windshield (St. Elmo's fire)
- Smell of sulfur
- Smell of ozone
- Humidity increase

VALVE**NAI VALVE 1, 2, 3, 4**

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

1 Choose one:

◆ NACELLE ANTI-ICE switch is **ON**:

Valve is failed closed.

Nacelle anti-ice is not available for the affected engine.



◆ NACELLE ANTI-ICE switch is **Off**:

Valve is failed open.

If TAT above 10° C:

If conditions allow, avoid high thrust settings.



VALVE

WAI VALVE LEFT, RIGHT

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

1 Choose one:

◆ WING ANTI-ICE switch is **ON**:

Valve is failed closed.

WING ANTI-ICE switch Off

Do not use wing anti-ice.



◆ WING ANTI-ICE switch is **Off**:

Valve is failed open.

WING ANTI-ICE switch ON

▶▶ **Go to step 2**

2 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ WAI VALVE LEFT, RIGHT continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	.ARMED	PM

▼ Continued on next page ▼

▼WAI VALVE LEFT, RIGHT continued▼

After Landing

- ENGINE BLEED air switches
(affected side) Off
- ISLN valve switch (affected side) Off

Note: If the WAI VALVE LEFT message is shown, do not shut down engine 1 when towed into a gate. Shutting down engine 1 depressurizes hydraulic system 1, and body gear steering is inoperative. Tight turns may cause tire scrubbing.



Non-Normal Checklists
Automatic Flight

Chapter NNC
Section 4

Table of Contents

>AUTOPILOT	4.1
>AUTOPILOT DISC	4.1
>AUTOTHROT DISC.....	4.1
>NO AUTOLAND	4.1
>NO LAND 3	4.1

Table of Contents

Intentionally
Blank

>AUTOPILOT

Condition: One or more of these occur:

- The autopilot operates in a degraded mode
- The engaged roll mode is failed
- The engaged pitch mode is failed



>AUTOPILOT DISC

Condition: All autopilots are disengaged.



>AUTOTHROT DISC

Condition: The autothrottle is disconnected.



>NO AUTOLAND

Condition: The autoland system is not available.



>NO LAND 3

Condition: The autoland system does not have redundancy for a triple channel autoland.



Intentionally
Blank

Non-Normal Checklists
Communications

Chapter NNC
Section 5

Table of Contents

Cabin Interphone System Inoperative	5.1
> DATALINK AVAIL	5.3
> DATALINK LOST	5.3
> DATALINK SYS	5.3
> HF DATA	5.3
PA System Inoperative	5.4
RADIO TRANSMIT	5.6
> SATCOM	5.7
> SATCOM DATA	5.7
> SATCOM VOICE	5.8
> SATVOICE AVAIL	5.8
> SATVOICE LOST	5.8

Table of Contents

Intentionally
Blank

Cabin Interphone System Inoperative

Condition: The cabin interphone system is inoperative.

- 1 Ensure all cabin handsets are properly reset and stowed.
- 2 Choose one:
 - ◆ Cabin interphone system is operative:
Continue normal operation.

■ ■ ■ ■
 - ◆ Cabin interphone system remains **inoperative**:
▶▶ Go to step 3
- 3 Avoid use of PA for direct messages to flight attendants except in an emergency.
- 4 Contact purser/flight leader and establish plan for communications under normal conditions.
- 5 Brief the purser/flight leader on the following alternate emergency procedure:

▼ Continued on next page ▼

▼ Cabin Interphone System Inoperative continued ▼

Cabin Interphone System Inoperative			
Source of Abnormal		Pilot Action	Briefing Items
Flight Deck	Cabin		
Smoke/Fire		Use PA.	PA is primary means to command an evacuation. The emergency signal (3 distinct chimes) may be designated as the signal to evacuate, provided the captain and purser/flight leader agree to use this signal in advance.
Emergency Landing			
Ditching			
Evacuation or Rejected Takeoff			
	Smoke/Fire	Continually monitor PA.	Flight attendant will sound the emergency signal (3 distinct chimes) to notify pilots to monitor PA.
	Hijacking		Flight attendant will sound the emergency signal (3 distinct chimes) to notify pilots to monitor PA.
	Passenger Problem (Medical/ Disturbance)		Flight attendant will sound the emergency signal (3 distinct chimes) to notify pilots to monitor PA. If unable, flight attendant will come to the flight deck door and use briefed entry method.



>DATALINK AVAIL

Condition: The ACARS datalink is available after a temporary loss.



>DATALINK LOST

Condition: The ACARS datalink is temporarily lost.



>DATALINK SYS

Condition: The ACARS datalink is failed and not available.



>HF DATA

Condition: The datalink system is failed.



PA System Inoperative

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

- 1 Establish cabin communications.
 - 2 Contact purser/flight leader and establish plan for communications under normal conditions, including:
 - Use of standard flight deck/cabin call signals.
 - Advising purser/flight leader to review location and operation of portable megaphones with flight attendants.
 - 3 Advise purser/flight leader 20 minutes (1 hour on transoceanic flights) and 5 minutes before landing.
- Note:** With the PA inoperative, the flight attendants must individually (few seats at a time) brief passengers before takeoff and landing. Coordinate as required to provide sufficient time to meet these requirements.
- 4 Brief the purser/flight leader on the following alternate emergency procedures.

▼ Continued on next page ▼

▼PA System Inoperative continued▼

Public Address System Inoperative			
Source of Abnormal		Pilot Action	Briefing Items
Flight Deck	Cabin		
Smoke/Fire		Use cabin interphone.	Pilots and flight attendants will use the cabin interphone for communication. Any public announcements accomplished by flight attendants using megaphones.
Emergency Landing		Use emergency signal (3 distinct chimes) followed by cabin interphone or face-to-face.	Pilots will use the emergency signal (3 distinct chimes) to alert flight attendants of emergency situation. Subsequent communication will then be via the interphone or face-to-face, time permitting. The interphone will be used to command an evacuation. Any public announcements will be made by the flight attendants using megaphones.
Ditching			
Evacuation or Rejected Takeoff			
	Smoke/Fire	Use cabin interphone.	Pilots and flight attendants will use the cabin interphone for communication. Public Announcements accomplished by flight attendants using megaphones.
	Hijacking		
	Passenger Problem (Medical/ Disturbance)		



RADIO TRANSMIT

Condition: A radio transmits continuously without crew input.

Objective: To identify and isolate the stuck microphone.

- 1 Transmitter select switches
(all audio select panels) FLT interphone
This deselects radios and stops radio transmissions.
- 2 The microphone or interphone with the stuck switch continuously transmits on flight interphone.
- 3 The associated audio select panel should stay on flight interphone. All other audio select panels may be used normally.



>SATCOM

Condition: The SATCOM system is failed.



>SATCOM DATA

Condition: ACARS data communication through SATCOM system not available.



>SATCOM VOICE

Condition: SATCOM voice communication not available.
ACARS data communication through
SATCOM is available.

Loss due to a SATCOM voice system failure.



>SATVOICE AVAIL

Condition: SATCOM voice reestablished after a
temporary loss.



>SATVOICE LOST

Condition: SATCOM voice communication temporarily
lost.

Loss due to a reason other than SATCOM
system failure.



Non-Normal Checklists
Electrical

Chapter NNC
Section 6

Table of Contents

>BAT DISCH APU	6.1
>BAT DISCH MAIN	6.1
>BATTERY OFF	6.1
>DRIVE DISC 1, 2, 3, 4	6.2
ELEC AC BUS 1, 2, 3, 4	6.3
ELEC BUS ISLN 1, 2, 3, 4	6.6
ELEC DRIVE 1, 2, 3, 4.....	6.7
ELEC GEN OFF 1, 2, 3, 4	6.8
>ELEC SSB OPEN	6.8
ELEC UTIL BUS L, R.....	6.8
Standby Power Approach and Landing.....	6.9
>STBY BUS APU.....	6.16
>STBY BUS MAIN.....	6.16
>STBY POWER OFF	6.16

Table of Contents

Intentionally
Blank

>BAT DISCH APU

Condition: An APU battery is discharging. The APU battery can provide power to the APU standby bus for a minimum of 30 minutes.



>BAT DISCH MAIN

Condition: A main battery is discharging. The main battery can provide power to the main standby bus for a minimum of 30 minutes.

Caution! With **>BAT DISCH MAIN** displayed, a minimum of 30 minutes of electrical power will be available to the Standby Bus. Flight beyond 30 minutes may result in complete loss of Standby electrical power. Plan to land at the nearest suitable airport. Go to the Standby Power Approach and Landing checklist on page 6.9, as required.

**OFF**

>BATTERY OFF

Condition: The battery switch is off.



>DRIVE DISC 1, 2, 3, 4

Condition: The generator drive is disconnected.



ISLN

ELEC AC BUS 1, 2, 3, 4

OFF

Condition: The AC bus is not powered.

Objective: To attempt to reset the generator and then the bus tie. Also, to reset the EEC if the bus is recovered.

Attempt only one reset

- 1  GEN CONT switch
 (affected generator) Off, then On

- 2 Choose one:

◆ ELEC AC BUS message **stays shown**:

Do **not** attempt to close the bus tie.

▶▶ **Go to step 3**

◆ ELEC AC BUS message **blanks**:

▶▶ **Go to step 6**

▼ Continued on next page ▼

▼ ELEC AC BUS 1, 2, 3, 4 continued ▼

3 Choose one:

◆ ELEC AC BUS **2** message stays shown:

Note: Left wing trailing edge flap indications are inoperative. Expect all flaps to move in the primary mode.

◆ ELEC AC BUS **3** message stays shown:◆ ELEC AC BUS **1 or 4** message stays shown:

►► **Go to step 4**

4 Choose one:

◆ ELEC AC BUS **1** message is shown:

Avoid icing conditions.

Flight in icing conditions may result in unreliable captain's and Standby flight instrument indications.

►► **Go to Inoperative Items**

◆ ELEC AC BUS **4** message is shown:

Avoid icing conditions.

Flight in icing conditions may result in unreliable first officer's flight instrument indications.

►► **Go to Inoperative Items**

▼ Continued on next page ▼

▼ ELEC AC BUS 1, 2, 3, 4 continued ▼

Inoperative Items

Both pitot probe heaters on one side of the airplane inop

Avoid icing conditions.

Autothrottle inop

Use manual throttle.

LNAV and VNAV inop

Use HDG SEL or HDG HOLD and FLCH, V/S, or ALT HOLD

Reference EPR is blank

Use manual throttle.

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

HEAT P/S CAPT, F/O

HEAT P/S L, R AUX



Attempt BUS TIE reset and EEC reset if needed

Attempt only one reset

6  BUS TIE switch
(affected bus) Off, then AUTO

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

ELEC BUS ISLN

▼ Continued on next page ▼

▼ ELEC AC BUS 1, 2, 3, 4 continued ▼

8 Choose one:

◆ ENG EEC MODE message **is blank**:



◆ ENG EEC MODE message **is shown**:

▶▶ **Go to step 9**

9 For the affected engine, do these steps:

Thrust lever Retard to mid position

ELEC ENG CONTROL switch ALTN, then
NORM



ISLN

ELEC BUS ISLN 1, 2, 3, 4

Condition: The bus tie is open.

Objective: To reset the bus tie.

Attempt only one reset.

1  BUS TIE switch
 (affected side) Off, then AUTO



DRIVE**ELEC DRIVE 1, 2, 3, 4**

Condition: One of these occurs:

- IDG oil pressure low
- IDG oil temperature high
- Generator control open due to uncorrectable generator frequency fault

Objective: To prevent damage to the IDG.

Action is irreversible

- 1  Generator DRIVE DISC switch (affected generator) Confirm Push and hold for 1 second

- 2 Do **not** accomplish the following checklists:

>DRIVE DISC

ELEC GEN OFF



OFF**ELEC GEN OFF 1, 2, 3, 4**

Condition: The generator control is open.

Objective: To reset the generator.

- 1  Attempt only one reset.
 GEN CONT switch
 (affected generator) Off, then ON
■ ■ ■ ■

>ELEC SSB OPEN

Condition: The split system breaker is failed open.

**OFF****ELEC UTIL BUS L, R**

Condition: One or more of these occur:

- A galley bus is not powered
- A utility bus is not powered
- The galley emergency power switch is off

Objective: To reset power.

- 1  Attempt only one reset
 UTILITY power switch
 (affected side). Off, then ON
 Multiple fuel pump messages show while the
 switch is off.
 Leave the UTILITY power switch ON.



Standby Power Approach and Landing

Condition: AC power failure due to an electrical anomaly or a loss of all generators.

Objective: To provide guidance on conducting an approach and landing on standby power, after completing all applicable non-normal checklists.

1 Operative Equipment

Left VHF communication and navigation radios.

6301 - 6314

Left CDU

6315 - 6316

Left FMS

2 Plan to use flaps 25 and VREF 25+20 for landing

6301 - 6314

3 Reference the thrust N1 settings and V speeds in the ODM.

6315 - 6316

4 Enter the adjusted flaps 25 VREF speed on the FMS APPROACH REF page.

5 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼

Deferred Items

- The leading edge flaps will not extend.
- The left trailing edge flap indication is inoperative (amber "X" displayed on the left outboard and inboard trailing edge flap indications). The right trailing edge flap indication is operative.
- The control wheel trim switches are inoperative.
- The antiskid, autobrake, auto speedbrake, and reversers are inoperative.

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF 25+20__	C&F
■ Approach briefing	complete	PM
■ Autobrakes	OFF	PM
Seat belt signs	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼

Additional deferred item

When flaps 1 is selected, the FLAPS DRIVE EICAS alert message is displayed.

Do **not** accomplish the following checklist:

FLAPS DRIVE

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Additional deferred items

Use the ALTN trim switches on the aisle stand to keep the aircraft in trim on landing.

Extend the ground spoilers manually after landing.

Landing Checklist

Landing gear	down	C&F
Flaps	25, 25	C&F
Speedbrake	DOWN	PM



▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼**Additional Information****Bus Equipment**

The following list identifies the selected equipment receiving power from the APU Battery, APU Hot Battery, Main Battery, Main Hot Battery, and Standby busses.

Communications

- Left VHF
- Left radio communication panel
- Cabin interphone
- Captain's interphone
- First officer's interphone
- Observer's interphone
- Service interphone
- Passenger address systems 1-4

Engines

- Engine 1-4 fuel control valve
- Engine 1-4 fuel shutoff valve
- Engine 1-4 fuel crossfeed valve
- Generator drive disconnect 1-4
- Standby ignition 1-4
- Nacelle anti-ice 1-4
- Engine start air control
- Engine 1-4 speed sensors 1 and 2
- Engine 1-4 fire/overheat detection loops A and B
- Engine 1-4 fire extinguisher A and B
- EEC 1-4 channel A reset/inhibit

▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼**Instruments/Navigation**

- Left CDU
- Left FMC (**6315 - 6316**)
- Left PFD (**6315 - 6316**)
- Left ND (**6315 - 6316**)
- Left VOR
- Left ILS
- Left ILS antenna switch
- RMI
- IRS left, center and right DC
- IRS on battery power
- Standby attitude indicator
- Standby attitude indicator ILS deviation bars
- Standby altimeter vibrator
- Standby instrument lights

Flight Controls

- Flight control 1L and 2L AC
- Stabilizer trim alternate control
- Left stick shaker
- Primary trailing edge flap control AC and DC
- Left stabilizer trim/rudder ratio module (DC power)
- Upper yaw damper

▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼**Misc. Fire Protection**

- Avionics and warning system status assembly
- Lower cargo fire extinguisher
- E/E cooling smoke override
- Fire switch unlock
- Main battery overheat protection

APU

- APU fuel shutoff valve
- APU DC fuel pump
- APU primary control
- APU alternate control
- APU duct overheat
- APU fire warning horn
- APU fire extinguisher
- APU inlet door
- APU battery overheat protection
- APU fire/bleed duct overheat loops A and B

Hydraulics/Landing Gear

- Hydraulic EDP supply 1-4
- Hydraulic system 2 and 3 ELCU control
- Primary landing gear display and control

▼ Continued on next page ▼

▼ Standby Power Approach and Landing continued ▼

Miscellaneous

- Parking brake
- Upper EICAS
- Left and right manual cabin pressurization
- Galley/utility ELCU control bus 1-4
- Left aural warning
- Left ADC
- Left EIU
- Autoflight warning
- Flight deck dome lights
- Flight deck storm lights
- Flight deck captain's indicator lights
- Oxygen reset
- Oxygen valve and indication

>STBY BUS APU

6315 - 6316

Condition: The APU standby bus is not powered.

**>STBY BUS MAIN**

6315 - 6316

Condition: The main standby bus is not powered.

**>STBY POWER OFF**

6301 - 6314

Condition: The standby bus is not powered.



Non-Normal Checklists
Engines, APU

Chapter NNC
Section 7

Table of Contents

Aborted Engine Start.....	7.1
Multiple Engine Flameout or Stall.....	7.4
Engine Limit or Surge or Stall	7.6
APU.....	7.8
APU DOOR	7.9
APU FUEL.....	7.10
>EEC 1, 2, 3, 4 TEST PWR	7.10
>ENG 1, 2, 3, 4 CONTROL.....	7.11
ENG 1, 2, 3, 4 EEC MODE.....	7.11
ENG 1, 2, 3, 4 FAIL.....	7.13
ENG 1, 2, 3, 4 FUEL FILT.....	7.16
ENG 1, 2, 3, 4 FUEL VLV	7.17
>ENG 1, 2, 3, 4 LIM PROT	7.17
ENG 1, 2, 3, 4 LOW IDLE.....	7.18
ENG 1, 2, 3, 4 OIL FILT.....	7.18
ENG 1, 2, 3, 4 OIL PRESS.....	7.19
ENG 1, 2, 3, 4 OIL TEMP	7.20
>ENG 1, 2, 3, 4 REVERSER.....	7.20
>ENG 1, 2, 3, 4 RPM LIM	7.21
>ENG 1, 2, 3, 4 SHUTDOWN.....	7.21
ENG 1, 2, 3, 4 START VLV	7.21
>ENG CONTROLS.....	7.21
ENG IGNITION	7.22
Engine In-Flight Start	7.23
>IDLE DISAGREE	7.26
Reverser Unlocked	7.26

Table of Contents

STARTER CUTOUT 1, 2, 3, 4 7.29

Two Engines Inoperative 7.30

Aborted Engine Start

Condition: On the ground, an aborted engine start is needed.

Objective: To shut down the engine and motor it.

- 1 FUEL CONTROL switch
(affected engine) CUTOFF

▼ Continued on next page ▼

▼ Aborted Engine Start continued ▼

2 Choose one:

◆ Engine START light is **illuminated**:

Motor the engine for 30 seconds.

If engine limit(s) are **not** exceeded and restart is desired:

AUTO IGNITION selector BOTH

FUEL CONTROL switch RUN

When the engine is started:

AUTO IGNITION selector 1

Consult the MDM and contact Maintenance Control for MEL-related considerations and further guidance.



If engine limit(s) are exceeded or restart **not** desired:

Engine START switch

(affected engine) Push



◆ Engine START light is **extinguished**:

►► **Go to step 3**

▼ Continued on next page ▼

▼ Aborted Engine Start continued ▼

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

Engine START switch (affected engine) . . . Pull

4 Motor the engine for 30 seconds.

If engine limit(s) are **not** exceeded and restart is desired:

AUTO IGNITION selector BOTH

FUEL CONTROL switch RUN

When the engine is started:

AUTO IGNITION selector 1

Consult the MDM and contact Maintenance Control for MEL-related considerations and further guidance.



If engine limit(s) are exceeded or restart **not** desired:

Engine START switch (affected engine) . . .Push



Multiple Engine Flameout or Stall

Condition: One of these occurs on two or more engines:

- Engine flameout
- Engine indications are abnormal
- Engine indications are more than limits
- Abnormal engine noises are heard
- There is no response to thrust lever movement

Objective: To attempt a rapid relight.

1 CON IGNITION switch ON

2 FUEL CONTROL switches
(affected engines) . . Confirm CUTOFF,
then RUN

3 If EGT rises rapidly approaching the EGT takeoff
limit:

Repeat the above step as needed.

▼ Continued on next page ▼

▼ Multiple Engine Flameout or Stall continued ▼

4 Choose one:

◆ Airspeed is **less than** 200 KIAS:

PACKS control selectors . . Set a maximum
of one pack on

Engine START switch
(affected engines) Pull

▶▶ **Go to step 5**

◆ Airspeed is **equal or more than** 200 KIAS:

▶▶ **Go to step 5**

5 Engines may accelerate to idle very slowly, especially at high altitudes. If N2 is steadily increasing, and EGT stays within limits, do not interrupt the start.

6 AUTO IGNITION selector BOTH

Note: If driftdown is required, refer to Miscellaneous, Section 0, Driftdown checklist.

Note: If engine relight is not achieved and engine securing is required, refer to the ENG 1, 2, 3, 4 FAIL checklist in this section.

Note: If landing with multiple engines inoperative, refer to the Two Engine Inoperative checklist in this section.



Engine Limit or Surge or Stall

- Condition: One or more of these occur:
- Engine indications are abnormal
 - Engine indications are rapidly approaching or exceeding limits
 - Abnormal engine noises are heard, possibly with airframe vibration
 - There is no response to thrust lever movement or the response is abnormal
 - Flames in the engine inlet or exhaust are reported

Objective: To recover normal engine operation, or shut down the engine if recovery is not possible.

- 1 Thrust lever
(affected engine) . . . Confirm Retard until
engine indications
stay within limits, or
the thrust lever is at idle

- 2 CON IGNITION switch ON
This may prevent flameout.

▼ Continued on next page ▼

▼ Engine Limit or Surge or Stall continued ▼

3 Choose one:

◆ Engine indications are **normal and** EGT is **stabilized or decreasing**:

▶▶ Go to step 4

◆ Engine indications are **abnormal or** EGT continues to **increase**:

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

Transponder mode selector TA ONLY

Do **not** accomplish the following checklist:

ENG SHUTDOWN



Check that RPM and EGT follow thrust lever movement.

4  Thrust lever
(affected engine) Advance slowly

5 Run the engine normally or at a reduced thrust setting that is surge and stall free.

6 Choose one:

◆ Engine runs **normally**:



◆ Engine runs at **reduced** thrust:

Transponder mode selector TA ONLY



APU

Condition: One of these occurs:

- An APU automatic shutdown
- APU N1 RPM is more than 95% with the APU selector off

Objective: One of the following:

- In flight, to ensure accurate fuel burn calculations
- On the ground, to attempt an APU restart

1 Choose one:

◆ APU selector is **OFF**:

APU fire switch . . . Confirm Override
and pull



◆ APU selector is **ON**:

APU selector OFF

▶▶ **Go to step 2**

2 Choose one:

◆ APU message **blanks**:

A restart may be attempted.



◆ APU message **stays shown**:

Do **not** start the APU.



APU DOOR

Condition: The APU door is not in the commanded position.

Objective: To ensure accurate fuel burn calculations in flight, or attempt an APU restart on the ground.

1 Choose one:

◆ In **flight**:

If the APU selector is **OFF**:

Apply the APU door open fuel burn penalty of 2%.



◆ On the **ground**:

▶▶ **Go to step 2**

2 Choose one:

◆ APU selector is **OFF**:



◆ APU selector is **ON**:

▶▶ **Go to step 3**

3 APU selector OFF, then ON

▼ Continued on next page ▼

▼ **APU DOOR continued** ▼

4 Choose one:

◆ APU DOOR message **blanks**:

A restart may be attempted.



◆ APU DOOR message **stays shown**:

Do **not** start the APU.



APU FUEL

Condition: One of the following occurs:

- Low pump pressure is detected when the pump is activated
- APU fuel valve is not in the commanded position

1 APU selector OFF

2 Do **not** start the APU.



>EEC 1, 2, 3, 4 TEST PWR

Condition: EEC maintenance power switch in TEST.



