

Preface

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717

Operations Manual Volume 1

Delta Air Lines, Inc.

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Preface

Model Identification

Chapter P1

Section 1

General

The aircraft 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 aircraft. Where data applies to all aircraft listed, no reference is made to individual aircraft numbers.

Use of the table below permits flight crew correlation of configuration differences by number within an operator's fleet for aircraft covered in this manual.

Configuration data reflects the aircraft as delivered configuration and is updated for service bulletin incorporations in conformance with the policy stated in the introduction section of this chapter.

Ship number is supplied by the operator. Registry number is supplied by the national regulatory agency. Serial and tabulation numbers are supplied by Boeing.

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

Ship Number	Airplane Number	Registry Number	Serial Number
9500	95A001	N949AT	55003
9501	95A002	N940AT	55004
9502	95A003	N942AT	55005
9503	95A004	N943AT	55006
9504	95A005	N944AT	55007
9505	95A006	N945AT	55008
9506	95A007	N946AT	55009
9507	95A008	N947AT	55010
9508	95A009	N948AT	55011
9509	95A010	N950AT	55012
9510	95A011	N951AT	55013

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Ship Number	Airplane Number	Registry Number	Serial Number
9511	95A012	N952AT	55014
9512	95A013	N953AT	55015
9513	95A014	N954AT	55016
9514	95A015	N955AT	55017
9515	95A016	N956AT	55018
9516	95A017	N957AT	55019
9517	95A018	N958AT	55020
9518	95A019	N959AT	55021
9519	95A020	N960AT	55022
9520	95A021	N961AT	55023
9521	95A310	N988AT	55068
9522	95A022	N963AT	55024
9523	95A023	N964AT	55025
9524	95A024	N965AT	55026
9525	95A025	N966AT	55027
9526	95A026	N967AT	55028
9527	95A311	N989AT	55152
9528	95A312	N990AT	55134
9529	95A313	N991AT	55135
9530	95A027	N968AT	55029
9531	95A028	N969AT	55030
9532	95A029	N970AT	55031
9533	95A030	N971AT	55032
9534	95A031	N972AT	55033
9535	95A314	N992AT	55136
9536	95A032	N974AT	55034
9537	95A033	N975AT	55035

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Ship Number	Airplane Number	Registry Number	Serial Number
9538	95A315	N993AT	55137
9539	95A316	N994AT	55138
9540	95A317	N995AT	55139
9541	95A034	N977AT	55036
9542	95A318	N996AT	55140
9543	95A035	N978AT	55037
9544	95A036	N979AT	55038
9545	95A319	N997AT	55141
9546	95A037	N980AT	55039
9547	95A320	N998AT	55142
9548	95A038	N981AT	55040
9549	95A039	N982AT	55041
9550	95A040	N717JL	55042
9551	95A050	N891AT	55043
9552	95A051	N892AT	55044
9553	95A052	N893AT	55045
9554	95A053	N894AT	55046
9555	95A054	N895AT	55047
9556	95A055	N896AT	55048
9557	95A056	N899AT	55049
9558	95A057	N922AT	55050
9559	95A058	N923AT	55051
9560	95A059	N983AT	55052
9561	95A060	N938AT	55098
9562	95A061	N939AT	55099
9563	95A401	N936AT	55058
9564	95A402	N935AT	55069

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Ship Number	Airplane Number	Registry Number	Serial Number
9565	95A403	N934AT	55070
9566	95A404	N933AT	55071
9567	95A405	N930AT	55072
9568	95A406	N932AT	55073
9569	95A407	N607AT	55074
9570	95A408	N929AT	55075
9571	95A409	N928AT	55076
9572	95A410	N927AT	55077
9573	95A411	N926AT	55078
9574	95A412	N925AT	55079
9575	95A413	N924AT	55080
9576	95A414	N608AT	55081
9577	95A415	N921AT	55082
9578	95A416	N920AT	55083
9579	95A417	N919AT	55084
9580	95A418	N915AT	55085
9581	95A419	N910AT	55086
9582	95A420	N906AT	55087
9583	95A421	N987AT	55088
9584	95A422	N986AT	55089
9585	95A423	N985AT	55090
9586	95A424	N937AT	55091
9587	95A306	N987DN	55064
9588	95A307	N988DN	55065
9589	95A309	N989DN	55067
9594	95A508	N603AT	55127
And Subsequent			

Preface

Introduction

Chapter P1

Section 2

General

The manufacturer has developed normal and non-normal procedures for the 717 aircraft. Delta Air Lines, Inc. has modified some of these procedures for simplification and standardization, when appropriate, with other aircraft operated by Delta Air Lines, Inc. Finally, the FAA has approved the procedures presented in this Operations Manual.

These procedures are intended to be followed during normal ground operations and in flight. Deviations from these procedures should be made only with good cause and based on the safest course of action. The captain's best judgment must be applied if an abnormality occurs that is not covered by these procedures.

Manual Rights

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Corrections to the Manual

Log on to the Delta Flight Operations Portal, <http://dlnet.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 Pilots Bulletin (APB).

There are links to the PCR form on each fleet page and also on the Flight Ops Manuals/Library Services page. 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.

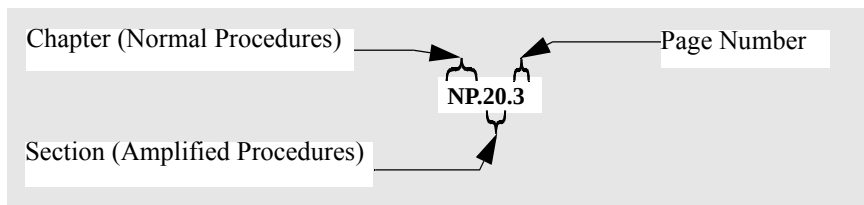
FCTM

- 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, and techniques.

Page Numbering

This manual uses a decimal page numbering system. The page number is divided into three fields; chapter, section, and page. An example of a page number for the Normal Procedures chapter 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, except in the Limitations chapter. In the Limitations chapter, aircraft effectivities are listed in bold when the effectivity applies to the entire section or subsection. When the effectivity applies only to a step within a section, it is listed in normal text.
- 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).

Using model number:

767-300	
EQUIPMENT COOLING mode selector.....	AUTO

In this example, the 767-300 will have the selector in the AUTO position.

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

FUEL L + R CTR PUMPS LO PR
9951-9961

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Abbreviations

Chapter P1

Section 3

General

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

A	
ABS	Auto Brake System
ABV	Above
AC	Alternating Current or Aircraft
ACARS	Aircraft Communications Addressing and Reporting System
ACE	Actuator Control Electronics
ACP	Audio Control Panel
ACT	Active
ADC	Air Data Computer
ADF	Automatic Direction Finder
ADI	Attitude Director Indicator
ADIRS	Air Data Inertial Reference System
ADIRU	Air Data Inertial Reference Unit
ADL	Airborne Data Loader

ADM	Air Data Module
ADS	Automatic Dependent Surveillance
AED	Automated External Defibrillator
AFB	Alternate Fuel Burn
AFDC	Autopilot Flight Director Computer
AFDS	Autopilot Flight Director System
AFE	Above Field Elevation
AFM	Airplane Flight Manual (FAA approved)
AFM - DPI	Airplane Flight Manual - Digital Performance Information
AFS	Automatic Flight System (Autopilot or Autothrottle)
A/G	Air/Ground
AGL	Above Ground Level

AH	Alert Height
AHRS	Attitude Heading Reference System
AI A-ICE	Anti-Ice
AIL	Aileron
AIMS	Airplane Information Management System
ALFA	Safe Stall Margin Speed
ALN	Align
ALT	Altitude
ALT ACQ	Altitude Acquire
ALT HOLD	Altitude Hold
ALTN	Alternate
AM	Amplitude Modulation
AMI	Airline Modifiable Information
AMM	Aircraft Maintenance Manual
AND	Aircraft Nose Down
ANP	Actual Navigational Performance
ANT	Antenna
ANNUN	Annunciator
ANU	Aircraft Nose Up
AOA	Angle of Attack

AOC	Airline Operational Communication Data Link
A/P	Autopilot
APCDU	APU Power Conversion and Distribution Units
APL	Airplane
APP	Approach
APU	Auxiliary Power Unit
AR	Authorization Required
AREU	Audio Remote Electronics Unit
ARINC	Aeronautical Radio, Incorporated
ARPT	Airport
ARR	Arrival
ART	Automatic Reserve Thrust
A/S	Airspeed
ASA	Autoland Status Annunciator
ASI	Airspeed Indicator
ASR	Airport Surveillance Radar
ASYM	Asymmetry
A/T	Autothrottle
ATA	Actual Time of Arrival
ATC	Air Traffic Control

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ATIS	Automated Terminal Information Service
ATM	Assumed Temperature Method
ATR	Automatic Thrust Restoration
ATT	Attitude
ATTND	Attendant
AUTO	Automatic
AUTO-THROT	Autothrottle
AUX	Auxiliary
AVAIL	Available
AWABS	Automated Weight and Balance System
B	
BARO	Barometric
BAT or BATT	Battery
B/C or B/CRS or BAC or BCS	Back Course
BFO	Beat Frequency Oscillator
BITE	Built-In Test Equipment
BKR	Breaker
BLD	Bleed
BLS	Bezel Light Sensor
BLW	Below