>ENG 1, 2, 3, 4 CONTROL

Condition: An EEC system fault occurs.



ALTN

ENG 1, 2, 3, 4 EEC MODE

Condition: An EEC is in the alternate control mode.

Objective: To reset all EECs in the NORM mode.

- 1 Thrust lever (affected engine) Retard
to mid position
(Idle if on the ground)
- 2 Associated EEC switch. ALTN, then NORM
- 3 Choose one:

◆ **If** EEC ALTN light and ENG EEC MODE message go off and remain off:

Leave the associated EEC switch in NORM.
Place the thrust lever to the desired thrust setting.



◆ **If** EEC ALTN light and ENG EEC MODE message remain or come on again:

▶▶ **Go to step 4**

▼ Continued on next page ▼

▼ENG 1, 2, 3, 4 EEC MODE continued▼

- 4 Perform the following steps for each operating engine, one at a time:

Note: This procedure places all engines in the alternate (N1) control mode.

Thrust lever Retard to mid position
ELEC ENG CONTROL switch ALTN

- 5 Maximum thrust limiting is not available.
6 Autothrottle is not available.



ENG 1, 2, 3, 4 FAIL

Condition: One of these occurs:

- An engine failure
- An engine flameout

1 **If** more than one ENG FAIL message is shown:

▶▶ **Go to the Multiple Engine Flameout or Stall checklist on page 7.4**



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

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

4 Transponder mode selector TA ONLY

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

ENG SHUTDOWN

6 A restart can be attempted if there is N1 rotation and no abnormal airframe vibration.

7 Choose one:

◆ Restart **is not** needed:

Note: For driftdown guidance, refer to Miscellaneous, Section 0, Driftdown Checklist.



◆ Restart **is** needed:

▶▶ **Go to step 8**

▼ Continued on next page ▼

▼ ENG 1, 2, 3, 4 FAIL continued ▼

- 8 Monitor EGT during start.
- 9 Engines may accelerate to idle very slowly, especially at high altitudes. If N2 is steadily increasing, and EGT stays within limits, do not interrupt the start.
- 10 AUTO IGNITION selector BOTH
- 11 Choose one:
- ◆ Crossbleed indication (X-BLD) is **not** shown:
 - CON IGNITION switch ON
 - FUEL CONTROL switch RUN
 - ▶▶ **Go to step 12**
 - ◆ Crossbleed indication (X-BLD) is **shown**:
 - Engine START switch Pull
 - FUEL CONTROL switch RUN
 - ▶▶ **Go to step 13**

▼ Continued on next page ▼

▼ ENG 1, 2, 3, 4 FAIL continued ▼

12 Choose one:

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

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

Note: For driftdown guidance, refer to Miscellaneous, Section 0, Driftdown Checklist.



- ◆ Start is **normal**:

Transponder mode selector TA/RA



13 Choose one:

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

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

Engine START switch Push

Note: For driftdown guidance, refer to Miscellaneous, Section 0, Driftdown Checklist.



- ◆ Start is **normal**:

Transponder mode selector TA/RA



ENG 1, 2, 3, 4 FUEL FILT

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

1 Choose one:

- ◆ Only **one** ENG FUEL FILTER message has shown during the flight:

Note: Erratic engine operation and flameout may occur on the affected engine due to fuel contamination.



- ◆ ENG FUEL FILTER messages for **more than one** engine show or have shown at any time during the flight (either separately or at the same time):

►► **Go to step 2**

2 Plan to land at the nearest suitable airport.

Note: Erratic engine operation and flameout may occur on one or more engines due to fuel contamination.



ENG 1, 2, 3, 4 FUEL VLV

Condition: One or more of these occur:

- The engine fuel valve is not in the commanded position
- The fuel spar valve is not in the commanded position

1 Choose one:

◆ FUEL CONTROL switch is in **RUN**:



◆ 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 an engine start.



>ENG 1, 2, 3, 4 LIM PROT

Condition: The EEC is in the alternate control mode and thrust is approaching maximum rating.



ENG 1, 2, 3, 4 LOW IDLE

Condition: Engine idle not in approach setting when commanded.

- 1 Thrust lever
(affected engine) Advance until the ENG
LOW IDLE message blanks



ENG 1, 2, 3, 4 OIL FILT

Condition: Oil filter contamination can cause oil to bypass the primary oil filter.

- 1 Primary engine oil filter approaching bypass condition. Oil flow to the engine will be filtered through the secondary filter element.



ENG 1, 2, 3, 4 OIL PRESS

Condition: The oil pressure is low.

1 Choose one:

◆ Oil pressure is **above** the red line limit:

Run the engine normally.



◆ Oil pressure **is at or below** the red line limit:

▶▶ **Go to step 2**

- 2 Thrust lever
(affected engine) . . . Confirm Idle
- 3 FUEL CONTROL switch
(affected engine) . . . Confirm CUTOFF
- 4 Transponder mode selector TA ONLY
- 5 Do **not** accomplish the following checklist:

ENG SHUTDOWN



ENG 1, 2, 3, 4 OIL TEMP

Condition: The oil temperature is high.

- 1 Thrust lever
(affected engine) . . . Confirm Retard slowly
until the temperature decreases

- 2 Choose one:

◆ ENG OIL TEMP message **blanks**:

Run the engine at a thrust level to keep the
ENG OIL TEMP message from showing.



- ◆ Oil temperature does **not decrease** below the
red line limit or **stays in the amber band** for
longer than 20 minutes:

▶▶ **Go to step 3**

- 3 FUEL CONTROL switch
(affected engine) . . . Confirm CUTOFF
- 4 Transponder mode selector TA ONLY
- 5 Do **not** accomplish the following checklist:

ENG SHUTDOWN



>ENG 1, 2, 3, 4 REVERSER

Condition: On the ground, a fault occurs in the thrust
reverser system.



>ENG 1, 2, 3, 4 RPM LIM

Condition: The N1 or N2 red line limit restricts engine thrust.



>ENG 1, 2, 3, 4 SHUTDOWN

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



ENG 1, 2, 3, 4 START VLV

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

1 Ground or in-flight start using bleed air source may be unsuccessful.

2 **If** in flight:

Increase airspeed until crossbleed indication (X-BLD) is blank.



>ENG CONTROLS

Condition: Three or four EEC systems operate in a degraded mode. The systems do not have full redundancy.



ENG IGNITION

Condition: The continuous ignition system is failed.

- 1 STBY IGNITION selector 1 or 2
■ ■ ■ ■

Engine In-Flight Start

Condition: An engine start is needed and all of the following are true:

- There was **no** engine fire
- There is **N1** rotation
- There is **no** abnormal airframe vibration

- 1 Monitor EGT during start.
- 2 Engines may accelerate to idle very slowly, especially at high altitudes. If N2 is steadily increasing, and EGT stays within limits, do not interrupt the start.
- 3 AUTO IGNITION selector BOTH
- 4 Choose one:

◆ Crossbleed indication (X-BLD) is **not** shown:

CON IGNITION switch ON

FUEL CONTROL switch RUN

►► **Go to step 5**

◆ Crossbleed indication (X-BLD) is **shown**:

Engine START switch Pull

FUEL CONTROL switch RUN

►► **Go to step 6**

▼ Continued on next page ▼

▼ **Engine In-flight Start continued** ▼

5 Choose one:

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

FUEL CONTROL

switch Confirm CUTOFF

Note: For driftdown guidance, refer to Miscellaneous, Section 0, Driftdown checklist.



- ◆ Engine **starts** and runs normally:

Transponder mode selector TA/RA



▼ **Continued on next page** ▼

▼ Engine In-flight Start continued ▼

6 Choose one:

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

FUEL CONTROL

switch Confirm CUTOFF

Engine START switch Push

Note: For driftdown guidance, refer to Miscellaneous, Section 0, Driftdown checklist.



- ◆ Engine **starts** and runs normally:

Transponder mode selector TA/RA



>IDLE DISAGREE

Condition: One or more engines are at approach idle and one or more engines are at minimum idle.



Reverser Unlocked

Condition: The reverse annunciation shows with intentional reverse thrust not selected.

1 Choose one:

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

Run the engine normally.



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

▶▶ **Go to step 2**

- 2 Thrust lever
(affected engine) . . . Confirm Idle
- 3 FUEL CONTROL switch
(affected engine) . . . Confirm CUTOFF
- 4 Do **not** accomplish the following checklist:
ENG SHUTDOWN
- 5 Transponder mode selector TA ONLY

▼ Continued on next page ▼

▼ Reverser Unlocked continued ▼

- 6 Buffet may be reduced by decreasing airspeed.
- 7 Plan to use flaps 25 and VREF 25+15 for landing.
Enter the adjusted flaps 25 VREF speed on the FMC
APPROACH REF page.
- 8 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF 25+15 ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps.	25, 25	C&F
Speedbrake	ARMED	PM



STARTER CUTOUT 1, 2, 3, 4

Condition: Start valve does not close.

1 Engine START switch (affected engine) Push

2 Choose one:

◆ STARTER CUTOUT message **blanks**:

■ ■ ■ ■

◆ STARTER CUTOUT message **stays shown**:

▶▶ **Go to step 3**

3 ENGINE BLEED air switch
(affected engine) Off

4 Nacelle anti-ice for the affected engine is not available.

■ ■ ■ ■

Two Engines Inoperative

Condition: A two engine landing is needed.

- 1 The autothrottle is inoperative.
- 2 Do not use autoland.
- 3 **Checklist Complete Except Deferred Items**

Deferred Items

Landing commit point is gear extension.

**Warning! Go-Around after passing the landing
commit point is not recommended.
Performance is not assured.**

Use Flaps 25 and VREF 25 (normal approach speed)
for landing.

PACK control selectors One pack on,
two packs OFF

▼ Continued on next page ▼

▼ Two Engines Inoperative continued ▼

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ Two Engines Inoperative continued ▼

Go-around procedure review

If a go-around is absolutely required:

- Do **not** use TO/GA
- Set flaps 20, at the same time increase thrust as
airspeed increases while maintaining directional
control
- Retract the landing gear without delay
- Retract flaps to flaps 1 on schedule. Descent
may be required
- Climb at VREF 25+55 (flaps 1 bug).

- Select flaps 10 at glideslope alive.
- Extend the landing gear and select flaps 20 at
glideslope intercept, or at final descent point.
- Prior to 1,000’ AGL, select flaps 25 and center rudder
trim.

Landing Checklist

Landing gear	down	C&F
Flaps	25, 25	C&F
Speedbrake	ARMED	PM
■ ■ ■ ■		

Non-Normal Checklists

Chapter NNC

Fire Protection

Section 8

Table of Contents

FIRE APU	8.1
FIRE ENG 1, 2, 3, 4 or Engine Severe Damage or Separation	8.2
Fire Engine Tailpipe	8.4
Smoke, Fire or Fumes	8.6

>BOTTLE LOW APU	8.11
>BTL LO L ENG A, B	8.11
>BTL LO R ENG A, B.....	8.11
>CARGO DET AIR.....	8.11
>CGO BTL DISCH.....	8.11
>DET FIRE APU.....	8.12
>DET FIRE/OHT 1, 2, 3, 4	8.12
EFB Battery Overheat or Fire	8.13
FIRE APU	8.1
FIRE CARGO AFT.....	8.15
FIRE CARGO FWD	8.19
FIRE ENG 1, 2, 3, 4 or Engine Severe Damage or Separation	8.2
Fire Engine Tailpipe	8.4
FIRE WHEEL WELL.....	8.23
OVHT ENG 1, 2, 3, 4 NAC.....	8.25
SMOKE DR 5 REST	8.26
>SMOKE LAVATORY	8.27
Smoke or Fumes Removal	8.28
Smoke, Fire or Fumes	8.6

Table of Contents

Intentionally
Blank

APU

FIRE APU

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:
 - ◆ FIRE APU message **stays shown**:
Plan to land at the nearest suitable airport.
▶▶ **Go to step 3**
 - ◆ FIRE APU message **blanks**:
▶▶ **Go to step 3**
- 3 Do **not** accomplish the following checklist:
APU



FIRE ENG 1, 2, 3, 4
or
Engine Severe Damage or Separation

Condition: One or more of these occur:

- Engine fire warning
- Airframe vibrations with abnormal engine indications
- Engine separation

1 Thrust lever
(affected engine) . . . Confirm Idle

2 FUEL CONTROL switch
(affected engine) . . . Confirm CUTOFF

3 Engine fire switch
(affected engine) . . . Confirm Pull

4 **If** the FIRE ENG message is shown:

Engine fire switch
(affected engine) Rotate to the stop
and hold for 1 second

If after 30 seconds, the FIRE ENG message
stays shown:

Engine fire switch
(affected engine) Rotate to the
other stop and
hold for 1 second

▼ Continued on next page ▼

▼ **FIRE ENG 1, 2, 3, 4**
 or
Engine Severe Damage or Separation continued ▼

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

- 6 Transponder mode selector TA ONLY

- 7 For severe engine damage, separation, or an engine fire that does not extinguish:

Plan to land at the nearest suitable airport.

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

ENG SHUTDOWN



Fire Engine Tailpipe

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

- 1 FUEL CONTROL switch
(affected engine) CUTOFF
- 2 Advise the cabin.
- 3 Choose one:
 - ◆ Bleed air is **available**:

▶▶ **Go to step 4**
 - ◆ Bleed air is **not** available:

Advise the tower.

■ ■ ■ ■
- 4 PACK control selectors (all) OFF
 This allows maximum bleed air for engine motoring.
- 5 Choose one:
 - ◆ Affected engine start light is extinguished:

▶▶ **Go to step 6**
 - ◆ Affected engine start light is **illuminated**:

▶▶ **Go to step 8**
- 6 Allow the affected N2 to decrease below 30%.
- 7 Engine START switch
(affected engine) Pull

▼ Continued on next page ▼

▼Fire Engine Tailpipe continued ▼

- 8 Advise the tower.
- 9 **When** the tailpipe fire is extinguished:
Engine START switch
(affected engine) Push


Smoke, Fire or Fumes

Condition: Smoke, fire or fumes occur.

- 1 Diversion may be needed.
6301 - 6314
- 2 Don oxygen masks and smoke goggles, if needed.
6315 - 6316
- 3 Don the oxygen masks, if needed.
- 4 Establish crew and cabin communications.
- 5 Instruct the cabin crew to turn off the main Inflight Entertainment System (IFE) and PC power switches.
- 6 Advise the cabin crew that the main cabin lighting will be turned off.
- 7 Instruct the cabin crew to turn on the cabin night lighting.
- 8 UTILITY power switches (both). Off
- 9 APU selector OFF
- 10 Passenger signs ON
- 11 **Anytime** the smoke or fumes become the greatest threat:

▶▶ Go to the Smoke or Fumes Removal checklist on page 8.28

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

12 Choose one:

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

Isolate and extinguish the source of the smoke, fire or fumes.

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

▶▶ **Go to step 13**

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

▶▶ **Go to step 14**

13 Choose one:

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

Continue the flight at the captain's discretion.

Restore unpowered items at the captain's discretion.

▶▶ **Go to step 25**

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

▶▶ **Go to step 14**

▼ Continued on next page ▼

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

- 14 Divert to the nearest suitable airport while continuing the checklist.
- 15 Consider an immediate landing if the smoke, fire or fumes situation becomes uncontrollable.
- 16 Do not delay landing in an attempt to complete the following steps.
- 17 ISLN valve switches (both) Off
This isolates the left and right sides of the bleed air system.
- 18 PACK 2 control selector OFF
- 19 **Wait** 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.
- 20 Choose one:
 - ◆ Smoke or fumes **continue or are increasing**:
 PACK 3 control selector OFF
Wait 2 minutes unless the smoke or fumes are increasing. This allows time for the smoke or fumes to clear.
►► Go to step 21
 - ◆ Smoke or fumes are **decreasing**:
►► Go to step 25

▼ **Continued on next page** ▼

▼ Smoke, Fire or Fumes continued ▼

21 Choose one:

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

PACK 3 control selector NORM

PACK 1 control selector OFF

R ISLN valve switch On

▶▶ **Go to step 22**

◆ Smoke or fumes are **decreasing**:

L ISLN valve switch On

▶▶ **Go to step 22**

22 PACK 2 control selector NORM

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

24 Choose one:

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

ISLN switches (both) On

PACK 1 control selector NORM

Consider an immediate landing.

▶▶ **Go to step 25**

◆ Smoke or fumes are **decreasing**:

▶▶ **Go to step 25**

▼ Continued on next page ▼

▼ Smoke, Fire or Fumes continued ▼

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

CARGO DET AIR

ELEC UTIL BUS L, R

FUEL OVRD 2, 3 FWD

FUEL PRESS CTR L

FUEL PUMP 2, 3 FWD

TEMP ZONE

TRIM AIR OFF

►► **Go to the Smoke or Fumes Removal checklist
on page 8.28, if needed**



>BOTTLE LOW APU

Condition: The APU fire bottle pressure is low.



>BTL LO L ENG A, B

Condition: The left wing engine fire bottle A or B pressure is low.



>BTL LO R ENG A, B

Condition: The right wing engine fire bottle A or B pressure is low.



>CARGO DET AIR

Condition: Cargo smoke detection airflow is not sufficient.



>CGO BTL DISCH

Condition: One of these occurs:

- On the ground, a cargo fire bottle pressure is low
- In flight, both cargo fire bottles A and B are discharged



>DET FIRE APU

Condition: APU fire detection is inoperative.



>DET FIRE/OHT 1, 2, 3, 4

Condition: Engine fire and overheat detection is inoperative.



EFB Battery Overheat or Fire

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

Warning! Use this procedure only when an electronic device battery overheats or fire is positively identified. If in doubt, Go to the Smoke, Fire or Fumes checklist on page 8.6.

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

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

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

▼ Continued on next page ▼

▼ EFB Battery Overheat or Fire continued ▼

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



AFT

FIRE CARGO AFT

Condition: Smoke is detected in the aft cargo compartment.

- 1 AFT CARGO FIRE
 ARM switch Confirm ARMED
 Pack 3 shuts down.
- 2 PACK 3 control selector OFF
- 3 PACK 1 and 2 control selector One pack on,
 one pack OFF

Warning! Either pack 1 or 2 must be operating to prevent excessive smoke accumulation on the flight deck.

- 4 CARGO FIRE DISCH switch Push and
 hold for 1 second
 195 minutes of fire suppression are available.

▼ Continued on next page ▼

▼ FIRE CARGO AFT continued ▼

5 Choose one:

◆ On the **ground**:

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



◆ In flight:

▶▶▶ Go to step 6

6 Choose one:

◆ Airplane is **at or below** 8,000 feet:

▶▶▶ Go to step 9

◆ Airplane is **above** 8,000 feet:

▶▶▶ Go to step 7

7 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.

8 LDG ALT selector Set between
8000 and 8500

▼ Continued on next page ▼

▼ FIRE CARGO AFT continued ▼

- 9 Plan to land at the nearest suitable airport
- 10 When leaving cruise altitude for landing:
 - LDG ALT switch Push to AUTO
 - AUTO landing altitude mode shows on EICAS.
- 11 Do **not** accomplish the following checklist:
 - LANDING ALT

12 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ FIRE CARGO AFT continued ▼

Approach Checklist

- Flight & nav instruments verified C&F
- Cabin notification complete C
- Altimeters (trans lvl) ____, xckd C&F

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

Landing Checklist

- Landing gear down C&F
- Flaps ____ , ____ C&F
- Speedbrake ARMED PM



FWD

FIRE CARGO FWD

Condition: Smoke is detected in the forward lower cargo compartment.

- 1 FWD CARGO FIRE
 ARM switch Confirm ARMED
 Pack 3 shuts down.
- 2 PACK 3 control selector OFF
- 3 PACK 1 and 2 control selector One pack on,
 one pack OFF

Warning! Either pack 1 or 2 must be operating to prevent excessive smoke accumulation on the flight deck.

- 4 CARGO FIRE DISCH switch Push and
 hold for 1 second
 195 minutes of fire suppression are available.

▼ Continued on next page ▼

▼ FIRE CARGO FWD continued ▼

5 Choose one:

◆ On the **ground**:

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



◆ In flight:

▶▶▶ Go to step 6

6 Choose one:

◆ Airplane is **at or below** 8,000 feet:

▶▶▶ Go to step 9

◆ Airplane is **above** 8,000 feet:

▶▶▶ Go to step 7

7 LDG ALT switch Actuate to MAN
 MAN landing altitude mode shows on EICAS.

8 LDG ALT selector Set between
 8000 and 8500

▼ Continued on next page ▼

▼ FIRE CARGO FWD continued ▼

- 9 Plan to land at the nearest suitable airport
- 10 When leaving cruise altitude for landing:
 - LDG ALT switch Push to AUTO
 - AUTO landing altitude mode shows on EICAS.
- 11 Do **not** accomplish the following checklist:
 - LANDING ALT

12 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____, ____, xckd	C&F
■Landing data	____, ____	C&F
■Approach briefing	complete	PM
■Autobrake	as reqd	PM
Seatbelt sign	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ FIRE CARGO FWD continued ▼

Approach Checklist

- Flight & nav instruments verifiedC&F
- Cabin notification completePM
- Altimeters (trans lvl) ____, xckdC&F

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

Landing Checklist

- Landing gear downC&F
- Flaps ____, ____C&F
- Speedbrake ARMEDPM



FIRE WHEEL WELL

Condition: Fire is detected in a main wheel well.

- 1 **When** extending or retracting the landing gear, do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).
- 2 Landing gear lever DN
This attempts to remove and extinguish the fire source.
- 3 Do **not** use FMC fuel predictions with gear extended.
- 4 Flight with gear down increases fuel consumption and decreases climb performance. Refer to the Gear Down performance tables in the Ferry Chapter of the ODM for flight planning.
- 5 Plan to land at the nearest suitable airport.
- 6 Choose one:
 - ◆ Gear **does not need to be retracted** for airplane performance:

■ ■ ■ ■
 - ◆ Gear **needs to be retracted** for airplane performance:

▶▶ **Go to step 7**

▼ Continued on next page ▼

▼ FIRE WHEEL WELL continued ▼

- 7 **When** the FIRE WHEEL WELL message blanks:
Wait 20 minutes. This ensures the fire is extinguished.
Landing gear lever UP, then OFF


OVHT ENG 1, 2, 3, 4 NAC

Condition: An overheat is detected in the engine.

- 1 ENGINE BLEED air
switch (affected engine) Off
- 2 Thrust lever
(affected engine) . . . Confirm . . . Retard slowly
until the OVHT ENG
NAC message blanks
or the thrust lever is at idle
- 3 Choose one:
 - ◆ OVHT ENG NAC message **stays shown**:
 - FUEL CONTROL switch
(affected engine) . Confirm CUTOFF
 - Transponder mode selector TA ONLY
 - ▶▶ **Go to step 4**
 - ◆ OVHT ENG NAC message **blanks**:
 - Run the engine at reduced thrust to keep
the OVHT ENG NAC message from showing.
 - Transponder mode selector TA ONLY
 - ▶▶ **Go to step 4**
- 4 Do **not** accomplish the following checklists:
 - BLEED OFF
 - ENG SHUTDOWN



SMOKE DR 5 REST

Condition: Smoke detected in door 5 crew rest area.

- 1 Establish communications with the Purser/Flight Leader and request a status report of the door 5 crew rest area.
- 2 Choose one:
 - ◆ Smoke is **persistent**:
 - Plan to land at the nearest suitable airport.
 - ■ ■ ■
 - ◆ Smoke is **cleared** and the fire is visually confirmed to be **extinguished**:
 - ▶▶ **Go to step 3**
- 3 Instruct the purser/flight leader to push the door 5 crew rest switch on the bottom of the door 5 crew rest TEMPERATURE CONTROL panel. This returns the packs to normal flow by resetting the recirculation fans.
- 4 **After** the FAN RESET switch is pushed:

PACK RST switch Push
and hold for 5 seconds

Note: If the recirculation fans **cannot** be reset, the air conditioning packs will remain in high flow. The engines will consume approximately 1% additional fuel.



>SMOKE LAVATORY

Condition: Smoke is detected in a lavatory.



Smoke or Fumes Removal

Condition: Smoke or fumes removal is needed.

Objective: To remove smoke or fumes through the smoke override valve, or the smoke evacuation port, or a cabin door.

- 1 Do this checklist **only** when directed by the Smoke, Fire or Fumes checklist.
- 2 Do not delay landing in an attempt to complete the following steps.
- 3 Close the flight deck door. This prevents smoke or fumes from penetrating onto the flight deck.
- 4 EQUIP COOLING selector OVRD

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

5 Choose one:

- ◆ Smoke or fumes does **not** continue and is **not** severe:
 - ▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.6 and do the remaining steps**
 - ■ ■ ■
- ◆ Smoke or fumes **continues or** is **severe** and the smoke or fumes source is determined to be on the **flight deck**:

Pull the smoke evacuation handle. Pulling the smoke evacuation handle when smoke or fumes source is not on the flight deck may bring the smoke or fumes into the flight deck.

 - ▶▶ **Go to the Smoke, Fire or Fumes checklist on page 8.6 and do the remaining steps**
 - ■ ■ ■
- ◆ Smoke or fumes **continues or** is **severe** and the smoke or fumes source is determined to be in the **cabin**:
 - ▶▶ **Go to step 6**

6 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

- 7 LDG ALT selector Set between
8000 and 8500
- 8 EQUIP COOLING selector NORM
- 9 Start a descent. Level off at 8,500 feet or the
lowest safe altitude, whichever is higher.
- 10 **When** at level off:
OUTFLOW VALVES MAN switches (both) . . . ON
OUTFLOW VALVES
manual control Hold in OPEN
until the outflow valve
indications show fully open
- 11 Do **not** accomplish the following checklists:
CABIN ALT AUTO
LANDING ALT
OUTFLOW VLV L, R
- 12 Set airspeed at 200 KIAS or less.

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

13 Choose one:

- ◆ Most of the smoke or fumes is in the **forward** section of the cabin:

▶▶ **Go to step 14**



- ◆ Most of the smoke or fumes is in the **aft** section of the cabin:

▶▶ **Go to step 15**



14 Instruct the cabin crew to open two doors:

Door 1L or 1R

Door 5L or 5R

Move the door mode select lever to MANUAL.
Rotate and secure the lever in the 12 o'clock position

▶▶ **Go to step 16**

15 Instruct the cabin crew to open door 2L or 2R only.

Move the door mode select lever to MANUAL.
Rotate and secure the lever in the 12 o'clock position

▼ Continued on next page ▼

▼ Smoke or Fumes Removal continued ▼

16 **When** the smoke or fumes has cleared:

Instruct the cabin crew to close the doors. Close the forward door first.

Move the door mode select lever to AUTO.

▶▶ Go to the Smoke, Fire or Fumes checklist on page 8.6 and do the remaining steps



Non-Normal Checklists

Chapter NNC

Flight Controls

Section 9

Table of Contents

AILERON LOCKOUT	9.1
>FLAP RELIEF.....	9.1
Flap Indication Disagree.....	9.2
FLAPS CONTROL	9.4
FLAPS DRIVE	9.8
FLAPS PRIMARY	9.11
>FLT CONT VLVS	9.11
Jammed Or Restricted Flight Controls.....	9.12
Jammed Stabilizer Landing	9.13
RUD RATIO DUAL	9.14
RUD RATIO SNGL.....	9.15
SPEEDBRAKE AUTO	9.15
>SPEEDBRAKES EXT	9.16
>STAB GREENBAND	9.17
>STAB TRIM 2, 3	9.17
STAB TRIM UNSCHD	9.18
>YAW DAMPER LWR, UPR	9.21

Table of Contents

Intentionally
Blank

AILERON LOCKOUT

Condition: An aileron lockout actuator is not in the commanded position.

- 1 At high airspeed, avoid large or abrupt control wheel inputs. [AFM]
- 2 Crosswind limit for landing is 20 KIAS.



>FLAP RELIEF

Condition: Flap load relief occurs.



Flap Indication Disagree

Condition: The flap position indication does not reach the selected setting and none of these messages show:

- FLAPS CONTROL
- FLAPS DRIVE
- FLAPS PRIMARY

Objective: To move the flaps normally.

- 1 Flaps are operating normally.
- 2 Use the speeds for the selected flap setting.
- 3 Choose one:
 - ◆ During flap **extension**:
Continue normal flap extension.

 - ◆ During flap **retraction**:
►► Go to step 4
- 4 Continue normal flap retraction.
- 5 The flap position indication may not reach the selected flap position.
- 6 The pitch limit indication and maximum speed may indicate previous flap setting.

▼ Continued on next page ▼

▼ Flap Indication Disagree continued ▼

7 Choose one:

- ◆ Maximum speed **stays** at 280 KIAS after normal retraction time with the flaps selected UP:

Plan to land at the nearest suitable airport.

Warning system functions and indications that use flap position data are unreliable.



- ◆ Maximum speed does **not** stay at 280 KIAS after normal retraction time with the flaps selected UP:

Continue normal operation.



FLAPS CONTROL

Condition: All flap control units are failed.

Objective: To use alternate flaps. Flaps still extend or retract normally with an inoperative flap position indication.

1 Choose one:

◆ During flap **retraction**:

Limit airspeed to the flaps 5 placard speed while the flaps are between UP and 5.

▶▶▶ **Go to step 2**

◆ During flap **extension**:

▶▶▶ **Go to step 2**

2 Use flaps 25 and VREF 25 for landing.

3 Plan additional time for flap operation. Flap extension from flaps 1 to 5 position requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

4 ALTN FLAPS ARM switch ALTN

5 ALTN FLAPS selector Move the alternate flap selector to EXT or RET to extend or retract the flaps on schedule

▼ Continued on next page ▼

▼ FLAPS CONTROL continued ▼

6 Choose one:

◆ Expanded flap position indication is **operative**:

▶▶ **Go to step 14**

◆ Expanded flap position indication is **inoperative**:

▶▶ **Go to step 7**

7 Autopilots are inoperative.

8 Outboard ailerons are unlocked.

9 At high airspeed, avoid large or abrupt control wheel inputs. [AFM]

▼ Continued on next page ▼

▼ FLAPS CONTROL continued ▼

10 Choose one:

◆ During flap **extension**:

Maintain flaps UP maneuvering speed.

Slow to flaps 5 maneuvering speed after 3 minutes and 45 seconds with the alternate flap selector in EXT.

Slow to flaps 25 approach speed after 5 minutes total.

Do not fly in stick shaker.

Extend the gear after the flaps are extended.

GND PROX FLAP OVRD switch OVRD

►► **Go to step 14**

◆ During flap **retraction**:

►► **Go to step 11**

11 Do not exceed 20,000 feet until flaps are UP. [AFM]

12 At gross weights above 680,000 pounds, limit the angle of bank to 15 degrees until flaps are UP.

13 **If** flap retraction is required:

Accelerate to flaps 5 maneuvering speed.

After 90 seconds, accelerate to flaps 5 placard.

After 5 minutes total with alternate flap selector in RET, accelerate to climb speed.

Do not fly in stick shaker.

▼ Continued on next page ▼

▼ **FLAPS CONTROL** continued ▼

14 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF 25 __	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps.	25, 25	C&F
Speedbrake	.ARMED	PM



FLAPS DRIVE

Condition: One or more of these occur:

- A flap group failed to move in secondary mode
- An asymmetry is detected

1 Do **not** use alternate flaps. Asymmetry and uncommanded motion protection are not provided in alternate mode.

2 Choose one:

◆ During flap **retraction**:

Do **not** exceed the flap placard speeds.

Do **not** exceed 20,000 feet. [AFM]

Do **not** use FMC fuel predictions with the flaps extended.

▶▶ **Go to step 3**

◆ During flap **extension**:

▶▶ **Go to step 3**

3 Do not use autoland.

4 Use flaps 25 and VREF 25+20 for landing. Enter the adjusted flaps 25 VREF speed on the FMC APPROACH REF page. Use the flap lever to position the available flap groups in the primary or secondary mode.

5 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **FLAPS DRIVE continued▼**

Deferred Items

If the amber minimum maneuvering speed band is above the flap maneuvering speed:

Autothrottle ARM switch OFF

Use the shown flap maneuvering speeds.

Do **not** accomplish the following checklist:

AIRSPEED LOW

Descent Checklist

- Altimeters __, xckd C&F
- Minimums ____, ____, xckd C&F
- Landing data **Flaps 25, VREF 25+20__** C&F
- Approach briefing complete PM
- Autobrakes as reqd PM
- Seatbelt signs. ON PM
- Recall ckd PM

Approach preparation

GND PROX FLAP OVRD switch OVRD

▼ **Continued on next page ▼**

▼ **FLAPS DRIVE continued** ▼

Caution! The **CONFIG GEAR** message, master warning lights, and siren may not function when all of the following occurs:

- The landing gear is not down and locked
- Any thrust lever is at idle
- Radio altitude (RA) is less than 800 feet with any inboard trailing edge flap at 20 or less

If the inboard trailing edge flaps are affected:
CON IGNITION switch On
This provides automatic approach idle.
Automatic continuous ignition may be inoperative.

Approach Checklist

■ Flight & nav instruments verified	C&F
Cabin notification complete	C
Altimeters (trans lvl) ____, xckd	C&F

Landing Checklist

Landing gear down	C&F
Flaps 25, 25	C&F
Speedbrake ARMED	PM



FLAPS PRIMARY

Condition: One or more flap groups primary mode is failed.

- 1 Plan additional time for flap operation. Secondary flap extension from flaps 1 to 5 position requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

**VALVE
CLOSED**

>FLT CONT VLVS

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



Jammed Or Restricted Flight Controls

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

- 1 Overpower the jammed or restricted flight control. Use maximum force, including a combined effort of both pilots, if needed.
- 2 Do **not** turn off any flight control hydraulic power switch.
- 3 Choose one:

◆ Freezing water is **not** the suspected cause:

►► **Go to step 4**

◆ Freezing water **is** the suspected cause:

If conditions allow, consider descent to warmer air and attempt to override the jammed or restricted control again.

►► **Go to step 4**

- 4 Choose one:

◆ Controls are **normal**:



◆ Controls are **jammed or restricted**:

Use operative flight controls, trim (including alternate trim), and thrust as needed for airplane control.

Do not use autoland.



Jammed Stabilizer Landing

Condition: The stabilizer is jammed.

- 1 Do not use autoland.
- 2 Use flaps 25 and VREF 25+15 for landing. Enter the adjusted flaps 25 VREF speed on the FMC APPROACH REF page.
- 3 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF 25+15 ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ **Jammed Stabilizer Landing continued** ▼

Landing Checklist

Landing gear	down	C&F
Flaps	25, 25	C&F
Speedbrake	ARMED	PM



RUD RATIO DUAL

Condition: Both rudder ratio changers are failed.

- 1 At high airspeed, avoid large or abrupt rudder inputs.
- 2 At low airspeed, rudder control may be reduced.
- 3 Manual landing crosswind limit is 10 KIAS.
- 4 Automatic landing crosswind limits are:
 - With all engines operating, 10 KIAS
 - With an engine inoperative, 5 KIAS



RUD RATIO SNGL

Condition: One rudder ratio changer is failed.

- 1 At high airspeed, avoid large or abrupt rudder inputs.
- 2 At low airspeed, rudder control may be reduced.
- 3 Landing crosswind limit is 20 KIAS.



SPEEDBRAKE AUTO

Condition: An automatic ground spoiler system fault occurs.

- 1 Do **not** arm the speedbrakes. This prevents inadvertent in flight extension.

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ SPEEDBRAKE AUTO continued ▼

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Additional deferred item

Extend the speedbrakes manually after landing.

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	DOWN	PM



>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
 - Two or more thrust levers are not at idle



>STAB GREENBAND

Condition: The nose gear pressure switch disagrees with the stabilizer green band calculated by the FMC. One or more of the following may be incorrect:

- Airplane loading
- Gross weight entry
- CG entry
- Takeoff flap entry

Note: A few light taps of the brakes during low speed taxi may extinguish the >STAB GREENBAND alert.

- 1 Contact Load Control Center (LCC) via Flight Control to verify the accuracy of the percent MAC.
- 2 Recheck the correct percentage MAC is entered into the FMC and that the STAB trim value is correctly set.



>STAB TRIM 2, 3

Condition: One of these occurs:

- Automatic cutout of related hydraulic system power to stabilizer trim
- A stabilizer trim cutout switch is in CUTOUT
- Trim commanded and the respective actuator does not move

- 1 **If** the stabilizer fails to trim:

►► Go to the Jammed Stabilizer Landing checklist on page 9.13



STAB TRIM UNSCHD

Condition: One of these occurs:

- Stabilizer movement without a signal to trim and automatic cutout does not occur
- The alternate stabilizer trim switches are used with an autopilot engaged

- 1 STAB TRIM CUTOUT switches (both) CUTOUT
- 2 Higher than normal control column force may be required to prevent unwanted pitch change.
- 3 Autopilot disengage switch Push

Immediately move the switch back to CUTOUT if unscheduled movement occurs.

- 4  STAB TRIM CUTOUT 2 switch AUTO
- 5 Trim may be available after a brief delay.
- 6 Choose one:

◆ Stabilizer movement is **normal**:

Continue normal operation.

Stabilizer trim moves at half rate.

Center and right autopilots are available.



◆ **Unscheduled stabilizer** movement occurs:

▶▶ **Go to step 7**

- 7 STAB TRIM CUTOUT 2 switch CUTOUT

▼ Continued on next page ▼

▼ STAB TRIM UNSCHD continued ▼

Immediately move the switch back to CUTOUT if unscheduled movement occurs.

8  STAB TRIM CUTOUT 3 switch. AUTO

9 Trim may be available after a brief delay.

10 Choose one:

◆ Stabilizer movement is **normal**:

Continue normal operation.

The stabilizer trim moves at half rate.

Left and center autopilots are available.



◆ **Unscheduled stabilizer** movement occurs:

▶▶ **Go to step 11**

11 STAB TRIM CUTOUT 3 switch CUTOUT

12 Stabilizer trim is inoperative.

13 Do not use autoland.

14 Use flaps 25 and VREF 25+15 for landing.

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

Jammed Stabilizer Landing

16 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ STAB TRIM UNSCHD continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	Flaps 25, VREF 25+15__	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs	ON	PM
Recall	ckd	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	25, 25	C&F
Speedbrake	ARMED	PM



INOP

>YAW DAMPER LWR, UPR

Condition: A yaw damper is inoperative because one of these occurs:

- A yaw damper system is failed
- An IRU is not aligned



Intentionally
Blank

Non-Normal Checklists
Flight Instruments, Displays

Chapter NNC
Section 10

Table of Contents

IAS DISAGREE or Airspeed Unreliable..... 10.1

ALT DISAGREE.....	10.12
>AOA RIGHT	10.15
>ATTITUDE	10.15
>BARO DISAGREE.....	10.15
CRT DISPLAY BLANKING	10.16
>EFIS CONTROL L, R.....	10.16
>EFIS/EICAS C/P	10.17
>EIU LEFT.....	10.17

IAS DISAGREE or Airspeed Unreliable..... 10.1

>SNGL SOURCE RA	10.17
>SOURCE SEL ADC	10.18
>SOURCE SEL EIU	10.18
>SOURCE SEL F/D	10.18
>SOURCE SEL IRS	10.18
>SOURCE SEL NAV	10.18
Suspected Electronic Interference.....	10.19

Table of Contents

Intentionally
Blank

**IAS DISAGREE
or
Airspeed Unreliable**

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

Objective: To identify a reliable airspeed indication, if possible, or to continue the flight using the ODM, Abnormal section, Operation Without Airspeed Indication tables.

- 1 Autopilot disengage switch Push
- 2 A/T ARM switch OFF
- 3 F/D switches (both) OFF
- 4 If necessary to stabilize the aircraft, set the following gear up pitch attitude and thrust:
 Flaps extended 10° and 90% N1
 Flaps up 4° and 80% N1

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

▼ Continued on next page ▼

**▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼**

Note: Incorrect aileron lockout and yaw damper motion may occur. Avoid abrupt control inputs.

5 The following are **reliable**:

Attitude

N1

Ground speed

Radio altitude

Note: Overspeed warning and AIRSPEED LOW alerts may occur erroneously or simultaneously.

The Flight Path Vector and Pitch Limit Indicator may be unreliable.

- 6 Refer to the ODM, Abnormal section, Operation Without Airspeed Indication tables and set the pitch attitude and thrust setting for the current airplane configuration and phase of flight.
- 7 When in trim and stabilized, cross check the PFD and standby airspeed indicators. An airspeed indication that differs by more than 30 knots or 0.03 Mach from the airspeed shown in the table should be considered **unreliable**.

▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

8 Choose one:

◆ **Reliable** airspeed indication **can** be determined:

Use the most reliable airspeed source for the remainder of the flight.

► ► **Go to step 9**

◆ **Reliable** airspeed **cannot** be determined:

Autopilots, autothrottle, and flight directors are not reliable.

► ► **Go to step 15**

▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

9 Choose one:

◆ **Captain’s** airspeed is **reliable**:

AIR DATA SOURCE
selector (first officer) C
Crosscheck PFD and standby
airspeed indications.

▶▶ **Go to step 10**

◆ **First officer’s** airspeed is **reliable**:

AIR DATA SOURCE selector (captain) . . . C
Crosscheck PFD and standby
airspeed indications.

▶▶ **Go to step 11**

◆ Only the **standby** airspeed is **reliable**:

AIR DATA SOURCE selector (captain) . . . C
Crosscheck PFD and standby
airspeed indications.

▶▶ **Go to step 12**

▼ Continued on next page ▼

**▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼**

10 Choose one:

◆ First officer’s airspeed is **reliable**:

Autopilots, autothrottle, and flight directors
are available.



◆ First officer’s airspeed is **not** reliable:

AIR DATA SOURCE
selector (first officer) L

FLT DIR SOURCE
selector (first officer) L

FMC selector L

C and L autopilots, autothrottle, and flight
directors are available.



▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

11 Choose one:

◆ Captain’s airspeed is **reliable**:

Autopilots, autothrottle, and flight directors
are available.



◆ Captain’s airspeed is **not** reliable:

AIR DATA SOURCE
selector (captain). R

FLT DIR SOURCE
selector (captain). R

FMC selector R

R autopilot, autothrottle, and flight
directors are available.



▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

12 Choose one:

◆ Captain's airspeed is **reliable**:

AIR DATA SOURCE

selector (first officer) L

FLT DIR SOURCE

selector (first officer) L

FMC selector L

C and L autopilots, autothrottle, and flight directors are available. First officer's airspeed stays unreliable.



◆ Captain's airspeed is **not** reliable:

►► **Go to step 13**

13 Continue flight using only the standby flight instruments.

14 Do not engage the A/P or A/T.

Note: Plan more time for alternate flap extension.
Use flaps 25 and VREF 25 for landing.

►► **Go to step 16**

▼ Continued on next page ▼

**▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼**

15 Set pitch attitude and thrust from the ODM, Abnormal section, Operation Without Airspeed Indication tables for the airplane configuration and phase of flight, as needed.

Note: Maintain visual conditions if possible.

Note: Establish landing configuration early.

Note: Radio altitude reference is available below 2,500 feet AGL.

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

Note: Plan more time for alternate flap extension.
Use flaps 25 and VREF 25 for landing.

16 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

**▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	VREF 25 ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

Flap Extension

Extend flaps normally until reaching flaps 20.

When flaps are at 20, continue extending flaps to 25 using alternate flaps:

- ALTN FLAPS ARM switch ALTN
- Alternate flaps selector EXT

Landing Checklist

- Landing gear down C&F
- Flaps **25** C&F
- Speedbrake ARMED PM
- ■ ■ ■

▼ Continued on next page ▼

▼ IAS DISAGREE
or
Airspeed Unreliable continued ▼

Additional Information

One or more of the following may indicate unreliable airspeed or Mach:

- Speed or altitude information not consistent with pitch attitude and thrust setting.
- Airspeed or Mach failure flags.
- PFD current airspeed box amber.
- Blank or fluctuating airspeed displays.
- Variation between captain's and first officer's airspeed displays.
- Amber line through one or more PFD flight mode annunciations.
- Invalid minimum maneuvering speed.
- Overspeed indications.
- Simultaneous overspeed and stall warnings.
- Radome damage or loss.
- One or more of the following EICAS messages show:

AILERON LOCKOUT	
>AIRSPEED LOW	
>OVERSPEED	
RUD RATIO DUAL	
RUD RATIO SNGL	

ALT DISAGREE

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

Objective: To attempt to select ADCs that do not disagree by more than 200 feet.

- 1 Transponder altitude received by ATC may be unreliable.
- 2 Autopilot disengage switch Push
- 3 AIR DATA SOURCE selector (captain) C
- 4 Choose one:

◆ ALT DISAGREE message **blanks**:

Engage the L, C, or R autopilot, if needed.
Transponder altitude is now reliable.



◆ ALT DISAGREE message **stays shown**:

▶▶ **Go to step 5**

- 5 AIR DATA SOURCE selector (first officer) L

▼ Continued on next page ▼

▼ ALT DISAGREE continued ▼

6 Choose one:

◆ ALT DISAGREE message **blanks**:

Engage the L or C autopilot, if needed.

R autopilot is unreliable.

Transponder altitude is now reliable.



◆ ALT DISAGREE message **stays shown**:

▶▶ **Go to step 7**

7 AIR DATA SOURCE selector (captain) R

8 AIR DATA SOURCE selector (first officer) C

9 Choose one:

◆ ALT DISAGREE message **blanks**:

Engage the R autopilot, if needed.

L and C autopilots are unreliable.

Transponder altitude is now reliable.



◆ ALT DISAGREE message **stays shown**:

▶▶ **Go to step 10**

10 AIR DATA SOURCE selector (captain) L

▼ Continued on next page ▼

▼ ALT DISAGREE continued ▼

11 Choose one:

◆ ALT DISAGREE message **blanks**:

Engage the L, C, or R autopilot, if needed.

Transponder altitude is now reliable.



◆ ALT DISAGREE message **stays shown**:

►► **Go to step 12**

12 Airplane does not meet RVSM airspace requirements.

13 Do **not** use the flight path vector.

14 **Checklist Complete Except Deferred Items**

Deferred Items

Review before descent:

Establish landing configuration early.

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

Radio altitude reference is available below 2,500 feet AGL.



>AOA RIGHT

Condition: The right angle of attack sensor is failed.
AOA system redundancy is lost.



>ATTITUDE

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



>BARO DISAGREE

Condition: The captain's and first officer's barometric reference settings disagree.



CRT DISPLAY BLANKING

Condition: All six CRT display units are blanking in flight.

Note: Boeing has determined that cycling these circuit breakers may be necessary to resolve system operation. This action will have no adverse effect on equipment or aircraft operation.

- 1 L EIU circuit breaker (P7-1/F9). CYCLE
Open circuit breaker for at least 5 seconds, then reset.
- 2 C EIU circuit breaker (P7-1/F10) CYCLE
Open circuit breaker for at least 5 seconds, then reset.
- 3 Record the circuit breaker names, grid locations, time, and flight deck effects in the aircraft log.

>EFIS CONTROL L, R

Condition: One of these occurs:

- The EFIS control panel has failed
- CDU control of the EFIS is used

The failed EFIS control panel may be controlled alternately through the respective CDU:

- 1 MENU key Select
- 2 EFIS CP prompt Select



>EFIS/EICAS C/P

Condition: One of these occurs:

- Both EFIS control panels and the EICAS display select panel are failed
- CDU control of the EFIS and EICAS is used

The failed EFIS control panels may be controlled alternately through the left or right CDU:

- 1 MENU key Select
- 2 EFIS CP prompt Select

The failed EICAS control panel may be controlled alternately through the left or right CDU:

- 3 MENU key Select
- 4 EICAS CP prompt Select



>EIU LEFT

Condition: The left EFIS/EICAS interface unit is failed.