BRG	Bearing
BRT	Bright
BTL	Bottle
BTL DISCH	Bottle Discharge (fire extinguisher)
BTMS	Brake Temperature Monitoring System
C	
C	Captain or Celsius or Center or Cool
CAA	Civil Aviation Authority
CADC	Central Air Data Computer
CALSEL	Call Select
CANC/RCL	Cancel/Recall
CANPA	Constant Angle Non-Precision Approach
CAP	Capture
CAPT	Captain
CAWS	Central Aural Warning System
CB	Circuit Breaker
CCD	Cursor Control Device
CDS	Common Display System
CDU	Control Display Unit

CFIT	Controlled Flight Into Terrain
CG	Center of Gravity
CH or CHAN	Channel
CHKL	Checklist
CHR	Chronograph
CKD	Checked
CKPT	Cockpit
CKT	Circuit
CL	Close
CLB	Climb
CLMP	Computer Lockout Manual Power
CLR	Clear
CMD	Command
CMP or CMPTR	Computer
CO	Company
COMM	Communication
COMP	Comparator
COMPT	Compartment
CON	Continuous
CONFIG	Configuration
CONSEQ	Consequence
CONT	Control
COOL	Cooling
CPA	Closest Point of Approach

CPC	Cabin Pressure Controller
C/PDLC	Controller/Pilot Datalink Communications
CRM	Crew Resource Management
CRS	Course
CRT	Cathode Ray Tube
CRZ	Cruise
CTL	Control
CTR	Center or Crosstie Relay
CVR	Cockpit Voice Recorder
CWS	Control Wheel Steering
D	
DA	Decision Altitude
DA(H)	Decision Altitude (Height)
DC	Direct Current
DCU	Display/Data Concentrator Unit
D/D	Direct Descent or Driftdown
DDA	Derived Decision Altitude (MDA +50 feet)
DDG	Dispatch Deviations Guide
DECR	Decrease
DEG	Degree

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DEL	Delete
DEP	Departure
DEP ARR	Departure Arrival
DEPR	Depressurize
DES or DESC	Descent
DEST	Destination
DET	Detector or Detection or Detect
DEU	Display Electronic Unit
DFCS	Digital Flight Control System
DFDAU	Digital Flight Data Acquisition Unit
DFDR	Digital Flight Data Recorder
DFGC	Digital Flight Guidance Computer
DFGS	Digital Flight Guidance System
DH	Decision Height
DIFF	Differential
DIR	Direct
DIR INTC	Direct Intercept
DISAG	Disagree
DISC	Disconnect
DISCH	Discharge
DK	Deck
DME	Distance Measuring Equipment

DN	Down
DPC	Display Processing Computer
DSP	Display Select Panel
DSPL	Display
DTG	Distance to Go
DTW	Distance to Waypoint
DU	Display Unit
E	
EAD	Engine and Alert Display
EADI	Electronic Attitude Director Indicator
ECON	Economy
ECP	Electronic Control Panel
E/D	End of Descent
E/E	Electrical/ Electronic
EEC	Electronic Engine Control
EFB	Electronic Flight Bag
EFI	Electronic Flight Instruments
EFIS	Electronic Flight Instrument System
EGPWS	Enhanced Ground Proximity Warning System
EGT	Exhaust Gas Temperature

EHSI	Electronic Horizontal Situation Indicator
EICAS	Engine Indication and Crew Alerting System
EIS	Electronic Instrument System
ELEC	Electrical
ELEV	Elevator
EMER	Emergency
ENG	Engine
ENG OUT	Engine Out
ENG OUT D/D	Engine Out Driftdown
ENT	Entry
EO or E/O	Engine Out
EOAP	Electronic Overhead Annunciation Panel
EPC	Electrical Power Center
EPCU	Electrical Power Control Unit
EPR	Engine Pressure Ratio
EQPT or EQUIP	Equipment
ET	Elapsed Time
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure

ETE	Estimated Time En Route
ETOPS	Extended Range Operation with Twin Engine Airplanes
ETP	Equal Time Point
EVAC	Evacuation
EXEC	Execute
EXT	Extend or External
F	
F	Fahrenheit
FAA	Federal Aviation Administration
FAC	Final Approach Course
FADEC	Full Authority Digital Engine Control
FAF	Final Approach Fix
FANS	Future Air Navigation System
FAR	Federal Aviation Regulation
FB	Fleet Bulletin
FCC	Flight Control Computer
FCOM	Flight Crew Operations Manual
FCP	Flight Control Panel
FCTL	Flight Control
FCTM	Flight Crew Training Manual