>SNGL SOURCE RA

Condition: Both primary flight displays use the same radio altimeter source.



>SOURCE SEL ADC

Condition: Both primary flight displays use the same air data source.



>SOURCE SEL EIU

Condition: Both pilots' displays use the same EFIS/EICAS interface unit source.



>SOURCE SEL F/D

Condition: Both primary flight displays use the same flight director source.



>SOURCE SEL IRS

Condition: Both pilots' displays use the same IRS source.



>SOURCE SEL NAV

Condition: Both pilots' displays use the same FMC source.



Suspected Electronic Interference

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

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

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

4 Choose one:

◆ Interference does **not continue**:

Continue normal EFB operation.

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



◆ Interference **continues**:

EFBs (all) Off

▶▶ Go to step 5

▼ Continued on next page ▼

▼ Suspected Electronic Interference continued ▼

5 Choose one:

◆ Interference does **not continue**:

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

▶▶ **Go to step 6**

◆ Interference **continues**:

EFBs (all) On

Resume normal flight using EFBs.

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



6 Choose one:

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

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



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

All EFBs Off

▶▶ **Go to the EFB Failure – All checklist on page 0.7**



Non-Normal Checklists
Flight Management, Navigation

Chapter NNC
Section 11

Table of Contents

FMC LEFT, RIGHT	11.1
>FMC MESSAGE.....	11.3
>GPS	11.3
>GPS LEFT, RIGHT	11.4
ILS ANTENNA	11.4
IRS CENTER, LEFT, RIGHT	11.4
>IRS AC CENTER, LEFT, RIGHT	11.5
>IRS DC CENTER, LEFT, RIGHT.....	11.5
IRS MOTION	11.6
>SNGL SOURCE ILS	11.6
>TRANSPONDER L, R.....	11.6
UNABLE RNP.....	11.7

Table of Contents

Intentionally
Blank

FMC LEFT, RIGHT

Condition: An FMC is failed.

1 Choose one:

◆ **A single** FMC is failed:

FMC selector Select
operable FMC

Reengage the autothrottle.

NAV SOURCE selector Select
operable FMC



◆ **Both** FMCs are failed:

►► **Go to step 2**

2 The autothrottle is inoperative.

▼ Continued on next page ▼

▼ **FMC LEFT, RIGHT continued** ▼

- 3 Choose one:
- ◆ Airplane position **is** north of 82°N latitude:
 - ▶▶▶ **Go to step 4**
 - ◆ Airplane position **is** north of 70°N latitude between 80°W and 130°W:
 - ▶▶▶ **Go to step 4**
 - ◆ Airplane position **is** south of 82°S latitude:
 - ▶▶▶ **Go to step 4**
 - ◆ Airplane position **is** south of 60°S latitude between 120°E and 160°E:
 - ▶▶▶ **Go to step 4**
 - ◆ Airplane position is **not** in the above regions:
 - ▶▶▶ **Go to step 5**
- 4 HDG reference switch TRUE
- 5 Engage heading select or heading hold mode as needed.
- 6 Route modifications must be entered into all three CDUs. Enter any new waypoints by latitude and longitude. (Example: N3531.5W10434.3)
- 7 Manually tune navigation radios through CDUs.
- 8 NAV SOURCE selector
(captain) CDU L or CDU C
- 9 NAV SOURCE selector
(first officer) CDU R or CDU C

▼ **Continued on next page** ▼

▼ FMC LEFT, RIGHT continued ▼

10 LDG ALT switch Actuate to MAN
MAN landing altitude mode shows on EICAS.

11 LDG ALT selector Set the landing altitude

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

LANDING ALT

Note: For Alternate Navigation guidance, refer to Volume I, Supplementary Procedures, SP.11, Navigation, Alternate Navigation.

Note: For EPR settings refer to the ODM, Operation Without Airspeed Indication in the Abnormal section. For approach and landing V speeds, refer to the ODM, Normal Landing Speeds table in the Approach/Landing section.



>FMC MESSAGE

Condition: An alert message is in the CDU scratchpad.



>GPS

GPS Equipped Aircraft

Condition: Both GPS receivers are failed.



>GPS LEFT, RIGHT

GPS Equipped Aircraft

Condition: One GPS receiver is failed.



ILS ANTENNA

Condition: An ILS receiver does not use the correct antenna.

- 1 Threshold clearance may be reduced.



IRS CENTER, LEFT, RIGHT

Condition: An IRU fault occurs.

- 1 IRS SOURCE selector Select operable IRU

Action is not reversible

- 2  IRS mode selector (affected IRU). Confirm ATT

Maintain straight and level, constant
airspeed flight until attitude displays
recover (approximately 30 seconds).

- 3 **When** straight and level constant airspeed flight
has been maintained for a minimum of 30 seconds.

▶▶ Go to step 4

▼ Continued on next page ▼

▼ IRS CENTER, LEFT, RIGHT continued ▼

4 Choose one:

◆ IRS message **blanks**:

Maintain straight and level flight while entering the heading. Enter the current heading on the SET IRS HEADING line of the CDU position initialization page. Maintain straight and level flight while entering the heading.

The IRS heading may have to be updated periodically.



◆ IRS message **stays shown**:

▶▶ **Go to step 5**

Action is not reversible

5  IRS mode selector
(affected IRU) Confirm OFF



>IRS AC CENTER, LEFT, RIGHT

Condition: IRU AC power is failed.



>IRS DC CENTER, LEFT, RIGHT

Condition: IRU backup DC power is failed.



IRS MOTION

Condition: Airplane motion is detected while the IRS aligns.

- 1 Stop airplane motion until IRS alignment is complete.
- 2 Verify that the position is correct and reenter if needed.



>SNGL SOURCE ILS

Condition: Both primary flight displays use the same ILS source.



>TRANSPONDER L, R

Condition: The transponder is failed.



UNABLE RNP**GPS Equipped Aircraft**

Condition: The actual navigational performance is not sufficient.

1 Choose one:**◆ On the **ground**:**

The message may show with GPS inhibited.

**◆ On procedure or airway that **has an RNP alerting requirement**:**

Select an alternate procedure or airway.
During an approach, go-around unless
suitable visual references can be
established and maintained.

**◆ On procedure or airway **without** an RNP alerting requirement:**

Verify position.



Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Fuel

Section 12

Table of Contents

FUEL IMBAL 1-4	12.1
FUEL IMBAL 2-3	12.3
FUEL IMBALANCE	12.5
>FUEL JETT A, B	12.7
FUEL JETT SYS.....	12.8
Fuel Jettison	12.8
Fuel Leak Engine	12.10
>FUEL LOW CTR L, R.....	12.14
>FUEL OVD CTR L, R	12.14
FUEL OVRD 2, 3 AFT, FWD	12.15
>FUEL PMP STB L.....	12.16
>FUEL PMP STB R	12.16
FUEL PRES STB L, R	12.17
FUEL PRESS CTR L, R	12.18
FUEL PRESS ENG 1, 2, 3, 4.....	12.21
FUEL PUMP 1, 4 AFT, FWD.....	12.23
FUEL PUMP 2, 3 AFT, FWD.....	12.25
FUEL QTY LOW	12.28
FUEL RES XFR 2, 3	12.31
FUEL STAB XFR.....	12.32
>FUEL TANK/ENG	12.33
FUEL TEMP LOW.....	12.34
FUEL TEMP SYS.....	12.35
FUEL X FEED 1, 4	12.35
FUEL X FEED 2, 3	12.37
>FUEL XFER 1+4	12.38

Table of Contents

>JETT NOZ ON 12.38

>JETT NOZ ON L, R 12.38

>JETT NOZZLE L, R 12.38

>SCAV PUMP ON..... 12.39

>X FEED CONFIG 12.39

FUEL IMBAL 1-4

Condition: There is a fuel imbalance of 3,000 pounds between main tanks 1 and 4.

Objective: To decide if a fuel leak is suspected. To balance fuel if a fuel leak is not suspected.

- 1 If an engine has low fuel flow and unusual engine indications, a fuel imbalance may show due to engine damage instead of a fuel leak.
- 2 The FUEL IMBAL 1-4 message may be caused by an engine fuel leak or a fuel imbalance.
- 3 A fuel leak should be suspected if one or more of the following are true:

Total total fuel remaining on EICAS is less than the planned fuel remaining

An engine has excessive fuel flow

On PROGRESS page 2, the totalizer is less than the calculated fuel.

The TOTALIZER fuel is the sum of the individual tank quantities.

The CALCULATED fuel is the totalizer value at engine start minus fuel used.

Fuel used is calculated using the engine fuel flow sensors.

▼ Continued on next page ▼

▼ **FUEL IMBAL 1-4 continued** ▼

4 Choose one:

◆ There is an **indication** of an engine fuel leak:

▶▶ **Go to the Fuel Leak Engine
checklist on page 12.10**



◆ There is **no** indication of an engine fuel leak:

▶▶ **Go to step 5**

5 Configure the crossfeed valves and fuel pumps:

X FEED valve switches (all) On

If main tank 1 quantity is low:

MAIN 1 pump switches (both) Off

If main tank 4 quantity is low:

MAIN 4 pump switches (both) Off

6 **When** fuel balancing is complete:

MAIN pump switches ON

X FEED valve switches (all) As reqd

Resume normal fuel management.



FUEL IMBAL 2-3

Condition: There is a fuel imbalance of 6,000 pounds between main tanks 2 and 3.

Objective: To decide if a fuel leak is suspected. To balance fuel if a fuel leak is not suspected.

- 1 If an engine has low fuel flow and unusual engine indications, a fuel imbalance may show due to engine damage instead of a fuel leak.
- 2 The FUEL IMBAL 2-3 message may be caused by an engine fuel leak or a fuel imbalance.
- 3 A fuel leak should be suspected if one or more of the following are true:

Total total fuel remaining on EICAS is less than the planned fuel remaining

An engine has excessive fuel flow

On PROGRESS page 2, the totalizer is less than the calculated fuel.

The TOTALIZER fuel is the sum of the individual tank quantities.

The CALCULATED fuel is the totalizer value at engine start minus fuel used.

Fuel used is calculated using the engine fuel flow sensors.

▼ Continued on next page ▼

▼ **FUEL IMBAL 2-3 continued** ▼

4 Choose one:

◆ There is an **indication** of an engine fuel leak:

▶▶ **Go to the Fuel Leak Engine
checklist on page 12.10**



◆ There is **no** indication of an engine fuel leak:

▶▶ **Go to step 5**

5 Configure the crossfeed valves and fuel pumps:

X FEED valve switches (all) On

If main tank 2 quantity is low:

MAIN 2 pump switches (both) Off

OVRD 2 pump switches (both) Off

If main tank 3 quantity is low:

MAIN 3 pump switches (both) Off

OVRD 3 pump switches (both) Off

6 **When** fuel balancing is complete:

MAIN pump switches ON

OVRD pump switches As reqd

X FEED valve switches (all) As reqd

Resume normal fuel management.



FUEL IMBALANCE

Condition: There is a fuel imbalance of 6,000 pounds between the inboard and outboard main tanks after the FUEL TANK/ENG message shows.

Objective: To decide if a fuel leak is suspected. To balance fuel if a fuel leak is not suspected.

- 1 If an engine has low fuel flow and unusual engine indications, a fuel imbalance may show due to engine damage instead of a fuel leak.
- 2 The FUEL IMBALANCE message may be caused by an engine fuel leak or a fuel imbalance.
- 3 A fuel leak should be suspected if one or more of the following are true:

Total total fuel remaining on EICAS is less than the planned fuel remaining

An engine has excessive fuel flow

On PROGRESS page 2, the totalizer is less than the calculated fuel.

The TOTALIZER fuel is the sum of the individual tank quantities.

The CALCULATED fuel is the totalizer value at engine start minus fuel used.

▼ Continued on next page ▼

▼ FUEL IMBALANCE continued ▼

Fuel used is calculated using the engine fuel flow sensors.

4 Choose one:

◆ There is an **indication** of an engine fuel leak:

▶▶ **Go to the Fuel Leak Engine checklist on page 12.10**



◆ There is **no** indication of an engine fuel leak:

▶▶ **Go to step 5**

5 Configure the crossfeed valves and fuel pumps:

X FEED valve switches (all) On
MAIN pump switches Turn off
for the low tanks

6 **When** fuel balancing is complete:

MAIN pump switches (all) ON
X FEED 1 and 4 valve switches. Off
Resume normal fuel management.


>FUEL JETT A, B

Condition: A fuel jettison system is failed.

Note: If one jettison system has failed, place the FUEL JETTISON Control selector to the operable system to continue jettison operations.



FUEL JETT SYS

Condition: One of these occurs:

- The total fuel quantity is less than the FUEL TO REMAIN and a jettison nozzle valve is open
- Both fuel jettison systems are failed

- 1 FUEL JETTISON NOZZLE
valve switches (both) Off
- 2 FUEL JETTISON selector OFF


Fuel Jettison

Condition: Fuel jettison is needed.

Note: In other than an emergency situation, 4,000 feet above the terrain is recommended as the minimum altitude for fuel jettison.

- 1 Do not extend or retract flaps between flaps 1 and 5 during fuel jettison. [AFM]
- 2 FUEL JETTISON selector A or B
- 3 FUEL TO REMAIN Set
- 4 FUEL JETTISON NOZZLE
valve switches (both) ON

▼ Continued on next page ▼

▼ Fuel Jettison continued ▼

- 5 Fuel pump switches
(all tanks that have fuel) ON

This turns on center wing tank and horizontal stabilizer tank pump switches if they are off with fuel remaining.

This ensures override pumps 2 and 3 are on.

- 6 Do **not** accomplish the following checklist during jettison:

FUEL OVRD 2, 3, AFT, FWD

Low back pressure and high flow rates can cause an erroneous low pressure indication. The override pumps are left on during fuel jettison.

- 7 **When** the FUEL PRES STB message shows:

STAB pump switches (both) Off

- 8 **When** the FUEL PRESS CTR message shows:

CTR pump switches (both) Off

- 9 **When** jettison is complete:

FUEL JETTISON NOZZLE

valve switches (both) Off

FUEL JETTISON selector OFF



Fuel Leak Engine

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.)

Objective: To verify that there is an engine fuel leak.
To identify the leaking engine, and shut down the engine.

- 1 STAB pump switches (both) Off
- 2 CTR pump switches (both). Off
- 3 FUEL X FEED valve switches (all) Off
- 4 OVRD 2 pump switches (both) Off
- 5 OVRD 3 pump switches (both) Off
- 6 Identify an engine fuel leak by observing one main tank fuel quantity decreasing faster than other main tank fuel quantities.
- 7 An increase in fuel imbalance of approximately 1,000 pounds or more in 30 minutes should be considered an engine fuel leak.
- 8 **If** conditions allow:
Visually check for an engine fuel leak.
- 9 Do **not** accomplish the following checklists:
FUEL IMBAL 1-4
FUEL IMBAL 2-3
FUEL IMBALANCE
X FEED CONFIG

▼ Continued on next page ▼

▼ Fuel Leak Engine continued ▼

10 Choose one:

- ◆ All main tank quantities decrease at **same rate**
(an engine fuel leak is **not** confirmed):
Resume normal fuel management.
If the FUEL DISAGREE - PROG 2 message
is shown on the CDU scratchpad:
Select PROGRESS PAGE 2.
TOTALIZER or
CALCULATED . . . Select USE for the
most accurate indication
▶▶ Go to step 18
- ◆ Any main tank quantity decreases at a different
rate (an engine fuel leak is **confirmed**):
▶▶ Go to step 11

11 Thrust lever
(affected engine) . . . Confirm Idle

12 **If** conditions allow:

Run at idle for two minutes to allow the engine
to cool and stabilize.

13 FUEL CONTROL switch
(affected engine) . . . Confirm CUTOFF

14 Transponder mode selector TA ONLY

▼ Continued on next page ▼

▼ Fuel Leak Engine continued ▼

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

ENG SHUTDOWN

16 Choose one:

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

Select PROGRESS PAGE 2.

TOTALIZER Select USE

Use TOTALIZER to determine fuel remaining.

▶▶ **Go to step 17**

- ◆ FUEL DISAGREE - PROG 2 message is **not** shown on the CDU scratchpad:

▶▶ **Go to step 17**

17 After engine shutdown, all remaining fuel can be used for the operating engines. Resume normal fuel management.

18 Choose one:

- ◆ FUEL QTY LOW message is **not** shown:



- ◆ FUEL QTY LOW message is **shown**:

▶▶ **Go to step 19**

19 FUEL X FEED valve switches (all) On

▼ Continued on next page ▼

▼ Fuel Leak Engine continued ▼

- 20 Fuel pump switches
(all tanks that have fuel) ON
- 21 Plan to land at nearest suitable airport.
- 22 Avoid high nose up attitude and excessive
acceleration and deceleration.
- 23 Do **not** accomplish the following checklist:

FUEL QTY LOW



Additional Information

One or more of the following may be an indication of a fuel leak:

- Visual observation of fuel spray from strut or engine
- Excessive engine fuel flow
- Total fuel quantity decreasing at an abnormal rate
- FUEL DISAGREE message on CDU scratchpad
- INSUFFICIENT FUEL message on CDU scratchpad
- FUEL QTY LOW EICAS message
- FUEL IMBAL 1-4 EICAS message
- FUEL IMBAL 2-3 EICAS message
- FUEL IMBALANCE EICAS message

>FUEL LOW CTR L, R

Condition: One of these occurs:

- Before start, the center wing tank quantity is less than 17,000 pounds with the pump switches ON
- In climb, the center wing tank quantity is approximately 7,000 pounds with the pump switches ON
- In cruise, the center wing tank quantity is approximately 3,000 pounds with the pump switches ON



>FUEL OVD CTR L, R

Condition: The center wing tank pump switch is off and one of these occurs:

- On the ground, the center wing tank quantity is 17,000 pounds or more
- In cruise, the center wing tank quantity is 4,000 pounds or more



PRESS**FUEL OVRD 2, 3 AFT, FWD**

Condition: The pump pressure is low, or load shedding has occurred.

1 OVRD pump switch (affected pump) Off

2 Choose one:

◆ **A single** OVRD pump in tank 2 or 3 is inoperative:



◆ **Both** OVRD pumps in tank 2 **or both** OVRD pumps in tank 3 are inoperative:

▶▶ **Go to step 3**

3 OVRD 2 pump switches (both) Off

4 OVRD 3 pump switches (both) Off

5 MAIN 1 pump switches (both) Off

6 MAIN 4 pump switches (both) Off

7 **When** the FUEL TANK/ENG message shows:

MAIN 1 pump switches (both) ON

MAIN 4 pump switches (both) ON

FUEL X FEED 1 and 4 valve switches. Off



>FUEL PMP STB L

Condition: One of these occurs:

- On the ground, the pump switch is ON
- In cruise, the stabilizer tank quantity is 1,000 pounds or more with the pump switch off



>FUEL PMP STB R

Condition: One of these occurs:

- On the ground, the pump switch is ON
- In cruise, the stabilizer tank quantity is 1,000 pounds or more with the pump switch off



PRESS**FUEL PRES STB L, R**

Condition: The pump pressure is low.

1 Choose one:

- ◆ Stabilizer tank fuel quantity is **less than or equal to** 2000 pounds:



- ◆ Stabilizer tank fuel quantity is **greater than** 2000 pounds:

STAB pump switch
(affected pump) Off

▶▶ **Go to step 2**

2 Choose one:

- ◆ **Both** pumps are inoperative:

The remaining stab fuel is unusable.



- ◆ **A single** pump is inoperative:

Continue normal operation.



FUEL PRESS CTR L, R

- Condition: One of these occurs:
- The FUEL LOW CTR L, R message is shown for 60 seconds
 - The pump pressure is low

1 CTR pump switch
(affected pump) Off

Override pumps 2 and 3 are commanded on by the center wing tank pump failure. Override pumps 2 and 3 return to armed after approximately five minutes.

2 Choose one:

◆ **Both** center wing tank override pumps are inoperative:



◆ **A single** center wing tank override pump is inoperative:

▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ FUEL PRESS CTR L, R continued ▼

3 Choose one:

- ◆ Center wing tank quantity is **less than or equal to 3,000 pounds in *crui*se**:

Resume normal fuel management.



- ◆ Center wing tank quantity is **less than or equal to 7,000 pounds in *climb***:

Resume normal fuel management.



- ◆ Center wing tank quantity is **greater than 3,000 pounds in *crui*se or 7,000 pounds in *climb***:

▶▶ **Go to step 4**

4 MAIN 1 pump switches (both) Off

5 MAIN 4 pump switches (both) Off

6 **When** the FUEL LOW CTR message shows for the operable pump:

MAIN 1 pump switches (both) ON

MAIN 4 pump switches (both) ON

CTR pump switch

(operable pump) Off

▼ Continued on next page ▼

▼FUEL PRESS CTR L, R continued▼

- 7 **If** the FUEL OVD CTR message shows in cruise:
- CTR pump switch (operable pump) ON
 - MAIN 1 pump switches (both) Off
 - MAIN 4 pump switches (both) Off
- When** the FUEL LOW CTR message shows:
- MAIN 1 pump switches (both) ON
 - MAIN 4 pump switches (both) ON
 - CTR pump switch (operable pump) Off
- 8 Resume normal fuel management.
- ■ ■ ■

FUEL PRESS ENG 1, 2, 3, 4

Condition: An engine is on suction feed.

Objective: To open the crossfeed valves to ensure fuel flow. To reconfigure if both pumps are failed in tank 1 or 4.

- 1 FUEL X FEED valve switches (all) On
- 2 MAIN pump switches (related tank) ON
- 3 Choose one:

◆ **Both** main pumps in **tank 2** are inoperative:

OVRD 2 pump switches (both) ON

The last 7,000 pounds of fuel in the affected tank is available only by suction feed.



◆ **Both** main pumps in **tank 3** are inoperative:

OVRD 3 pump switches (both) ON

The last 7,000 pounds of fuel in the affected tank is available only by suction feed.



◆ **Both** main pumps in **tank 1 or both** main pumps in **tank 4** are inoperative:

▶▶ **Go to step 4**

- 4 OVRD 2 pump switches (both) ON
- 5 OVRD 3 pump switches (both) ON

▼ Continued on next page ▼

▼ **FUEL PRESS ENG 1, 2, 3, 4 continued** ▼

- 6 The last 7,000 pounds of fuel in the affected tank are available only by suction feed.
- 7 Do **not** accomplish the fuel tank-to-engine normal procedure.
- 8 **When** the FUEL TANK/ENG message shows:

FUEL XFER MAIN 1 & 4 switch ON
This allows gravity transfer of fuel to main tanks 2 and 3.

- 9 **When** the FUEL OVRD 2 and 3, AFT and FWD messages show:
OVRD 2 pump switches (both) Off
OVRD 3 pump switches (both) Off
FUEL X FEED 1 and 4 valve switches Off
Fuel in the affected tank (1 or 4) is available only by suction feed. The unaffected tanks operate normally.

- 10 Do **not** accomplish the following checklist:
FUEL XFER 1+4

- 11 Do **not reaccomplish** the following checklist:
FUEL PRESS ENG


PRESS**FUEL PUMP 1, 4 AFT, FWD**

Condition: The pump pressure is low.

1 Choose one:

◆ Tank quantity is **low and** the airplane is in a **high nose up** attitude:

When pitch attitude is reduced:

▶▶ Go to step 2

◆ Tank quantity is **not** low **or** the airplane is **not** in a high nose up attitude:

▶▶ Go to step 3

2 Choose one:

◆ FUEL PUMP message **blanks**:



◆ FUEL PUMP message **stays shown**:

▶▶ Go to step 3

3 MAIN pump switch (affected pump) Off

4 Choose one:

◆ **At least one** main pump in tank 1 **and at least one** main pump in tank 4 are **operative**:



◆ **Both** main pumps in tank 1 **or both** main pumps in tank 4 are **inoperative**:

▶▶ Go to step 5

▼ Continued on next page ▼

▼ **FUEL PUMP 1, 4 AFT, FWD continued** ▼

- 5 The last 7,000 pounds of fuel in the affected tank are available only by suction feed.
- 6 Do **not** accomplish the fuel tank-to-engine normal procedure.
- 7 **When** the FUEL TANK/ENG message shows:

FUEL XFER MAIN 1 & 4 switch ON

This allows gravity transfer of fuel to main tanks 2 and 3.
- 8 **When** the FUEL OVRD 2 and 3, AFT and FWD messages show:

OVRD 2 pump switches (both) Off

OVRD 3 pump switches (both) Off

FUEL X FEED 1 and 4 valve switches Off

Fuel in the affected tank (1 or 4) is available only by suction feed. The unaffected tank pumps operate normally.
- 9 Do **not** accomplish the following checklists:

FUEL PRESS ENG

FUEL XFER 1+4



PRESS**FUEL PUMP 2, 3 AFT, FWD**

Condition: The pump pressure is low, or load shedding has occurred.

1 Choose one:

- ◆ Tank quantity is **low and** the airplane is in a **high nose up** attitude:

When pitch attitude is reduced:

▶▶ **Go to step 2**

- ◆ Tank quantity is **not** low **or** the airplane is **not** in a high nose up attitude:

▶▶ **Go to step 3**

2 Choose one:

- ◆ FUEL PUMP message **blanks**:



- ◆ FUEL PUMP message **stays shown**:

▶▶ **Go to step 3**

▼ Continued on next page ▼

▼ **FUEL PUMP 2, 3 AFT, FWD continued** ▼

3 MAIN pump switch (affected pump) Off

4 Choose one:

◆ **At least one** main pump in tank 2 **and at least one** main pump in tank 3 are **operative**:



◆ **Both** main pumps in tank 2 **or both** main pumps in tank 3 are **inoperative**:

►► **Go to step 5**

5 OVRD 2 pump switches (both) ON

6 OVRD 3 pump switches (both) ON

7 The last 7,000 pounds of fuel in the affected tank are available only by suction feed.

8 Do **not** accomplish the fuel tank-to-engine normal procedure.

9 **When** the FUEL TANK/ENG message shows:
FUEL X FEED 1 and 4 valve switches Off

▼ **Continued on next page** ▼

▼ FUEL PUMP 2, 3 AFT, FWD continued ▼

10 **When** the FUEL OVRD 2 and 3, AFT and FWD messages show:

OVRD 2 pump switches (both) Off

OVRD 3 pump switches (both) Off

FUEL X FEED valve switch
(affected tank) Off

This prevents fuel imbalance and fuel starvation.

Fuel in main tanks 2 and 3 is at standpipe level, 7,000 pounds.

Do **not** accomplish the following checklist:

FUEL PRESS ENG



FUEL QTY LOW

Condition: Fuel quantity is 2,000 pounds or less in one or more main tanks.

Objective: To decide if a fuel leak is suspected. To ensure that all fuel is available for use if a fuel leak is not suspected.

- 1 Avoid high nose up attitude. Make thrust changes slowly and smoothly. This reduces the possibility of uncovering fuel pumps.
- 2 The FUEL QTY LOW message may be caused by an engine fuel leak or low fuel.
- 3 A fuel leak should be suspected if one or more of the following are true:

Total total fuel remaining on EICAS is less than the planned fuel remaining.

An engine has excessive fuel flow.

One main tank is abnormally low compared to the other main tanks and to the expected fuel remaining in the tanks.

On PROGRESS page 2, the totalizer is less than the calculated fuel.

The TOTALIZER fuel is the sum of the individual tank quantities.

The CALCULATED fuel is the totalizer value at engine start minus fuel used.

Fuel used is calculated using the engine fuel flow sensors.

▼ Continued on next page ▼

▼ FUEL QTY LOW continued ▼

4 Choose one:

◆ There is an **indication** of an engine fuel leak:

▶▶ **Go to the Fuel Leak Engine
checklist on page 12.10**



◆ There is **no** indication of an engine fuel leak:

▶▶ **Go to step 5**

5 FUEL X FEED valve switches (all) On

6 Fuel pump switches (all tanks that have fuel) . ON

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

FUEL TANK/ENG

8 Choose one:

◆ FUEL STAB XFR message is **not** shown:

▶▶ **Go to step 9**

◆ FUEL STAB XFR message is **shown**:

Do not turn on the center or stabilizer tank pump switches.

OVRD 2 pump switches (both) ON

OVRD 3 pump switches (both) ON

Plan to land before tank 2 or 3 reaches 35,000 pounds to maintain CG within limits.



▼ Continued on next page ▼

▼ FUEL QTY LOW continued ▼

- 9 Plan to land at the nearest suitable airport.
- 10 Avoid high nose up attitude and excessive acceleration and deceleration.



FUEL RES XFR 2, 3

Condition: The reserve transfer valve is not in the commanded position.

1 Fuel in the affected tank is not available if the quantity does not decrease.

2 Choose one:

◆ Reserve tank fuel **decreases**:



◆ Reserve tank fuel does **not** decrease:

Reduce maximum operating speed to 325
KIAS or 0.92 Mach.



FUEL STAB XFR

Condition: The stabilizer tank fuel transfer function is failed.

- 1 STAB pump switches (both) ON
- 2 Choose one:
 - ◆ FUEL STAB XFR message **blanks**:
Continue normal operation.

 - ◆ FUEL STAB XFR message **stays shown**:
▶▶ Go to step 3
- 3 CTR pump switches (both) Off
- 4 FUEL X FEED 1 and 4 valve switches Off
- 5 OVRD 2 pump switches (both) Off
- 6 OVRD 3 pump switches (both) Off
- 7 STAB pump switches (both) Off
- 8 Stabilizer and center wing fuel tanks are not available.

Warning! Do not jettison fuel.

- 9 Usable fuel is the total of:
 - All fuel in tanks 1 and 4, and
 - Fuel in tanks 2 and 3 down to 35,000 pounds remaining in each.

▼ Continued on next page ▼

▼ FUEL STAB XFR continued ▼

10 Plan to land before tank 2 or 3 reaches 35,000 pounds to maintain CG within limits.

11 **When** the FUEL QTY LOW message is shown:

FUEL X FEED 1 and 4 valve switches. On

OVRD 2 pump switches (both) ON

OVRD 3 pump switches (both) ON

Land before tank 2 or 3 reaches 35,000 pounds to maintain CG within limits.

Do **not** accomplish the following checklist:

FUEL QTY LOW



>FUEL TANK/ENG

Condition: One of these occurs with crossfeed valve 1 or 4 open:

- Main tank 2 quantity is equal to or less than main tank 1 quantity, or main tank 3 quantity is equal to or less than main tank 4 quantity
- On the ground after refueling, after initial electrical power established, or after CMC ground test; main tank 2 quantity less than or equal to main tank 1 quantity plus 1000 pounds and main tank 3 quantity less than or equal to main tank 4 quantity plus 1000 pounds



FUEL TEMP LOW

Condition: Fuel temperature is near the minimum.

1 Choose one:

- ◆ Fuel temperature is **not** approaching the fuel temperature limit (3°C above the fuel freeze point) [AFM]:

Check the fuel temperature regularly. Do this checklist if the fuel temperature approaches the fuel temperature limit (3°C above the fuel freeze point). [AFM]



- ◆ Fuel temperature is **approaching** the fuel temperature limit (3°C above the fuel freeze point) [AFM]:

►► **Go to step 2**

- 2 Increase airspeed, or change altitude, or deviate to a warmer air mass, or all three, to achieve a TAT equal to or higher than the fuel temperature limit.
- 3 TAT will increase approximately 0.5 to 0.7 degrees C for each .01 Mach increase in speed.
- 4 In extreme conditions, it may be necessary to descend to as low as FL250.



FUEL TEMP SYS

Condition: The fuel temperature indication is failed.

- 1 Use total air temperature as the indication of fuel temperature.



FUEL X FEED 1, 4

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

- 1 Choose one:

◆ FUEL TANK/ENG message is **not** shown:



◆ FUEL TANK/ENG message is **shown**:

▶▶ **Go to step 2**

- 2 FUEL X FEED 2 and 3 valve switches Off
This maintains tank-to-engine fuel flow.

- 3 FUEL X FEED 1 or 4 valve
switch (unaffected side) On

- 4 The FUEL X FEED 1, 4 and the FUEL TANK/ENG
messages stay shown.

- 5 Do **not** accomplish the following checklist:
X FEED CONFIG

- 6 **If** the FUEL IMBALANCE message shows:
FUEL X FEED 2 and 3 valve switches On

▼ Continued on next page ▼

▼FUEL X FEED 1, 4 continued▼

- MAIN 1 pump switches (both) Off
- MAIN 4 pump switches (both) Off
- Do **not** accomplish the following checklist:
FUEL PUMP 1, 4 AFT, FWD

- 7 **When** the FUEL IMBALANCE message blanks:
 - MAIN 1 pump switches (both) ON
 - MAIN 4 pump switches (both) ON
 - FUEL X FEED 2 and 3 valve switches. Off

Note: Steps 6 and 7 may be repeated.



FUEL X FEED 2, 3

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

- 1 FUEL X FEED 2 and 3 valve switches. Off

This puts tanks 2 and 3 into a tank-to-engine configuration. This prevents a lateral imbalance.

The center wing tank supplies fuel to engines 1 and 4 only.

- 2 Choose one:

◆ Center wing tank does **not** contain fuel:

▶▶ **Go to step 4**

◆ Center wing tank **contains** fuel:

The last 3,000 pounds of fuel in the center wing tank may not be available. Verify the remaining fuel is sufficient.

▶▶ **Go to step 3**

- 3 **When** the FUEL TANK/ENG message is shown:

Wait until both of the following occur:

FUEL LOW CTR L or R message is shown

Center wing tank quantity is less than 3,000 pounds

Then do the tank-to-engine procedure.

▶▶ **Go to step 4**

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

X FEED CONFIG



>FUEL XFER 1+4

Condition: The fuel transfer main 1 & 4 switch is on and one of these occurs:

- The airplane is on the ground
- In flight, the inboard main tank quantities are more than the outboard main tank quantities

**>JETT NOZ ON**

Condition: Both jettison nozzle valves are open.

**>JETT NOZ ON L, R**

Condition: A jettison nozzle valve is open.

**VALVE****>JETT NOZZLE L, R**

Condition: The fuel jettison nozzle valve position disagrees with the commanded position.



>SCAV PUMP ON

6301 - 6310

Condition: On the ground, the center wing tank scavenge pump operates.



>X FEED CONFIG

Condition: A fuel crossfeed valve is not in the correct position.



Intentionally
Blank

Non-Normal Checklists
Hydraulics

Chapter NNC
Section 13

Table of Contents

HYD CONTROL 1, 4	13.1
HYD OVHT SYS 1, 2, 3, 4	13.2
HYD PRESS DEM 1, 2, 3, 4	13.14
HYD PRESS ENG 1, 2, 3, 4.....	13.14
HYD PRESS SYS 1, 2, 3, 4	13.15
>HYD QTY HALF 1, 2, 3, 4.....	13.25
>HYD QTY LOW 1	13.26
>HYD QTY LOW 2, 3.....	13.28
>HYD QTY LOW 4	13.29

Table of Contents

Intentionally
Blank

HYD CONTROL 1, 4

Condition: The hydraulic control system is inoperative.

Objective: To ensure hydraulic system pressure during high demand.

- 1 DEMAND PUMP selector (affected system). . . . ON
- 2 Affected system indications may be inoperative.



**SYS
FAULT**

HYD OVHT SYS 1, 2, 3, 4

Condition: The system temperature is high.

Objective: To cool the system and, if the overheat persists, to configure for landing.

- 1 Choose one:
- ◆ HYD OVHT SYS **1** message is shown:
Use the L or R autopilot.
▶▶ **Go to step 2**
 - ◆ HYD OVHT SYS **2** message is shown:
Use the C or L autopilot.
▶▶ **Go to step 2**
 - ◆ HYD OVHT SYS **3** message is shown:
Use the R or C autopilot.
▶▶ **Go to step 2**
 - ◆ HYD OVHT SYS **4** message is shown:
▶▶ **Go to step 2**

Cool down the system

- 2 ENGINE PUMP switch (affected system). Off
- 3 DEMAND PUMP selector (affected system) . . . OFF
- 4 **When** the HYD OVHT SYS message blanks:
DEMAND PUMP
selector (affected system) AUTO

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼

Do **not** accomplish the following checklist:

HYD PRESS ENG

5 Choose one:

◆ HYD OVHT SYS message **stays blank**:

Continue normal operation.



◆ HYD OVHT SYS message **shows again**:

▶▶ **Go to step 6**

Depressurize the system

6 DEMAND PUMP selector (affected system) . . . OFF

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

HYD PRESS SYS

8 Note degraded or inoperative system items below.

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼**System 1****Inoperative Items****Center autopilot inop**

Left and right autopilots are available.

Left outboard elevator inop

Pitch control is reduced.

Inboard trailing edge flap hydraulic operation inop

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Nose and body gear hydraulic extension and retraction inop

Alternate gear extension is needed.

Nose and body gear steering inop

A tow will be needed after landing.

System 1 alternate brake source inop

System 4 normal and system 2 alternate brake sources are available.

Thrust reverser engine 1

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼**System 2****Inoperative Items****Right autopilot inop**

Left and center autopilots are available.

Two outboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

System 2 hydraulic power to stabilizer trim inop

System 3 powers the trim at half rate.

System 2 alternate brake source inop

System 4 normal and system 1 alternate brake sources are available.

Thrust reverser engine 2

Use symmetrical thrust unless stopping distance is critical.

System 3**Inoperative Items****Left autopilot inop**

Center and right autopilots are available.

System 3 hydraulic power to stabilizer trim inop

System 2 powers the trim at half rate.

Two outboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

Thrust reverser engine 3

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼**System 4****Inoperative Items****Right outboard elevator inop**

Pitch control is reduced.

Outboard trailing edge flap hydraulic operation inop

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Two inboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

Wing gear hydraulic extension and retraction inop

Alternate gear extension is needed.

System 4 normal brake source inop

System 1 and system 2 alternate brake sources are available.

Autobrake inop

Manual braking is needed.

Thrust reverser engine 4

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼

9 Recall switch Push

10 Choose one:

◆ **Only one** HYD PRESS SYS message is shown:

▶▶ **Go to step 12**

◆ **More than one** HYD PRESS SYS message is shown:

Plan to land at the nearest suitable airport.

Use flaps 25 and VREF 25+15 for landing.
Enter the adjusted flaps 25 VREF speed on
the FMC APPROACH REF page.

Cross wind limit is 20 knots.

▶▶ **Go to step 11**

11 Do not use autoland.

12 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼HYD OVHT SYS 1, 2, 3, 4 continued▼

Deferred Items

Descent Checklist

- Altimeters ____, xckd C&F
- Minimums ____, ____, xckd C&F
- Landing data ____, ____ C&F
- or Flaps 25, VREF 25+15**____ C&F
- (with more than one system inoperative)**
- Approach briefing complete PM
- Autobrakes as reqd PM
- or OFF** PM
- (with system 4 inoperative)**
- Seatbelt signs. ON PM
- Recall ckd PM

Approach Checklist

- Flight & nav instruments verified C&F
- Cabin notification complete C
- Altimeters (trans lvl) ____, xckd C&F

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼

Choose one:

- ◆ Both Systems **1 and 4** are inoperative:
 - ▶▶ **Go to A) Both Systems 1 and 4 are inoperative**
- ◆ Both Systems **2 and 3** are inoperative:
 - ▶▶ **Go to B) Both Systems 2 and 3 are inoperative**
- ◆ Only System **2** is inoperative:
 - ▶▶ **Go to Landing Checklist**
- ◆ Only System **3** is inoperative:
 - ▶▶ **Go to Landing Checklist**
- ◆ All **other** system failure conditions:
 - ▶▶ **Go to C) All other system failure conditions**

A) Both Systems 1 and 4 are inoperative

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Do **not** accomplish the following checklist:

FLAPS PRIMARY

▼ Continued on next page ▼

▼HYD OVHT SYS 1, 2, 3, 4 continued▼

Alternate Gear Extension

Landing gear lever OFF

Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).



Action is not reversible

ALT GEAR EXTEND
WING switch. ALTN



Action is not reversible

ALTN GEAR EXTEND
NOSE/BODY switch ALTN

Reduction of speed to below .60 Mach may be necessary for the wing gear to lock down.

When all gear are down:

Landing gear lever DN

AUTOBRAKES selector OFF

The speedbrake lever does **not** extend past the flight detent until the nose gear is on the runway.

Extend the speedbrakes manually and slowly. Automatic extension of the outboard speedbrakes, without automatic extension of the inboard speedbrakes, causes the nose to pitch up.

Thrust reversers are only available after the nose gear is on the runway.

▶▶ **Go to Landing Checklist**

▼ Continued on next page ▼

▼ HYD OVHT SYS 1, 2, 3, 4 continued ▼

B) Both Systems 2 and 3 are inoperative

Stabilizer trim and elevator feel are inoperative.
Avoid abrupt elevator movement.

All autopilots are inoperative.

►► **Go to Landing Checklist**

C) All other system failure conditions

Trailing edge flaps move in secondary mode.
Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Do **not** accomplish the following checklist:

FLAPS PRIMARY

Alternate Gear Extension

Landing gear lever OFF

Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).

▼ Continued on next page ▼

▼HYD OVHT SYS 1, 2, 3, 4 continued▼

Action is not reversible

 ALT GEAR EXTEND
WING switch. ALTN

Action is not reversible

 ALTN GEAR EXTEND
NOSE/BODY switch ALTN

Reduction of speed to below .60 Mach may be necessary for the wing gear to lock down.

When all gear are down:
Landing gear lever DN

▼ Continued on next page ▼

▼HYD OVHT SYS 1, 2, 3, 4 continued▼

If system 4 is inoperative:

AUTOBRAKES selector OFF

Extend the speedbrakes manually and slowly.
Automatic extension of the outboard
speedbrakes, without automatic extension of
the inboard speedbrakes, causes the nose to
pitch up.

►► **Go to Landing Checklist**

Landing Checklist

Landing gear down C&F

Flaps _____, _____ C&F
or 25, 25 C&F

(with more than one system inoperative)

Speedbrake ARMED PM
or DOWN PM

(with system 4 inoperative)



PRESS

HYD PRESS DEM 1, 2, 3, 4

Condition: The pump pressure is low.

Objective: To restore pump operation, or avoid system contamination or pump damage.

- 1 DEMAND PUMP selector (affected system) ON
- 2 Choose one:

◆ HYD PRESS DEM message **blanks**:

Continue normal operation.

■ ■ ■ ■

◆ HYD PRESS DEM message **stays shown**:

▶▶ **Go to step 3**
- 3 DEMAND PUMP selector (affected system) . . . OFF

■ ■ ■ ■

PRESS

HYD PRESS ENG 1, 2, 3, 4

Condition: The pump pressure is low.

Objective: To avoid system contamination or pump damage.

- 1 ENGINE PUMP switch (affected system). Off

■ ■ ■ ■

HYD PRESS SYS 1, 2, 3, 4**PRESS****SYS
FAULT**

Condition: The hydraulic system pressure is low.

Objective: To restore system pressure, avoid further system damage, and configure for landing.

- 1 DEMAND PUMP selector (affected system) . . . ON
- 2 ENGINE PUMP switch (affected system) Off
- 3 Do **not** accomplish the following checklist:

HYD PRESS ENG

- 4 Choose one:

◆ HYD PRESS SYS message **blanks**:

Continue normal operation.



◆ HYD PRESS SYS message **stays shown**:

►► **Go to step 5**

- 5 DEMAND PUMP selector (affected system) . . . OFF
- 6 Note degraded or inoperative system items below.

▼ Continued on next page ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼**System 1****Inoperative Items****Center autopilot inop**

Left and right autopilots are available.

Left outboard elevator inop

Pitch control is reduced.

Inboard trailing edge flap hydraulic operation inop

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Nose and body gear hydraulic extension and retraction inop

Alternate gear extension is needed.

Nose and body gear steering inop

A tow will be needed after landing.

System 1 alternate brake source inop

System 4 normal and system 2 alternate brake sources are available.

Thrust reverser engine 1

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼**System 2****Inoperative Items****Right autopilot inop**

Left and center autopilots are available.

Two outboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

System 2 hydraulic power to stabilizer trim inop

System 3 powers the trim at half rate.

System 2 alternate brake source inop

System 4 normal and system 1 alternate brake sources are available.

Thrust reverser engine 2

Use symmetrical thrust unless stopping distance is critical.

System 3**Inoperative Items****Left autopilot inop**

Center and right autopilots are available.

System 3 hydraulic power to stabilizer trim inop

System 2 powers the trim at half rate.

Two outboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

Thrust reverser engine 3

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼**System 4****Inoperative Items****Right outboard elevator inop**

Pitch control is reduced.

Outboard trailing edge flap hydraulic operation inop

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Two inboard spoiler panels on each wing inop

Roll rate and spoiler capability are reduced.

Wing gear hydraulic extension and retraction inop

Alternate gear extension is needed.

System 4 normal brake source inop

System 1 and system 2 alternate brake sources are available.

Autobrake inop

Manual braking is needed.

Thrust reverser engine 4

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼

7 Recall switch Push

8 Choose one:

◆ **Only one** HYD PRESS SYS message is shown:

▶▶ **Go to step 9**

◆ **More than one** HYD PRESS SYS message is shown:

Plan to land at the nearest suitable airport.

Use flaps 25 and VREF 25+15 for landing.
Enter the adjusted flaps 25 VREF speed on
the FMC APPROACH REF page.

Cross wind limit is 20 knots.

▶▶ **Go to step 9**

9 Do not use autoland.

10 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **HYD PRESS SYS 1, 2, 3, 4 continued** ▼

Deferred Items

Descent Checklist

- Altimeters ____, xckd C&F
- Minimums ____, ____, xckd C&F
- Landing data ____, ____ C&F
or Flaps 25/VREF 25+15 C&F
(with more than one system inoperative)
- Approach briefing complete PM
- Autobrakes as reqd PM
or OFF PM
(with system 4 inoperative)
- Seatbelt signs. ON PM
- Recall ckd PM

Approach Checklist

- Flight & nav instruments verified C&F
- Cabin notification complete C
- Altimeters (trans lvl) ____, xckd C&F

▼ **Continued on next page** ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼

Choose one:

- ◆ Both Systems **1 and 4** are inoperative:
 - ▶▶ **Go to A) Both Systems 1 and 4 are inoperative**
- ◆ Both Systems **2 and 3** are inoperative:
 - ▶▶ **Go to B) Both Systems 2 and 3 are inoperative**
- ◆ Only System **2** is inoperative:
 - ▶▶ **Go to Landing Checklist**
- ◆ Only System **3** is inoperative:
 - ▶▶ **Go to Landing Checklist**
- ◆ All **other** system failure conditions:
 - ▶▶ **Go to C) All other system failure conditions**

A) Both Systems 1 and 4 are inoperative

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Do **not** accomplish the following checklist:

FLAPS PRIMARY

▼ Continued on next page ▼

▼ **HYD PRESS SYS 1, 2, 3, 4 continued** ▼

Alternate Gear Extension

Landing gear lever OFF

Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).

 Action is not reversible

ALT GEAR EXTEND
WING switch. ALTN

 Action is not reversible

ALTN GEAR EXTEND
NOSE/BODY switch ALTN

Reduction of speed to below .60 Mach may be necessary for the wing gear to lock down.