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FCU	Flush Control Unit
FD, F/D or FLT DIR	Flight Director
FF	Fuel Flow
FFM	Force Fight Monitor
FGCP	Flight Guidance Control Panel
FGS	Flight Guidance System
FILT	Filter
FIR	Flight Information Region
FL	Flight Level
FLAR or FLR	Flare
FL CH or FLCH	Flight Level Change
FLEX TO	Flex Takeoff
FLO	Flow
FLT	Flight
FLT CTRL	Flight Control
FLT RCDR	Flight Recorder
FLPRN	Flaperon
FMA	Flight Mode Annunciator
FMC	Flight Management Computer
FMS	Flight Management System
F/O or F O	First Officer
FOM	Flight Operations Manual

FPA	Flight Path Angle
FPM	Feet Per Minute
FPV	Flight Path Vector
FQS	Fuel Quantity System
FREQ	Frequency
F/S	Fast/Slow
FT	Feet
FWD	Forward
FWSOV	Fire Wall Shut Off Valve
FX	Fix
G	
G	Acceleration of Gravity or Generator
GA	Go-Around
GEN	Generator
GLS	GNSS Landing System
GMT	Greenwich Mean Time
GND	Ground
GNSS	Global Navigation Satellite System
GNSSU	Global Navigation System Sensor Units
GP or G/P	Glide Path
GPS	Global Positioning System

GPWS	Ground Proximity Warning System
GS	Ground Speed or Ground Service
G/S	Glide Slope
GW	Gross Weight
H	
HAA	Height Above Airport
HAT	Height Above Touchdown
HDG	Heading or Hydraulic Driven Generator
HDG REF	Heading Reference
HDG SEL	Heading Select
HF	High Frequency
HGS	Head-Up Guidance System (HGS® is a registered trademark of Flight Dynamics)
HI	High
HLD	Hold
HP	High Pressure
HPA	Hectopascals
HPSOV	High Pressure Shut Off Valve
HSI	Horizontal Situation Indicator
HUD	Head-Up Display
HYD	Hydraulic

I	
I/O	Input/Output
IAF	Initial Approach Fix
IAN	Integrated Approach Navigation
IAS	Indicated Airspeed
ICAO	International Civil Aviation Organization
IDENT	Identification
IDG	Integrated Drive Generator
IFE	In-Flight Entertainment System
IFR	Instrument Flight Rules
IGN	Ignition
IGS	Instrument Guidance System
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
IN	Inches
INBD	Inboard
INCR	Increase
IND	Indicator
IND LTS	Indicator Lights

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IN HG	Inches of Mercury
INOP	Inoperative
INIT	Initialization
INSTR	Instrument
INT or INTPH	Interphone
INTC	Intercept
INTC CRS	Intercept Course
IP	Instructor Pilot
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISA	International Standard Atmosphere
ISDU	Inertial System Display Unit
ISFD	Integrated Standby Flight Display
ISIS	Integrated Standby Instrument System
ISOL	Isolation
ISLN	Isolation
J	
JAA	Joint Aviation Authority
K	
K or KTS	Knots
KCAS	Knots Calibrated Airspeed
KGS	Kilograms

KIAS	Knots Indicated Airspeed
L	
L	Left
LAT	Latitude or Lateral
LBS	Pounds
LCDU	Liquid-Crystal Display Units
LCM	Logic Control Module
LD	Load
LDA	Localizer-type Directional Aid
LDG	Landing
LDG ALT	Landing Altitude
LE	Leading Edge
LED	Light Emitting Diode
LIM	Limit
LIM SPD	Limit Speed
LKD	Locked
L NAV or LNAV	Lateral Navigation
LND	Land
LO	Low
LOC	Localizer
LOC-BC	Localizer Back Course
LOM	Locator Outer Marker

LON or LONG	Longitude
LP	Low Pressure
LPR	Landing Performance Request
LRC	Long Range Cruise
LRU	Line Replaceable Unit
LSK	Line Select Key
LT	Light
LWD	Left Wing Down
LWR CTR	Lower Center
LWR DSPLY or LWR DSPL	Lower Display
M	
M	Mach
MAG	Magnetic
MAHP	Missed Approach Holding Point
MAINT	Maintenance
MAN	Manual or Maneuvering
MAP	Missed Approach Point
MASI	Mach/Airspeed Indicator
MAX	Maximum
MAX ALT	Maximum Engine Out Altitude
MAX CLB	Maximum Climb