When all gear are down:

Landing gear lever DN
AUTOBRAKES selector. OFF

The speedbrake lever does **not** extend past the flight detent until the nose gear is on the runway.

Extend the speedbrakes manually and slowly. Automatic extension of the outboard speedbrakes, without automatic extension of the inboard speedbrakes, causes the nose to pitch up.

Thrust reversers are only available after the nose gear is on the runway.

►► **Go to Landing Checklist**

▼ **Continued on next page** ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼

B) Both Systems 2 and 3 are inoperative

Stabilizer trim and elevator feel are inoperative.
Avoid abrupt elevator movement.

All autopilots are inoperative.

►► **Go to Landing Checklist**

C) All other system failure conditions

Trailing edge flaps move in secondary mode.
Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Do **not** accomplish the following checklist:

FLAPS PRIMARY

Alternate Gear Extension

Landing gear lever OFF

Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).

▼ Continued on next page ▼

▼ **HYD PRESS SYS 1, 2, 3, 4 continued** ▼

Action is not reversible

 ALT GEAR EXTEND
WING switch. ALTN

Action is not reversible

 ALTN GEAR EXTEND
NOSE/BODY switch ALTN

Reduction of speed to below .60 Mach may be necessary for the wing gear to lock down.

When all gear are down:
Landing gear lever DN

▼ **Continued on next page** ▼

▼ HYD PRESS SYS 1, 2, 3, 4 continued ▼

If system 4 is inoperative:

AUTOBRAKES selector OFF

Extend the speedbrakes manually and slowly.
Automatic extension of the outboard
speedbrakes, without automatic extension of
the inboard speedbrakes, causes the nose to
pitch up.

►► **Go to Landing Checklist**

Landing Checklist

Landing gear down C&F

Flaps _____, _____ C&F
or **25, 25** C&F

(with more than one system inoperative)

Speedbrake ARMED PM
or **DOWN** PM

(with system 4 inoperative)



>HYD QTY HALF 1, 2, 3, 4

Condition: Hydraulic quantity 1/2 normal service level.



**SYS
FAULT**

>HYD QTY LOW 1

Condition: The hydraulic quantity is low.

Objective: If needed, to reconfigure to preclude a progressive loss of systems.

- 1 Choose one:

◆HYD PRESS SYS 4 is **not** shown:

Continue normal operation.

■ ■ ■ ■

◆HYD PRESS SYS 4 is **shown**:

▶▶Go to step 2
- 2 **If** C autopilot is engaged:

Autopilot disengage switch Push

L and R autopilots are available.
- 3 ENGINE PUMP 1 switch Off
- 4 DEMAND PUMP 1 selector OFF
- 5 Plan to land at the nearest suitable airport.
- 6 Do **not** accomplish the following checklists:

HYD PRESS ENG 1

HYD PRESS SYS 1

▼ Continued on next page ▼

▼ HYD QTY LOW 1 continued ▼

Inoperative Items

Left outboard elevator inop

Pitch control is reduced until hydraulic system 1 is repressurized just before extending flaps or landing gear.

7 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	OFF	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼HYD QTY LOW 1 continued▼

Approach Checklist

- Flight & nav instruments verifiedC&F
- Cabin notification completeC
- Altimeters (trans lvl) ____, xckdC&F

Just before extending the flaps or landing gear for approach:

- ENGINE PUMP 1 switch ON
- DEMAND PUMP 1 selector. AUTO

If hydraulic fluid is lost from system 1 after hydraulic fluid is lost from system 4, the loss is likely through the brake system. Hydraulic fluid may subsequently be lost from system 2.

Landing Checklist

- Landing gear downC&F
- Flaps ____, ____C&F
- Speedbrake DOWNPM



SYS
FAULT

>HYD QTY LOW 2, 3

Condition: The hydraulic quantity is low.



**SYS
FAULT**

>HYD QTY LOW 4

Condition: The hydraulic quantity is low.

Objective: If needed, reconfigure to preclude a progressive loss of systems.

1 Choose one:

◆ HYD PRESS SYS 4 message is **shown**:

▶▶ **Go to the HYD PRESS SYS 1, 2, 3, 4
checklist on page 13.15**



◆ HYD PRESS SYS 4 message is **not** shown and
less than one hour from landing:

Continue normal operation.



◆ HYD PRESS SYS 4 message is **not** shown and **one
hour or more** from landing:

▶▶ **Go to step 2**

2 ENGINE PUMP 4 switch Off

3 DEMAND PUMP 4 selector OFF

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

HYD PRESS ENG 4

HYD PRESS SYS 4

▼ Continued on next page ▼

▼HYD QTY LOW 4 continued▼

Inoperative Items

- Two inboard spoiler panels on each wing inop**
Roll rate and spoiler capability are reduced until hydraulic system 4 is repressurized before extending flaps or landing gear.
- Right outboard elevator inop**
Pitch control is reduced until hydraulic system 4 is repressurized before extending flaps or landing gear.

5 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____, ____, xckd	C&F
■Landing data	____, ____	C&F
■Approach briefing	complete	PM
■Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ HYD QTY LOW 4 continued ▼

Just before extending the flaps or landing gear for approach:

ENGINE PUMP 4 switch ON

DEMAND PUMP 4 selector AUTO

Autobrake ____

Landing Checklist

Landing gear down C&F

Flaps ____, ____ C&F

Speedbrake ARMED PM



Intentionally
Blank

Non-Normal Checklists

Chapter NNC

Landing Gear

Section 14

Table of Contents

AIR/GND SYSTEM.....	14.1
ANTISKID	14.3
ANTISKID OFF	14.5
AUTOBRAKES	14.7
>BODY GEAR STRG	14.9
BRAKE LIMITER	14.9
>BRAKE SOURCE	14.9
BRAKE TEMP.....	14.10
GEAR DISAGREE or Gear Lever Jammed In Off Position	14.11
GEAR DOOR	14.19
GEAR DOOR	14.21
Gear Lever Jammed In Up Position	14.22
Gear Lever Will Not Move Up	14.28
GEAR TILT	14.29
Nose and Body Gear Up	14.30
Tire Failure(s).....	14.36
>TIRE PRESSURE.....	14.37

Table of Contents

Intentionally
Blank

AIR/GND SYSTEM

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

Objective: To provide information about the thrust reversers, autobrake, and speedbrakes for landing.

- 1 The thrust reversers are inoperative.
- 2 Auto speedbrake deployment is inoperative.
- 3 When deployed manually, spoiler position is limited to FLIGHT DETENT.
- 4 The autobrake system is inoperative.
- 5 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ AIR/GND SYSTEM continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	OFF	PM
Seatbelt signs	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	DOWN	PM



ANTISKID

Condition: An antiskid system fault occurs.

1 Braking effectiveness may be reduced.

Note: The autobrake system is inoperative. Use minimum braking consistent with the runway conditions to reduce the possibility of a tire blowout.

2 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____, ____, xckd	C&F
■Landing data	____, ____	C&F
■Approach briefing	complete	PM
■Autobrakes	OFF	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ANTISKID continued▼

Approach Checklist

■Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	ARMED	PM



ANTISKID OFF

Condition: One or more of these occur:

- The parking brake valve is not fully open
- The antiskid system power is off

1 Use brakes with caution. Braking effectiveness is reduced.

Note: The autobrake system is inoperative. Use minimum braking consistent with the runway conditions to reduce the possibility of a tire blowout.

2 **Checklist Complete Except Deferred Items**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■Minimums	____, ____, xckd	C&F
■Landing data	____, ____	C&F
■Approach briefing	complete	PM
■Autobrakes	OFF	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

▼ Continued on next page ▼

▼ ANTISKID OFF continued ▼

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	ARMED	PM



AUTOBRAKES

Condition: One of these occurs:

- The autobrake system is failed or disarmed
- The autobrake selector is off but the autobrake system stays armed
- RTO is initiated above 85 knots and the autobrake has not been applied

1 AUTOBRAKES selector. OFF, then
as needed

2 Choose one:

◆ AUTOBRAKES message **blanks**:



◆ AUTOBRAKES message **stays shown**:

AUTOBRAKES selector OFF

▶▶ **Go to step 3**

3 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ AUTOBRAKES continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	OFF	PM
Seatbelt signs	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	ARMED	PM



>BODY GEAR STRG

Condition: One or more of these occur:

- Body landing gear steering does not lock
- Body landing gear steering pressure is on when commanded off



BRAKE LIMITER

Condition: One or more of these occur:

- More than one brake torque limiter is failed on a single gear
- The parking brake valve is not fully open

- 1 Brake with caution. Heavy braking could exceed the brake torque limit.



>BRAKE SOURCE

Condition: Normal and alternate brake system pressures are low.



BRAKE TEMP

Condition: One or more brake temperatures are high.

Objective: To allow the brakes to cool.

1 Choose one:

◆ In **flight**:

When extending or retracting the landing gear, do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).

Landing gear lever DOWN

This allows cooling air to flow around the brakes.

When the BRAKE TEMP message blanks:

Wait 8 minutes. This ensures sufficient cooling time.

Landing gear lever. . . . UP, then OFF

Confirm the landing gear is retracted.

Landing gear lever. OFF



◆ On the **ground**:

▶▶ **Go to step 2**

2 Refer to the Brake Cooling Schedule in the ODM for the required cooling time.

3 Minimum cooling time is 70 minutes.



**GEAR DISAGREE
or
Gear Lever Jammed In Off Position**

Condition: One or more of these occur:

- The gear position disagrees with the landing gear lever position
- The landing gear lever is jammed in the OFF position

Objective: To extend the gear using alternate gear extension, or land on the available gear.

▼ Continued on next page ▼

**▼ GEAR DISAGREE or Gear Lever Jammed In Off Position
continued ▼**

1 Choose one:

◆ Landing gear lever **UP**:

Do not exceed the gear EXTEND limit speed (270K/.82M).

Do not use FMC fuel predictions with gear extended. Refer to Gear Down performance tables in the ODM for flight planning.



◆ Landing gear lever **DN and all gear down**:

GND PROX GEAR OVRD switch OVRD

Do a normal landing.



◆ Landing gear lever **DN and any gear not down**:

Do not exceed the gear EXTEND limit speed (270K/.82M).

Landing gear lever UP

Wait 30 seconds.

▶▶ **Go to step 4**

◆ Landing gear lever **jammed OFF**:

▶▶ **Go to step 4**

◆ Landing gear lever **will not move UP**:

▶▶ **Go to step 2**

▼ Continued on next page ▼

**▼ GEAR DISAGREE or Gear Lever Jammed In Off Position
continued ▼**

2 Choose one:

◆ **GEAR TILT or BODY GEAR STRG** message is **shown**:

Do not exceed the gear extended limit speed (320K/.82M).

Landing gear lever DN

Do not retract the landing gear.

Do not use FMC fuel predictions with the gear extended.

▶▶ Go to step 3

◆ **GEAR TILT and BODY GEAR STRG** messages are **not** shown:

Landing gear lever

LOCK OVRD switch Push and hold

Landing gear lever UP, then OFF

▶▶ Go to step 3

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

Gear Lever Will Not Move Up



4 Landing gear lever OFF

5 Do not exceed the gear EXTEND limit speed (270K/.82M).

6 ALTN GEAR EXTEND WING switch. ALTN

▼ Continued on next page ▼

**▼ GEAR DISAGREE or Gear Lever Jammed In Off Position
continued ▼**

7 ALTN GEAR EXTEND NOSE/BODY switch . . . ALTN

8 Reduction of speed to below .60 Mach may be necessary for the wing gear to lock down.

9 **Wait** 90 seconds.

10 Choose one:

◆ All gear indicate **DN**:

Landing gear lever (if possible) . . . DN

If landing gear lever OFF:

GND PROX

GEAR OVRD switch OVRD

Nose and body gear steering are not available.

Do a normal landing.



◆ Nose and both body gear indicate **UP**:

**▶▶ Go to the Nose and Body Gear Up
checklist on page 14.30**



◆ All other combinations of **partial gear extension**:

▶▶ Go to step 11

11 Landing gear lever (if possible) DN

12 GND PROX GEAR OVRD switch OVRD

▼ Continued on next page ▼

**▼ GEAR DISAGREE or Gear Lever Jammed In Off Position
continued ▼**

13 Land on available gear.

14 Do not arm the speedbrakes.

Caution! If any wing or body gear is not extended, deployment of the thrust reversers may affect directional control.

Caution! If the nose gear is not extended, do not deploy the thrust reversers until the nose contacts the runway.

Caution! Delay extending the speedbrakes until the nose and both sides of the airplane have touched down.

Caution! If any wing gear is not extended, use aileron control to keep the wings level during the rollout until the airplane comes to a complete stop.

Caution! If any wing or body gear is not extended, braking effectiveness is reduced.

Caution! If any wing or body gear is not extended, do not attempt to taxi the airplane or use the tiller.

▼ Continued on next page ▼

▼ **GEAR DISAGREE or Gear Lever Jammed In Off Position**
continued ▼

Caution! If both body gear are not extended, the airplane may tip tail down on the ground. Door 1 escape slides are then unusable.

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

CONFIG GEAR

16 **Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

**▼ GEAR DISAGREE or Gear Lever Jammed In Off Position
continued ▼**

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

Landing Checklist

Landing gear	down	C&F
Flaps	____, ____	C&F
Speedbrake	DOWN	PM



Intentionally
Blank

GEAR DOOR

6301 - 6310

Condition: One or more gear doors are not closed.

Objective: To attempt to close the gear door.

1 Do **not** exceed gear EXTEND limit speed (270 KIAS/.82 Mach).

2 Choose one:

◆ Landing gear lever is **DN**:

Reduction of speed to below .70 Mach may be necessary for the nose gear doors to close with the nose gear extended.



◆ Landing gear lever is **OFF**:

Landing gear lever UP

▶▶ **Go to step 3**

Landing gear lever is **UP**:

▶▶ **Go to step 4**

3 Choose one:

◆ GEAR DOOR message **blanks**:



◆ GEAR DOOR message **stays shown**:

▶▶ **Go to step 4**

4 Landing gear lever DN

▼ Continued on next page ▼

▼ **GEAR DOOR continued** ▼

- 5 ALTN GEAR EXTEND switches (both) ALTN
The GEAR DOOR message is inhibited.

- 6 Do **not** accomplish the following checklist:
GEAR DISAGREE

- 7 **After** a minimum of 90 seconds:
ALTN GEAR EXTEND switches (both) Off
Landing gear lever UP

■ ■ ■ ■

GEAR DOOR

6311 - 6316

Condition: One or more gear doors are not closed.

Objective: To attempt to close the gear door.

- 1 Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).
- 2 Choose one:

◆ Landing gear lever is **DN**:

Reduction of speed to below .70 Mach may be necessary for the nose gear doors to close with the nose gear extended.



◆ Landing gear lever is **OFF**:

Landing gear lever UP



Gear Lever Jammed In Up Position

Condition: The landing gear lever is jammed in the UP position.

Objective: If there is enough time and fuel available, to depressurize hydraulic system 1 and allow the nose and body gear to extend.

1 Check the total fuel quantity.

Alternate nose and body gear extension may take up to 15 minutes.

Do **not** accomplish this checklist unless there is sufficient fuel to extend the gear and then complete an approach, with sufficient reserves.

Land with gear up or land with available gear if fuel is not sufficient.

Note: Do not use FMC fuel prediction with gear extended

2 Checklist Complete Except Deferred Items

▼ Continued on next page ▼

▼ GEAR Lever Jammed in Up Position continued ▼

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs.	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ Continued on next page ▼

▼ GEAR Lever Jammed in Up Position continued ▼

Depressurize hydraulic system 1

If C autopilot is engaged:

Autopilot disengage switch Push
L and R autopilots are available.

Hydraulic DEMAND PUMP 1 selector. OFF
Hydraulic ENGINE PUMP 1 switch Off

Do **not** accomplish the following checklist:

HYD PRESS SYS 1

Alternate gear extension

Do **not** exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).
ALTN NOSE/BODY GEAR
EXTEND switch ALTN

Note: If fuel becomes critical while doing this checklist, vigorous cycling of the control wheel helps depressurize the landing gear hydraulic lines, significantly reducing the alternate extension time. (During flight test, 80 cycles of +/-4 units of aileron reduced the depressurization time to 90 seconds.)

▼ Continued on next page ▼

▼ GEAR Lever Jammed in Up Position continued ▼

Inoperative Items

Left outboard elevator inop

Pitch control is reduced.

Inboard trailing edge flap hydraulic operation inop

Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Nose and body gear hydraulic extension and retraction inop

Alternate gear extension is needed.

Nose and body gear steering inop

A tow will be needed after landing.

System 1 alternate brake source inop

System 4 normal and system 2 alternate brake sources are available.

Automatic ground spoilers inop

Manual extension available.

Thrust reverser engine 1

Use symmetrical thrust unless stopping distance is critical.

▼ Continued on next page ▼

▼ **GEAR Lever Jammed in Up Position continued** ▼

GND PROX GEAR OVRD switch OVRD
Land on available gear.

Do **not** accomplish the following checklist:

CONFIG GEAR

Caution! Do not repressurize hydraulic system 1 in flight or on the ground as the gear will retract.

Caution! Deployment of the thrust reversers may affect directional control.

Caution! Delay extending the speedbrakes until the nose and both sides of the airplane have touched down.

Caution! Use aileron control to keep the wings level during the rollout until the airplane comes to a complete stop.

Caution! Braking effectiveness will be reduced.

Caution! Do not attempt to taxi the airplane or use the tiller.

Caution! Pin the landing gear after stopping.

▼ **Continued on next page** ▼

▼ GEAR Lever Jammed in Up Position continued ▼

Do **not** accomplish the following checklists:

FLAPS PRIMARY

GEAR DISAGREE or Gear Lever Jammed In Off Position

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



Gear Lever Will Not Move Up

Condition: The landing gear lever cannot move to UP.

1 Choose one:

◆ **GEAR TILT or BODY GEAR STRG** message is **shown**:

Do **not** exceed the gear extended limit speed (320 KIAS/.82 Mach).

Landing gear lever DN

Do **not** retract the landing gear.

Do **not** use FMC fuel predictions with the gear extended. Refer to the Gear Down performance tables in the Ferry Chapter of the ODM for flight planning.



◆ **GEAR TILT and BODY GEAR STRG** messages are **not** shown:

►► **Go to step 2**

- 2 Landing gear lever
LOCK OVRD switch Push and hold
- 3 Landing gear lever UP, then OFF
- 4 Confirm the landing gear is fully retracted.
- 5 Landing gear lever OFF



GEAR TILT

Condition: The main landing gear trucks are not in the fully tilted position.

- 1 Do not retract the landing gear.
- 2 Do not exceed the gear extended limit speed (320 KIAS/.82 Mach).
- 3 Do not use FMC fuel predictions with gear extended. Refer to the Gear Down performance tables in the chapter for flight planning.



Nose and Body Gear Up

Condition: The nose and body gear are failed in the up position.

Objective: If there is enough time and fuel available, to depressurize hydraulic system 1 to allow the nose and body gear to extend.

- 1 Do this checklist only when directed by the GEAR DISAGREE or Gear Lever Jammed in Off Position checklist.
- 2 Check the total fuel quantity.

Alternate nose and body gear extension may take up to 15 minutes.

Do not accomplish this checklist unless there is sufficient fuel to extend the gear and then complete an approach, with sufficient reserves.

Land with gear up or land with available gear if fuel is not sufficient.

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

- 3 **If** C autopilot is engaged:
Autopilot disengage switch Push
L and R autopilots are available.
- 4 Hydraulic DEMAND PUMP 1 selector OFF
- 5 Hydraulic ENGINE PUMP 1 switch Off

▼ Continued on next page ▼

▼ Nose and Body Gear Up continued ▼

- 6 Do **not** accomplish the following checklist:
HYD PRESS SYS 1
- 7 Do not exceed the gear EXTEND limit speed (270 KIAS/.82 Mach).
- 8 ALTN NOSE/BODY GEAR
EXTEND switch. ALTN

Note: If fuel becomes critical while doing this checklist, vigorous cycling of the control wheel helps depressurize the landing gear hydraulic lines, significantly reducing the alternate extension time. (During flight test, 80 cycles of +/-4 units of aileron reduced the depressurization time to 90 seconds.)

▼ Continued on next page ▼

▼ **Nose and Body Gear Up continued** ▼

Inoperative Items

Left outboard elevator inop
Pitch control is reduced.

Inboard trailing edge flap hydraulic operation inop
Trailing edge flaps move in secondary mode. Secondary extension from flaps 1 to 5 requires approximately 4 minutes. During approach, allow approximately 2 additional minutes to fully extend the flaps to the landing position.

Nose and body gear hydraulic extension and retraction inop
Alternate gear extension is needed.

Nose and body gear steering inop
A tow will be needed after landing.

System 1 alternate brake source inop
System 4 normal and system 2 alternate brake sources are available.

Automatic ground spoilers inop
Manual extension available.

Thrust reverser engine 1
Use symmetrical thrust unless stopping distance is critical.

- 9 GND PROX GEAR OVRD switch OVRD
- 10 Land on available gear.
- 11 Do **not** accomplish the following checklist:
CONFIG GEAR

▼ **Continued on next page** ▼

▼ Nose and Body Gear Up continued ▼

Caution! Do not repressurize hydraulic system 1 in flight or on the ground as the gear will retract.

Caution! If any wing or body gear is not extended, deployment of the thrust reversers may affect directional control.

Caution! If the nose gear is not extended, do not deploy the thrust reversers until the nose contacts the runway.

Caution! If any gear is not extended, delay extending the speedbrakes until the nose and both sides of the airplane have touched down.

Caution! If any wing gear is not extended, use aileron control to keep the wings level during the rollout until the airplane comes to a complete stop.

Caution! If any wing gear or body gear is not extended, braking effectiveness is reduced.

Caution! Do not attempt to taxi the airplane or use the tiller.

▼ Continued on next page ▼

▼ **Nose and Body Gear Up continued** ▼

Caution! Pin the landing gear after stopping.

- 12 Do **not** accomplish the following checklists:
- FLAPS PRIMARY
 - GEAR DISAGREE or Gear Lever Jammed in Off Position

13 Checklist Complete Except Deferred Items

Deferred Items

Descent Checklist

Altimeters	____, xckd	C&F
■ Minimums	____, ____, xckd	C&F
■ Landing data	____, ____	C&F
■ Approach briefing	complete	PM
■ Autobrakes	as reqd	PM
Seatbelt signs	ON	PM
Recall	ckd	PM

Approach Checklist

■ Flight & nav instruments	verified	C&F
Cabin notification	complete	C
Altimeters (trans lvl)	____, xckd	C&F

▼ **Continued on next page** ▼

▼ Nose and Body Gear Up continued ▼

Landing Checklist

- Landing gear down C&F
- Flaps ____, __ C&F
- Speedbrake **DOWN** PM



Tire Failure(s)

Condition: One or more tires have failed, or are suspected to have failed

Note: Consider continuing to the destination unless there is evidence that other damage has occurred. (e.g., Abnormal engine indications or engine vibration, or loss of hydraulic pressure and/or quantity).

Continuing to the destination ensures a lighter landing weight and allows the crew time to plan and coordinate the arrival and landing when the workload is low

- 1 Advise ATC of possible tire remnants on the runway.
- 2 Avoid landing overweight.
- 3 Use normal approach and landing techniques.
- 4 Use differential braking as needed to assist directional control.
- 5 Choose one:
 - ◆ Uncertain about whether a nose or main landing gear tire has failed:
 - ▶▶ **Go to step 6**
 - ◆ Nose landing gear tire flat:
 - ▶▶ **Go to step 9**
 - ◆ Main landing gear tire flat:
 - ▶▶ **Go to step 14**

▼ Continued on next page ▼

▼ Tire Failure(s) continued ▼

- 6 Slowly and gently lower the nose to the runway.
- 7 Do not use autobrakes.
- 8 Use idle or higher reverse thrust as needed to stop the aircraft.



- 9 Slowly and gently lower the nose to the runway.
- 10 Runway length permitting, use idle reverse thrust.
- 11 Autobrakes may be used at lower settings.
- 12 After the nose landing gear is down, vibration levels may be affected by increasing or decreasing control column back pressure.
- 13 Maintain nose landing gear contact with the runway.



- 14 Braking effectiveness will be reduced.
- 15 Light braking will cause yawing toward the flat tire. Hard braking will cause yawing away from the flat tire.
- 16 Use of maximum reverse thrust is recommended.
- 17 Do not use autobrakes.

**>TIRE PRESSURE**

Condition: One or more tire pressures are not normal.



Intentionally
Blank

Non-Normal Checklists
Warning Systems

Chapter NNC
Section 15

Table of Contents

>AIRSPEED LOW	15.1
>ALT CALLOUTS	15.1
>ALTITUDE ALERT	15.1
>CONFIG FLAPS	15.1
>CONFIG GEAR	15.2
>CONFIG GEAR CTR.....	15.2
>CONFIG PARK BRK	15.2
>CONFIG SPOILERS	15.2
>CONFIG STAB.....	15.2
>CONFIG WARN SY	15.3
GND PROX SYS	15.3
>OVERSPEED	15.3
>TCAS OFF	15.3
>TCAS RA CAPT, F/O.....	15.3
>TCAS SYSTEM	15.4
>TERR OVRD.....	15.4
TERR POS	15.4
WINDSHEAR SYS	15.5

Table of Contents

Intentionally
Blank

>AIRSPEED LOW

Condition: Airspeed is less than the minimum maneuvering speed.



>ALT CALLOUTS

Pre FANS/CPDLC Equipped Aircraft

Condition: Altitude tones during approach are not supplied.

FANS/CPDLC Equipped Aircraft

Condition: Altitude voice annunciations during approach are not supplied.



>ALTITUDE ALERT

Condition: A deviation from the MCP set altitude occurs.



>CONFIG FLAPS

Condition: The flaps are not in a takeoff position during takeoff.



>CONFIG GEAR

Condition: A landing gear is not down and locked and one of these occurs:

- Below 800 feet radio altitude and a thrust lever is between idle and mid position
- The flaps are in a landing position



>CONFIG GEAR CTR

Condition: Body gear steering is not centered during takeoff.



>CONFIG PARK BRK

Condition: The parking brake is set during takeoff.



>CONFIG SPOILERS

Condition: The speedbrake lever is not down during takeoff.



>CONFIG STAB

Condition: The stabilizer is not in the greenband during takeoff.



>CONFIG WARN SY

Condition: A configuration warning system fault occurs.



GND PROX SYS

Condition: A ground proximity warning system fault occurs.

Note: Some or all ground proximity alerts are not available. Ground proximity alerts that occur are valid.



>OVERSPEED

Condition: Airspeed is more than Vmo/Mmo.



>TCAS OFF

Condition: TCAS modes TA or TA/RA are not selected.



>TCAS RA CAPT, F/O

Condition: TCAS cannot show RA guidance on the PFD.



>TCAS SYSTEM

Condition: TCAS is failed.



>TERR OVRD

Condition: The ground proximity terrain override switch is in OVRD.



TERR POS

Condition: Terrain position data is lost.

Note: Position data for look-ahead alerting and display are unavailable. Ground proximity alerts that occur are valid.



WINDSHEAR SYS

Condition: A windshear system fault occurs.

Note: Some or all windshear alerts are not available. Windshear alerts that occur are valid.



Intentionally
Blank

Non-Normal Operational InformationChapter NNOI
Table of Contents **Section 0**

Non-Normal Ops Info. NNOI.1

 ILS Approach Equipment Requirements
 (Not for Dispatch) NNOI.1.1

 RNAV Approach Equipment Requirements
 (Not for Dispatch) NNOI.1.2

 RNAV Enroute Equipment Requirements
 (Not for Dispatch) NNOI.1.3

Intentionally
Blank

Non-Normal Operational Information Chapter NNOI

Non-Normal Ops Info Section 1

ILS Approach Equipment Requirements (Not for Dispatch)

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

Equipment Required	CAT I	CAT II	CAT III
AC Generators	3	3	3 (a)
AFDS FMS(s)	0	2	2
Anti-skid	Not required	Not Required	Required
Autopilot(s)/Flight Director(s)	1/1 (f)	2/1	3/0
Autobrakes or Groundspeed indication	Not Required	Not Required	Required
Autothrottle	Not Required	Required	Required
DH(DA)/AH Annunciation	1	2	2
EIU	1	2	2
TO/GA Go-Around Guidance	Not Required	Not Required	Required
Hydraulic Systems	3	4	4
IRU(s)	2	2	3
Marker Beacon System	0	0 (b)	0
Normal Flight Controls	Not Required	Required	Required
ND(s)	2	2	2
PFD(s)	2	2	2
Radio Altimeter(s)	1	2	3
Rudder Ratio System	0 (c) (d)	1 (c) (d)	1 (c) (d)
Thrust Reversers	0	0	3 (e)
Windshield Wipers (High)	0	2	2

Note: Additional low weather approach equipment requirements may be found in the MDM.

- (a) Bus Tie Breakers 1, 2, and 3 must be operative. DC Bus Isolation Relays 1, 2, and 3 must be operative.
- (b) The Inner Marker is required for CAT II RA NOT AUTH approaches.
- (c) 10 knot crosswind limit with rudder ration system inoperative.
- (d) 5 knot crosswind limit with rudder ratio system inoperative and engine inoperative.
- (e) Four reversers must be operational for the airplane to be dispatched CAT III or braking action is less than good. However, should an engine fail in flight, only 3 remaining reversers are required to fly a CAT III approach and landing.
- (f) For approaches with “autopilot coupled approaches not authorized” restrictions, hand-flown CAT I are authorized to applicable minimums with an operable flight director.

RNAV Approach Equipment Requirements (Not for Dispatch)

This list contains the equipment required to conduct a RNAV approach on aircraft equipped with GPS Multi Mode Receivers (MMR).

Equipment Required	RNAV (GPS)	RNAV (RNP)
IRU(s)	2	NOT AUTHORIZED
AFDS FMA(s)	1	
Global Positioning System(s)	1	
Autopilot(s)/Flight Director(s)	1/0	
Forward CDU(s)	1	
ADC(s) Pitot and Static	2	
GPWS	0	
Electrical Power Source(s)	3	
FMC(s) with current database	1	
EICAS	1	
PFD(s)	1	
ND(s)	1	
Radio Altimeter(s)	0	
TO/GA Switch(es)	0	

RNAV Enroute Equipment Requirements (Not for Dispatch)

Equipment Required	RNP-4 Enroute	RNAV Enroute
Internal Reference Units (IRU)	2	1
AFDS FMA	1	0
Global Positioning System (GPS)	2	1
Autopilot Systems	1	1
Autothrottle System	0	0
Control Display Unit	2	2
EGPWS	0	0
EGPWS (Terrain Display Function)	0	0
Flight Director Displays	1	1
FMC	2	1
EICAS	1	1
ND	1	1
PFD	1	1
Radio Altimeter	0	0
TO/GA switches	0	0
Automatic Dependent Surveillance	1	0
ACARS	1	0
Flight Deck Communications System (Datalink) CPDLC	1	0
Satellite Communication Systems (SATCOM)	1	0

This chart is used for enroute requirements only. For dispatch requirements, refer to the RNAV Minimum Requirements table in the MDM, Navigation Equipment section.

Intentionally
Blank

Non-Normal Checklist Instructions	Chapter NNCI
Table of Contents	Section 0

Non-Normal Checklists	NNCI.1
Introduction	NNCI.1.1
Non-Normal Checklist Operation	NNCI.1.2
General	NNCI.1.2
Landing at the Nearest Suitable Airport	NNCI.1.3
Land Immediately	NNCI.1.3
Checklists Directing Engine Shutdown	NNCI.1.3
Non-Normal Checklist Assumptions	NNCI.1.4
Circuit Breaker Reset	NNCI.1.4
Non-Normal Checklist Use	NNCI.1.5
General	NNCI.1.5
Calling for the Checklist	NNCI.1.5
Reading the Checklist	NNCI.1.5
Dual Verification of Critical Controls	NNCI.1.6
Conditional Items	NNCI.1.7
Deferred Items	NNCI.1.7
Consequential EICAS Alert Messages	NNCI.1.7
Checklist Completion	NNCI.1.8
Checklist Limitations	NNCI.1.8
Non-Normal Checklist Legend	NNCI.1.8
Redirection Symbol	NNCI.1.8
Separator Symbol	NNCI.1.8
Task Divider Symbol	NNCI.1.8
Decision Symbol	NNCI.1.9
Precaution Symbol	NNCI.1.9
Evacuation Flow/Philosophy	NNCI.1.9

Intentionally
Blank

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

Introduction

The Non-Normal Checklists chapter contains checklists used by the flight crew to manage non-normal situations. The checklists are grouped in sections that 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.

A caret symbol > precedes some EICAS alert messages that may or may not contain procedural steps. Flight crews must reference the non-normal section for every EICAS alert message displayed, whether it is preceded with or without a caret. In the printed non-normal checklists, the titles also have the caret symbol to agree with the EICAS alert message.

Checklists without an EICAS alert message are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, Engine Fuel Leak is in section 12, Fuel. Unannunciated checklists with no associated system (such as Volcanic Ash) are in section 0, Miscellaneous. In addition, the Miscellaneous section contains checklists titled “Considerations.” These checklists are designed to assist crewmembers in the decision making process to accomplish a non-normal maneuver (such as a decision to perform an overweight landing), assist in the preparation and execution of a non-normal maneuver (such as preparation for a ditching), and/or provide considerations that should be taken into account after a non-normal maneuver has been executed (such as post RTO). These checklists should be referenced as time and conditions allow.

All checklists have condition statements. The condition statement briefly describes the situation that caused the 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 from memory before reading the checklist. Condition, objective and precaution statements, and notes associated with memory items (i.e., above the dashed line) support action steps and are not considered memory items. The last memory item is followed by a dashed horizontal line. Reference items are actions to be done while reading the checklist.

Note: Crewmembers must maintain a sufficient knowledge of all designated memory items so that they can accomplish the critical steps in proper sequence without omission. Verbatim memorization of the steps is not required.

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

Checklists that need a quick response are listed in the Quick Action Index. In each system section, Quick Action Index checklists are listed first, followed by 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 AUTOBRAKE) are annunciated by an EICAS alert message or other indication. Checklist titles in upper and lower case (such as Window Damage L, R) are not annunciated. Some checklist titles are shown in a larger font (such as Evacuation) to make them easier to read under conditions where crewmembers may be wearing an oxygen mask or under conditions of reduced visibility.

Non-Normal Checklist Operation

General

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

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

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

Landing at the Nearest Suitable Airport

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

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

Land Immediately

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

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

Checklists Directing Engine Shutdown

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

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

Non-Normal Checklist Assumptions

Non-normal checklists also assume:

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

Circuit Breaker Reset

WARNING: Do not reset a tripped fuel boost pump circuit breaker. [AFM]

Flight crew reset of a tripped circuit breaker is not recommended unless specifically directed by a non-normal checklist.

However, a tripped circuit breaker may be reset once, after a short cooling period if, in the judgment of the captain, the situation resulting from the circuit breaker trip has a significant adverse effect on safety. A reset of a tripped circuit breaker should only be accomplished after maintenance and the flight crew have determined it is safe to reset the circuit breaker.

Flight crew may cycle (pull and reset) the circuit breaker(s) of a degraded or inoperative system (normally only one time per event) provided the captain determines the affected system is desirable for the conduct of the flight and one of the following conditions exists:

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

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

Non-Normal Checklist Use

General

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

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

When a non-normal situation occurs, at the direction of the PF (with the captain's concurrence if he is the PM), both crewmembers do all memory items in their areas of responsibility without delay.

The PF may also (with captain's concurrence if he is the PM) 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.

Calling for the Checklist

The PF calls for the checklist when:

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

Reading the Checklist

The pilot monitoring reads aloud:

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

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

For checklists with memory items, the PM first verifies that each memory item has been done. The checklist is normally read aloud during this verification. The PF 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 PM reads aloud the reference items, including:

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

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

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

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

Dual Verification of Critical Controls

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

- an engine thrust lever
- an engine fuel control switch
- an engine, APU or cargo fire switch
- a generator drive disconnect switch
- a flight control switch
- an IRS mode selector.

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

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

Conditional Items

Conditional items are used at a decision point. Conditional items usually begin with “If.” When a conditional item is encountered in a procedure, apply the following logic:

- If the conditional item applies, accomplish the action step(s) immediately following it.
- If the conditional item does not apply, skip the associated action step(s) and proceed to the next procedural step.

Deferred Items

When there are deferred items, the non-normal checklist will include the item **"Checklist Complete Except Deferred Items."** The PF 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 PM. The crewmember taking the action states the response.

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

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

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

Consequential EICAS Alert Messages

Consequential EICAS alert messages can show as the result of a primary failure condition (such as FUEL IMBAL 1-4 as a result of FUEL LEAK ENGINE) or as a result of doing a non-normal checklist crew action. The checklists for the consequential messages can have procedural steps, notes, or other information. The crew does not do these checklists. If consequential checklist steps, notes, and information are applicable to the primary failure condition, then these are included in the primary checklist. The statement “Do not accomplish the following checklists:” followed by a list of the checklists, shows in the printed primary checklist to inform the crew of consequential checklists. All consequential alert messages may not show while doing the primary checklist, depending on operational circumstances.

Checklist Completion

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



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

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

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

Checklist Limitations

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

Non-Normal Checklist Legend

Redirection Symbol



The redirection symbol is used in two ways:

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

Separator Symbol



The separator symbol is used in two ways:

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

Task Divider Symbol



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

Decision Symbol

Choose one:



The decision symbol is used to identify possible choices.

Precaution Symbol



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

Evacuation Flow/Philosophy

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

The checklist follows the flow pattern of:

STOP
CONFIGURE
SHUTDOWN
EVACUATE

Intentionally
Blank

Revision Record
Table of Contents

Chapter RR
Section RR

Model Identification	RR.ModID
Introduction	RR.Intro
General	RR.Intro.1
Manual Rights	RR.Intro.1
Corrections to the Manual	RR.Intro.2
Organization	RR.Intro.2
Page Numbering	RR.Intro.4
Example Page Number	RR.Intro.4
Warnings, Cautions, and Notes	RR.Intro.4
Aircraft Effectivities	RR.Intro.5
Abbreviations	RR.Abbrev
Revision Record	RR.RR
QRH List of Effective Pages - FAA Approved.....	RR.LEP

Intentionally
Blank

Revision Record

Model Identification

Chapter RR

Section ModID

General

The airplanes listed in the table below are covered in the operations manual. The numbers are used to distinguish data peculiar to one or more, but not all of the airplanes. Where data applies to all airplanes listed, no reference is made to individual airplane numbers.

The table permits flight crew correlation of configuration differences by Registry Number in alpha/numeric order within an operator's fleet for airplanes covered in this manual. Configuration data reflects the airplane as delivered configuration and is updated for service bulletin incorporations in conformance with the policy stated in the introduction section of Volume 1 of the operations manual.

Ship number is supplied by the operator. Registry number is supplied by the national regulatory agency. Serial and tabulation numbers are supplied by Boeing.

Airplane Number	Registry Number	Serial Number	Tabulation Number
6301	N661US	23719	RT401
6302	N662US	23720	RT402
6303	N663US	23818	RT403
6304	N664US	23819	RT404
6305	N665US	23820	RT405
6306	N666US	23821	RT406
6307	N667US	24222	RT407
6308	N668US	24223	RT408
6309	N669US	24224	RT409
6310	N670US	24225	RT410
6311	N671US	26477	RM241
6312	N672US	30267	RM242
6313	N673US	30268	RM243
6314	N674US	30269	RM244
6315	N675NW	33001	RM245

Airplane Number	Registry Number	Serial Number	Tabulation Number
6316	N676NW	33002	RM246

Revision Record

Introduction

Chapter RR

Section Intro

General

The manufacturer has developed normal and non-normal procedures for the B747-400 aircraft. Delta Air Lines, Inc. has modified some of these procedures for simplification and standardization, when appropriate, with other aircraft operated by Delta Air Lines, Inc. Finally, the FAA has approved the procedures presented in this Operations Manual.

These procedures are intended to be followed during normal ground operations and in flight. Deviations from these procedures should be made only with good cause and based on the safest course of action. The captain's best judgment must be applied if an abnormality occurs that is not covered by these procedures

Manual Rights

The B747-400 Operations Manual has been prepared for the exclusive use of Delta Air Lines, Inc., Flight Operations personnel under the direction and authority of Delta and shall, at all times, remain the property of Delta. The holder hereof acknowledges and agrees that this manual contains or may contain trade secrets, copyrighted material and commercial and proprietary information, privileged and confidential, to the interest of Delta, and the holder hereof further agrees that this manual may not be reproduced, distributed or copied, in whole or in part, without the express prior written consent of Delta.

In the event this B747-400 Operating Manual is sold or distributed to any other party, no warranty or guarantee, expressed or implied, is made as to the accuracy, sufficiency or suitability of the materials contained herein or of any revision, supplement or bulletin hereto. It is understood and agreed to by such other party that it shall release, indemnify, and hold Delta Air Lines, Inc., its officers, employees and agents harmless against any and all claims or actions of whatever nature which may arise or claim to arise from the use hereof.

Corrections to the Manual

Log on to the Delta Flight Operations Portal, <http://deltanet.delta.com> and submit a Publications Change Request (PCR) to correct any errors or discrepancies discovered in this manual, or to submit a suggested change to any Aircraft Operating Manual, Volume 1, Volume 2, Quick Reference Handbook (QRH), Flight Crew Training Manual (FCTM), Normal Checklist, Airway Manual (AM), Flight Operations Manual (FOM), Operating Experience (OE/TOE) Guide, Fleet Bulletin (FB), or All Pilot Bulletin (APB).

There is a link to the PCR form at Deltanet > My Division > Pilot Support > Forms and Reports. Once submitted, the PCR is automatically routed to the applicable Fleet Technical Manager and Technical Writer for that manual.

Organization

The operations manual is organized in the following manner.

Volume 1

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Limitations - Covers operational limitations.
- Normal Procedures - Covers all amplified normal operating procedures and are based on a thorough analysis of crew activity required to operate the aircraft, and reflect the latest knowledge and experience available.
- Normal Operational Information - Contains reference material used to support normal procedures.
- Supplementary Procedures is organized by system and covers:
 - any procedure that is non-routine in nature,
 - any first-flight-of-the-day test or other systems test,
 - guidance on lengthy operating procedures, and
 - adverse weather procedures and guidance.
- Differences - Notes differences between aircraft models and variants.

Volume 2

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Contains general aircraft and systems information. These chapters are generally subdivided into sections covering controls and indicators and systems descriptions.

QRH

- Non-normal checklists - Contains checklists used to manage non-normal situations.
- Non-Normal Operational Information - Contains reference material used to support non-normal procedures.
- Non-Normal Checklist Instructions - Contains non-normal checklist instructions and evacuation flow/philosophy.
- Revision Record - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.

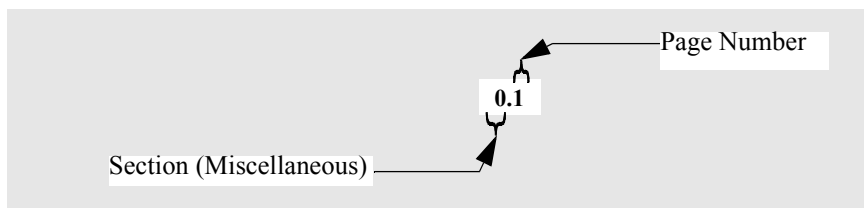
FCTM

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Provides information and recommendations on aircraft operations, maneuvers techniques, and human factors.

Page Numbering

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

Example Page Number



Warnings, Cautions, and Notes

The following levels of written advisories are used throughout the manual and are not to be confused with EICAS messages, which are identified in separate text.

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

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

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

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

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

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

Aircraft Effectivities

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

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

Example (with subordinate items):

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

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

Example (without subordinate items):
Using ship number:

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

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

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

FUEL L + R CTR PUMPS LO PR
9951-9961

Revision Record

Abbreviations

Chapter RR

Section Abbrev

General

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

AC	Alternating Current or Aircraft
ACARS	Aircraft Communications Addressing and Reporting System
ACE	Actuator Control Electronics
ACP	Audio Control Panel
ACT	Active
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Director Indicator
ADIRS	Air Data Inertial Reference System
ADIRU	Air Data Inertial Reference Unit
ADM	Air Data Module
ADR	Air Data Reference
AED	Automated External Defibrillator
AFDC	Autopilot Flight Director Computer
AFDS	Autopilot Flight Director System
AFE	Above Field Elevation

AFM	Airplane Flight Manual (FAA approved)
AFM - DPI	Airplane Flight Manual - Digital Performance Information
AFS	Automatic Flight System (Autopilot or Autothrottle)
A/G	Air/Ground
AGL	Above Ground Level
AH	Alert Height
AHRS	Attitude Heading Reference System
AI	Anti-Ice
AIL	Aileron
AIMS	Airplane Information Management System
ALFA	Safe Stall Margin Speed
ALT	Altitude
ALT ACQ	Altitude Acquire
ALT HOLD	Altitude Hold
ALTN	Alternate
AM	Amplitude Modulation
AMI	Airline Modifiable Information

ANP	Actual Navigation Performance
ANT	Antenna
ANU	Aircraft Nose Up
AOA	Angle of Attack
AOC	Airline Operational Communication Data Link
A/P	Autopilot
APB	All Pilot Bulletin
APL	Airplane
APP or APPR	Approach
APU	Auxiliary Power Unit
ARINC	Aeronautical Radio, Incorporated
ARM	Aircraft Restrictions Manual
ARPT	Airport
ARR	Arrival
ART	Automatic Reserve Thrust
ASA	Autoland Status Annunciator
ASAP	As Soon As Possible
ASI	Airspeed Indicator
A/SKID	Anti-Skid
ASR	Airport Surveillance Radar
ASYM	Asymmetry
A/T	Autothrottle
ATA	Actual Time of Arrival
ATC	Air Traffic Control

A/THR	Auto Thrust Function
ATIS	Automated Terminal Information Service
ATM	Assumed Temperature Method
ATT	Attitude
AUTO	Automatic
AUTO-THROT	Autothrottle
AUX	Auxiliary
AVAIL	Available
AWABS	Automated Weight and Balance System
AWI	Altitude Warning Indicator
AWY	Airway
B	
BARO	Barometric
BAT	Battery
B/C or B/CRS or BAC or BCS	Back Course
BCL	Battery Charge Limiter
BFO	Beat Frequency Oscillator
BITE	Built-In Test Equipment
BKR	Breaker
BLD	Bleed
BLW	Below
BMC	Bleed Air Monitoring Computer
BRG	Bearing
BRT	Bright

▲ DELTA
747 Operations Manual

BSCU	Braking Steering Control Unit
BTC	Bus Tie Contactor
BTL	Bottle
BTL DISCH	Bottle Discharge (fire extinguisher)
BTMS	Brake Temperature Monitoring System
C	
C	Captain or Celsius or Center or Cool
CAA	Civil Aviation Authority
CADC	Central Air Data Computer
CALSEL	Call Select
CANC/RCL	Cancel/Recall
CANPA	Constant Angle Non-Precision Approach
CAP	Capture
CAPT	Captain
CAS	Calibrated Airspeed
CAWS	Central Aural Warning System
CB or C/B	Circuit Breaker
CCD	Cursor Control Device
CDI	Course Deviation Indicator
CDL	Configuration Deviation List
CDS	Common Display System
CDU	Control Display Unit

CDFS	Centralized Fault Display System
CFIT	Controlled Flight Into Terrain
CG	Center of Gravity
CHKL	Checklist
CHR	Chronograph
CIDS	Cabin Intercommunication Data System
CKD	Checked
CKT	Circuit
CL	Close
CLB	Climb
CLMP	Computer Lockout Manual Power
CLR	Clear
CMD	Command
CO	Company
COMM	Communication
COMP	Comparator
COMPT	Compartment
CON	Continuous
CONFIG	Configuration
CONT	Control
COOL	Cooling
CO RTE	Company Route
CRC	Continuous Repetitive Chime
CRS	Course
CRT	Cathode Ray Tube
CRZ	Cruise

CSM/G	Constant Speed Motor/Generator
CSTR	Constraint
CTL	Control
CTR	Center
CVR	Cockpit Voice Recorder
CWS	Control Wheel Steering
D	
DA	Decision Altitude
DA(H)	Decision Altitude (Height)
DC	Direct Current
DCU	Display Concentrator Unit
D/D	Direct Descent
DDG	Dispatch Deviations Guide
DDRMI	Digital Distance & Radio Magnetic Indicator
DEL	Delete
DEP	Departure
DEP ARR	Departure Arrival
DEPR	Depressurize
DES	Descent
DEST	Destination
DEU	Display Electronic Unit
DFDR	Digital Flight Data Recorder
DFGS	Digital Flight Guidance System
DH	Decision Height
DIFF	Differential
DIR	Direct

DIR TO	Direct To
DISC	Disconnect
DISCH	Discharge
DIST	Distance
DK	Deck
DMC	Display Management Computer
DME	Distance Measuring Equipment
DN	Down
DPC	Display Processing Computer
DSP	Display Select Panel
DSPL	Display
DTG	Distance to Go
DTW	Distance to Waypoint
DU	Display Unit
E	
EADI	Electronic Attitude Director Indicator
ECAM	Electronic Centralized Aircraft Monitor
ECB	Electronic Control Box (APU)
ECU	Electronic Control Unit
ECON	Economy
E/D	End of Descent
EDP	Engine Driven Pump
E/E	Electrical/Electronic
EEC	Electronic Engine Control
EFB	Electronic Flight Bag

747 Operations Manual

EFI	Electronic Flight Instruments
EFIS	Electronic Flight Instrument System
EFOB	Estimated Fuel On Board
EGPWS	Enhanced Ground Proximity Warning System
EGT	Exhaust Gas Temperature
EHSI	Electronic Horizontal Situation Indicator
EICAS	Engine Indication and Crew Alerting System
EIS	Electronic Instrument System
EIU	Engine Interface Unit
ELAC	Elevator Aileron Computer
ELEC	Electrical
ELEV	Elevator
EMER	Emergency
EMER GEN	Emergency Generator
ENG	Engine
ENG OUT	Engine Out
ENT	Entry
EO or E/O	Engine Out
EOAP	Electronic Overhead Annunciation Panel
EPR	Engine Pressure Ratio
EQPT or EQUIP	Equipment
ER	Extended Range
ETOPS	Extended Operations
EVAC	Evacuation

EVMU	Engine Vibration Monitoring Unit
E/WD	Engine/Warning Display
EXEC	Execute
EXT	Extend or External
F	
F	Fahrenheit
FAC	Final Approach Course or Flight Augmentation Computer
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
FAF	Final Approach Fix
FAR	Federal Aviation Regulation
FB	Fleet Bulletin
FCC	Flight Control Computer
FCTL	Flight Control
FCU	Flight Control Unit
FD, F/D or FLT DIR	Flight Director
FF	Fuel Flow
FFM	Flight Force Monitor
FGCP	Flight Guidance Control Panel
FGS	Flight Guidance System
FILT	Filter
FIR	Flight Information Region
FL	Flight Level
FLCH or flch	Flight Level Change

FLT	Flight
FLT CTRL or F/CTL	Flight Control
FLPRN	Flaperon
FMA	Flight Mode Annunciator
FMC	Flight Management Computer
FMGC	Flight Management Guidance Envelope Computer
FMGS	Flight Management Guidance Envelope System
FMS	Flight Management System
F/O or FO	First Officer
FOB	Fuel On Board
FOM	Flight Operations Manual
FPA	Flight Path Angle
F-PLN	Flight Plan
FPM	Feet Per Minute
FPV	Flight Path Vector
FREQ	Frequency
F/S	Fast/Slow
FT	Feet
FWC	Flight Warning Computer
FWD	Forward
FWSOV	Fire Wall Shut Off Valve
FX	Fix
G	
GA	Go-Around
GCU	Generator Control Unit
GE	General Electric

GEN	Generator
GLC	Generator Line Contactor
GLS	GPS Landing System
GMT	Greenwich Mean Time
GND	Ground
GNSS	Global Navigation Satellite System
GP or G/P	Glide Path
GPS	Global Positioning System
GPWS	Ground Proximity Warning System
G/S	Glide Slope
GS	Ground Speed
GW	Gross Weight
H	
HAA	Height Above Airport
HAT	Height Above Touchdown
HDG	Heading
HDG REF	Heading Reference
HDG SEL	Heading Select
HF	High Frequency
HGS	Head-Up Guidance System (HGS® is a registered trademark of Flight Dynamics)
HI	High
HLD	Hold
HMU	Hydrau-Mechanical Unit
HP	High Pressure
HPA	Hectopascals

▲ DELTA
747 Operations Manual

HPSOV	High Pressure Shut Off Valve
HPV	High Pressure Valve
HSI	Horizontal Situation Indicator
HUD	Head Up Display
HYD	Hydraulic
HZ	Hertz
I	
IAF	Initial Approach Fix
IAN	Integrated Approach Navigation
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organization
IDENT	Identification
IDG	Integrated Drive Generator
IFE	In-Flight Entertainment System
IFR	Instrument Flight Rules
IGN	Ignition
IGS	Instrument Guidance System
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
IN	Inches
INBD	Inboard
IND	Indicator
IND LTS	Indicator Lights

INOP	Inoperative
INIT	Initialization
INSTR	Instrument
INT or INTPH	Interphone
INTC	Intercept
INTC CRS	Intercept Course
IP	Instructor Pilot or Intermediate Pressure
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ISDU	Inertial System Display Unit
ISFD	Integrated Standby Flight Display
ISLN or ISOL	Isolation
J	
JAA	Joint Aviation Authority
K	
K or KT or KTS	Knots
KCAS	Knots Calibrated Airspeed
KGS	Kilograms
KIAS	Knots Indicated Airspeed
L	
L	Left
LAT	Latitude
LAF	Load Alleviation Function

LAT REV	Lateral Revision
LAV	Lavatory
LBS	Pounds
LD	Load
LDA	Localizer-type Directional Aid
LDG	Landing
LDG ALT	Landing Altitude
LE	Leading Edge
L/G	Landing Gear
LIM	Limit
LIM SPD	Limit Speed
LKD	Locked
L NAV or LNAV	Lateral Navigation
LOC	Localizer
LOC-BC	Localizer Back Course
LOM	Locator Outer Marker
LON or LONG	Longitude
LP	Low Pressure
LR	Long Range
LRC	Long Range Cruise
LRU	Line Replaceable Unit
LSK	Line Select Key
LT	Light
LVL	Level
LVL/CH	Level Change
LWR CTR	Lower Center
LWR DSPLY or LWR DSPL	Lower Display

M	
M	Mach
MAC	Mean Aerodynamic Chord
MAG	Magnetic
MAHP	Missed Approach Holding Point
MAN	Manual
MAP	Missed Approach Point
MASI	Mach/Airspeed Indicator
MAX	Maximum
MB	Millibar
MCC	Maintenance Control Center
MCDU	Multi-purpose Control and Display Unit or Multi-function Control and Display Unit
MCO	Maintenance Carry Over
MCP	Mode Control Panel
MCT	Maximum Continuous Thrust
MDA	Minimum Descent Altitude
MDA(H)	Minimum Descent Altitude (Height)
MEA	Minimum Enroute Altitude
MEL	Minimum Equipment List
MFD	Multifunction Display
MHZ	Megahertz
MIC	Microphone
MIN	Minimum
MKR	Marker

▲ DELTA
747 Operations Manual

MLS	Microwave Landing System
MM	Middle Marker
MMO	Maximum Mach Operating Speed
MNPS	Minimum Navigation Performance Specification
MOCA	Minimum Obstruction Clearance Altitude
MOD	Modify
MORA	Minimum Off Route Altitude
MSA	Minimum Safe Altitude
MSG	Message
MSGS RCVD	Messages Received
MSL	Mean Sea Level
MTOW	Maximum Take-Off Weight
MTRS	Meters
MUH	Minimum Use Height
MZFW	Maximum Zero Fuel Weight
N	
N	Normal
NADP	Noise Abatement Departure Procedures
NAR	North America Route
NAV	Navigation
NAV RAD	Navigation Radio
ND	Navigation Display
NDB	Non Directional Beacon

NGS	Nitrogen Generating System
NLT	No Later Than
NM	Nautical Mile(s)
NNC	Non-Normal Checklist
NNM	Non-Normal Maneuver
NPS	Navigation Performance Scales
NORM	Normal
NW	Nose Wheel
N1	Low Pressure Rotor Speed
N2	High Pressure Rotor Speed (Pratt & Whitney and GE engines) or Intermediate Pressure Rotor Speed (Rolls Royce Engines)
N3	High Pressure Rotor Speed (Rolls Royce Engines)
O	
OAP	Overhead Annunciator Panel (a.k.a. EOAP)
OAT	Outside Air Temperature
OCC	Operations Control Center
ODM	Operational Data Manual
OFST	Offset
OHU	Overhead Unit
OM	Outer Marker
OP	Open
OUTBD DSPL	Outboard Display
OVHD	Overhead

OVHT	Overheat
OVRD	Override
OXY or O2	Oxygen
OVSPD	Overspeed
P	
PA	Passenger Address
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
pb	Push-Button
PBE	Protective Breathing Equipment
PCP	Pilot Call Panel
PDC	Pitch Data Computer or Performance Data Computer or Pre-Departure Clearance
PED	Personal Electronic Device
PERF	Performance
PERF INIT	Performance Initialization
PES	Pitch Enhancement System
PF	Pilot Flying
PFAF	Precision Final Approach Fix
PFD	Primary Flight Display
PI	Performance Inflight
PIP	Product Improvement Package
PLI	Pitch Limit Indicator

PM	Pilot Monitoring
PMC	Power Management Control
PNL	Panel
POS	Position
POS INIT	Position Initialization
POS REF	Position Reference
PPI	Planned Position Indicator
PPOS	Present Position
PRES or PRESS	Pressure
PRED	Prediction
PREV	Previous
PRI	Primary
PROC T	Procedure Turn
PROG	Progress
PROX	Proximity
P/RST	Push To Reset
PRV	Pressure Regulating Valve
PSI	Pounds Per Square Inch
PTH	Path
PTT	Push To Talk
PTU	Power Transfer Unit
PWR	Power
PWS	Predictive Windshear System
Q	
Q	Quantity
QFE	Local Station Pressure
QNH	Altimeter Setting

▲ DELTA
747 Operations Manual

QRH	Quick Reference Handbook
QT	Quart
QTY	Quantity
R	
R	Right
RA	Radio Altitude or Resolution Advisory
RAAC	Rotor Active Clearance Control
RAD	Radio
RAIM	Receiver Autonomous Integrity Monitoring
RAT	Ram Air Turbine or Ram Air Temperature
RCDR or REC	Recorder
RCL	Request for Clearance
RDMI	Radio Distance Magnetic Indicator
RECIR or RECIRC	Recirculation
REF	Reference
RET	Retract
REV	Reverse
RF	Radius-to-Fix (RF) Legs or Refill
RMI	Radio Magnetic Indicator
RMP	Radio Management Panel
RNAV or RNV	Area Navigation
RNP	Required Navigation Performance

RPL	Rudder Pressure Limiter
RPM	Revolutions Per Minute
RPR	Rudder Pressure Reducer
RR	Rolls Royce
RSEP	Rudder System Enhancement Program
RST	Reset
RSV	Reserves
RSVR	Reservoir
R/T	Radio Transmit
RTE	Route
RTO	Rejected Takeoff
RTP	Radio Tuning Panel
RUD	Rudder
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
RWY	Runway
S	
SAARU	Secondary Attitude Air Data Reference Unit
SAT	Static Air Temperature
SB	Service Bulletin
S/B	Speedbrake
SC	Single Chime
S/C	Step Climb
SD	System Display
S/D	Step Descent
SDAC	System Data Acquisition Concentrator
SDCU	Smoke Detection Control Unit

SDF	Simplified Directional Facility
SEC	Spoiler Elevator Computer
SEI	Standby Engine Indicator
SEL	Select
SELCAL	Selective Calling
SMGCS	Surface Movement & Guidance Control System
SENS	Sensitivity
SERV	Service
SFCC	Slat/Flap Control Computer
SG	Symbol Generator
SID	Standard Instrument Departure
SPD	Speed
SPDBRK	Speedbrake
SPD LIM	Speed Limit
SPLR	Spoiler
SRS	Speed Reference System
STA	Station
STAB	Stabilizer
STAR	Standard Terminal Arrival Route
STAT or STS	Status
STAT INV	Static Inverter
STBY	Standby
STD	Standard
STRG	Steering
SW	Switch
SWTG	Switching

SYS	System
T	
T or TRU	True
T or TK or TRK	Track (to a Navaid)
TA	Traffic Advisory
TAA	Terminal Arrival Area
TACAN	Tactical Air Navigation
TAC	Thrust Asymmetry Compensation
TAI	Thermal Anti-Ice
TAS	True Airspeed
TAT	Total Air Temperature
T/C	Top of Climb
TCA	Terminal Control Area
TCAS	Traffic Alert and Collision Avoidance System
TCI	Thrust Computer Indicator
T/D	Top of Descent
TDZ	Touch Down Zone
TDZE	Touch Down Zone Elevation
TE	Trailing Edge
TEMP	Temperature
TERR	Terrain
TFC	Traffic
TFR	Transfer
THR	Throttle or Thrust
THR HOLD	Throttle Hold

▲ DELTA
747 Operations Manual

THS	Trimmable Horizontal Stabilizer
TK	Tank
TLA	Throttle Lever Angle
TMC	Thrust Management Computer
TMI	Track Message Identifier
TMSP	Thrust Mode Select Panel
TO or T/O	Takeoff
TOC	Top of Climb
TOD	Top of Descent
TOGA or TO/GA	Takeoff /Go-Around
TOGW	Takeoff Gross Weight
T-P	Turn Point
TPR	Turbine Pressure Ratio
TR	Traffic Resolution
TRP	Thrust Rating Panel
TRU	Transformer Rectifier Unit
TURB	Turbine or Turbulence
U	
UNLK	Unlock
UNLKD	Unlocked
UNSCHD or UNSCHED	Unscheduled
UPR DSPL	Upper Display
U.S.	United States
USB	Upper Side Band
UTC	Universal Time Coordinated

UTIL	Utility
V	
V	Volt
VA	Design maneuvering speed
VAL	Valve
VANP	Vertical Actual Navigational Performance
VASI	Visual Approach Slope Indicator
VDP	Visual Descent Point
VEF	Speed at Engine Failure
VERT	Vertical
VFE	Maximum Velocity Flaps Extended
VFR	Visual Flight Rules
VG	Vertical Gyro
VHF	Very High Frequency
VIB	Vibration
VLV	Valve
VMC	Visual Meteorological Conditions
VMCA	Minimum Control Airspeed or Single Engine Minimum Control Airspeed
VMCG	Minimum Control Speed Ground
VMO	Maximum Operating Speed
V NAV or VNAV	Vertical Navigation
VOR	VHF Omnidirectional Range

VR	Rotation Speed
VREF	Reference Speed
VRNP	Vertical Required Navigation Performance
V/S	Vertical Speed
VSCF	Variable Speed Constant Frequency
VSD	Vertical Situation Display
VSI	Vertical Speed Indicator
VSID	Vertical Speed Indicator Display
VTK	Vertical Track
V1	Takeoff Decision Speed or Critical Engine Failure Speed
V1 (MCG)	Minimum for Control on the Ground
V2	Takeoff Safety Speed
W	
W	Warm
WATRS	Western Atlantic Route System
WDR	Weight Data Record
WGS-84	World Geodetic system of 1984
WHC	Window Heat Computer
WHL	Wheel
WPT	Waypoint
WTB	Wing Tip Brake
WXR	Weather Radar
X	
X-FEED	Crossfeed
XFR	Transfer

XMTR	Transmitter
XPDR or XPNDR	Transponder
XTK	Cross Track
Z	
ZFCG	Zero Fuel Center of Gravity
ZFW	Zero Fuel Weight

Revision Record

Revision Record

Chapter RR

Section RR

QRH Revision Transmittal Letter

To: All holders of Delta Air Lines, Inc. 747-400 Operations Manual, QRH

Subject: Quick Reference Handbook (QRH) Revision.

This revision reflects the most current information available to Delta Air Lines, Inc. through the subject revision date. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed
0	January 1, 2010	
2	May 24, 2010	
4	November 8, 2010	
6	March 17, 2011	
8	September 1, 2011	
10	April 12, 2012	
12	March 14, 2013	
14	December 19, 2013	
16	November 20, 2014	
18	August 27, 2015	
20	September 23, 2016	

No.	Revision Date	Date Filed
1	April 11, 2010	
3	July 19, 2010	
5	November 10, 2010	
7	July 7, 2011	
9	December 22, 2011	
11	November 7, 2012	
13	August 13, 2013	
15	April 10, 2014	
17	March 12, 2015	
19	March 25, 2016	

General

Delta Air Lines, Inc. issues operations manual revisions to provide new or revised procedures and information. Formal revisions may also incorporate appropriate information from previously issued Fleet Bulletins.

The revision date is the date the revision material is distributed and considered current. EFB revision downloads and/or flight deck distribution should be accomplished as soon as possible, but may take as much as 21 days after the revision date for completion.

Revisions include a Transmittal Letter, Revision Record, Revision Highlights, and a List of Effective Pages. Use the information on the new Revision Record to review the revised operations manual content.

Revision Highlights

Pages containing revised technical and non-technical material have revision bars associated with the changed text or illustration.

Chapter NNC - Non-Normal Checklists

Section 0 - Unannunciated Checklists

Ditching

0.1 - Added USCG HF (4125kHz) and Navy HF (2182kHz).

Chapter NNOI - Non-Normal Operational Information

Section 1 - Non-Normal Ops Info

ILS Approach Equipment Requirements (Not for Dispatch)

NNOI.1.1 - Added "(f)" to CAT I for Autopilot(s) and/or Flight Directors.

NNOI.1.1 - Added "(f) For approaches with “autopilot coupled approaches not authorized” restrictions, hand-flown CAT I are authorized to applicable minimums with an operable flight director."

RNAV Approach Equipment Requirements (Not for Dispatch)

NNOI.1.2 - Changed Radio Altimeter(s) from 1 to 0 for RNAV (GPS).

Chapter NNCI - Non-Normal Checklist Instructions

Section 1 - Non-Normal Checklists

Non-Normal Checklist Assumptions

NNCI.1.4 - Updated language to remove reference to the MDM.

Chapter RR - Revision Record

Section Intro - Introduction

Corrections to the Manual

RR.Intro.2 - Updated the web address for logging on to the Delta Flight Operations Portal.

RR.Intro.2 - Updated the path for submitting PCRs.

Organization

RR.Intro.3 - Added human factors to list of topics covered in the FCTM.

Section Abbrev - Abbreviations

RR.Abbrev.8 - Removed MDM - Mechanical Dispatch Manual.

Section RR - Revision Record

RR.RR.1 - Removed extraneous sentence.

RR.RR.2 - Revised General section to match the electronic-only methodology.

RR.RR.2 - Removed Filing Instructions section.

RR.RR.2 - Updated language in Revision Highlights section for cross-fleet standardization.

Intentionally
Blank

Revision Record

QRH List of Effective Pages - FAA Approved

Chapter RR

Section LEP

Page	Date
Quick Reference Handbook	
Quick Action Index	
* QA.Index.1-2	September 23, 2016
Annunciated Index (tab)	
* Annun.Index.1-10	September 23, 2016
Unannunciated Index (tab)	
* Unann.Index.1-2	September 23, 2016
Alphabetical Index (tab)	
* Alpha.Index.1-12	September 23, 2016
0 Miscellaneous (tab)	
* 0.TOC.1-2	September 23, 2016
* 0.1-28	September 23, 2016
1 Airplane General, Emergency Equipment, Doors, Windows (tab)	
* 1.TOC.1-2	September 23, 2016
* 1.1-22	September 23, 2016
2 Air Systems (tab)	
* 2.TOC.1-2	September 23, 2016
* 2.1-30	September 23, 2016
3 Anti-Ice, Rain (tab)	
* 3.TOC.1-2	September 23, 2016
* 3.1-12	September 23, 2016
4 Automatic Flight (tab)	
* 4.TOC.1-2	September 23, 2016
* 4.1-2	September 23, 2016
5 Communications (tab)	
* 5.TOC.1-2	September 23, 2016
* 5.1-8	September 23, 2016

Page	Date
6 Electrical (tab)	
* 6.TOC.1-2	September 23, 2016
* 6.1-16	September 23, 2016
7 Engines, APU (tab)	
* 7.TOC.1-2	September 23, 2016
* 7.1-32	September 23, 2016
8 Fire Protection (tab)	
* 8.TOC.1-2	September 23, 2016
* 8.1-32	September 23, 2016
9 Flight Controls (tab)	
* 9.TOC.1-2	September 23, 2016
* 9.1-22	September 23, 2016
10 Flight Instruments, Displays (tab)	
* 10.TOC.1-2	September 23, 2016
* 10.1-20	September 23, 2016
11 Flight Management, Navigation (tab)	
* 11.TOC.1-2	September 23, 2016
* 11.1-8	September 23, 2016
12 Fuel (tab)	
* 12.TOC.1-2	September 23, 2016
* 12.1-40	September 23, 2016
13 Hydraulics (tab)	
* 13.TOC.1-2	September 23, 2016
* 13.1-32	September 23, 2016
14 Landing Gear (tab)	
* 14.TOC.1-2	September 23, 2016
* 14.1-38	September 23, 2016

* = Revised, Added, or Deleted

Copyright © Delta Air Lines, Inc. See title page for details.

September 23, 2016

RR.LEP.1

Page	Date
15 Warning Systems (tab)	
* 15.TOC.1-2	September 23, 2016
* 15.1-6	September 23, 2016
Non-Normal Operational Information (tab)	
* NNOI.TOC.0.1-2	September 23, 2016
* NNOI.1.1-4	September 23, 2016
Checklist Instructions (tab)	
* NNCI.TOC.0.1-2	September 23, 2016
* NNCI.1.1-10	September 23, 2016
Revision Record (tab)	
* RR.TOC.RR.1-2	September 23, 2016
* RR.ModID.1-2	September 23, 2016
* RR.Intro.1-6	September 23, 2016
* RR.Abbrev.1-14	September 23, 2016
* RR.RR.1-4	September 23, 2016
* RR.LEP.1-2	September 23, 2016
Evacuation	
* Back Cover.1-2	September 23, 2016

* = Revised, Added, or Deleted

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

Evacuation

Condition: Evacuation is needed.

- 1 Parking brake Set
- 2 OUTFLOW VALVES MAN switches (both) ON
- 3 OUTFLOW VALVES
manual control Hold in OPEN
until the outflow valve
indications show fully open
to depressurize the airplane
- 4 FUEL CONTROL switches (all). CUTOFF
- 5 Notify the flight attendants "EASY VICTOR" three times.
- 6 Notify the flight attendants: "THIS IS THE CAPTAIN. EVACUATE, EVACUATE".
- 7 Advise the tower.
- 8 Engine fire switches (all) Pull
- 9 APU fire switch Override and pull
- 10 **If** an engine or APU fire warning occurs:
Related fire switch Rotate to the stop
and hold for 1 second