MAX DES	Maximum Descent
MAX END	Maximum Endurance
MB	Millibars
MCC	Maintenance Control Center
MCDU	Multi-function Control and Display Unit
MCL	Maximum Climb (Engine Rating)
MCO	Maintenance Carry Over
MCP	Mode Control Panel
MCT	Maximum Continuous Thrust
MDA	Minimum Descent Altitude
MDA(H)	Minimum Descent Altitude (Height)
MDM	Mechanical Dispatch Manual
MEA	Minimum Enroute Altitude
MECH	Mechanic
MED	Medium
MEL	Minimum Equipment List
MFD	Multifunction Display
MHZ	Megahertz
MIC	Microphone
MIN	Minimum

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MISC	Miscellaneous
MKR	Marker
MLG	Main Landing Gear
MLS	Microwave Landing System
MLW	Maximum Landing Weight
MM	Middle Marker
MMEL	Master Minimum Equipment List
MMO	Maximum Mach Operating Speed
MNPS	Minimum Navigation Performance Specification
MOCA	Minimum Obstruction Clearance Altitude
MOD	Modify
MOM	Momentary
MORA	Minimum Off Route Altitude
MSA	Minimum Safe Altitude
MSG	Message
MSGS RCVD	Messages Received
MSL	Mean Sea Level
MSP	Mode Select Panel
MTES	Maintenance Test Enable Switch

MTOGW	Maximum Takeoff Gross Weight
MTRS	Meters
MU	Management Unit
MUH	Minimum Use Height
N	
N	Normal
N/A	Not Available
NACL	Nacelle
NADP	Noise Abatement Departure Procedures
NAR	North American Route
NAV	Navigation
NAV RAD	Navigation Radio
ND	Navigation Display
NGS	Nitrogen Generation System
NDB	Non-Directional Beacon
NL	Nose Left
NLG	Nose Landing Gear
NLT	No Later Than
NM	Nautical Mile(s)
NNC	Non-Normal Checklists
NNM	Non-Normal Maneuvers
NPS	Navigation Performance Scales

NORM	Normal
NR	Nose Right
N1	Low Pressure Rotor Speed
N2	High Pressure Rotor Speed (Pratt & Whitney and GE engines) or Intermediate Pressure Rotor Speed (Rolls Royce Engines)
N3	High Pressure Rotor Speed (Rolls Royce Engines)
O	
OAP	Overhead Annunciator Panel (a.k.a. EOAP)
OAT	Outside Air Temperature
OCC	Operations Control Center
ODM	Operational Data Manual
OFST	Offset
OHU	Overhead Unit
OM	Outer Marker
OP	Open
OUTBD DSPL	Outboard Display
OVHD	Overhead
OVHT	Overheat
OVRD	Override

OVSPD	Overspeed
OXY or O2	Oxygen
P	
PA	Passenger Address
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PASS	Passenger
PBD	Place/Bearing/Distance
PBE	Protective Breathing Equipment
PCDU	Power Conversion and Distribution Units
PCP	Pilot Call Panel
PDC	Pitch Data Computer or Performance Data Computer or Pre-Departure Clearance
PED	Pedestal
PERF	Performance
PERF INIT	Performance Initialization
PERF PEN	Performance Penalty

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PES	Pitch Enhancement System
PF	Pilot Flying
PFAF	Precision Final Approach Fix
PFC	Primary Flight Computer
PFD	Primary Flight Display
PI	Performance Inflight
PIP	Product Improvement Package
PLAN	Plan Mode
PLI	Pitch Limit Indicator
PM	Pilot Monitoring
PMC	Power Management Control
PMP	Pump
PNEU	Pneumatic
PNL	Panel
PODS	Pneumatic Overheat Detection System
POS	Position
POS INIT	Position Initialization
POS REF	Position Reference
PPH	Pounds Per Hour
PPI	Planned Position Indicator

PPOS	Present Position
PRAM	Prerecorded Announcement Machine
PRES or PRESS	Pressure
PREV	Previous
PRI	Primary
PRAIM	Predictive Receiver Autonomous Integrity Monitoring
PROF	Profile
PROG	Progress
PROX	Proximity
P/RST	Push To Reset
PRV	Pressure Regulating Valve
PSEU	Proximity Switch Electronics Unit
PSI	Pounds Per Square Inch
PSU	Passenger Service Utilities
PTH	Path
PTT	Push To Talk
PTU	Power Transfer Unit
PWR	Power
PWS	Predictive Windshear System

Q	
Q	Quantity
QFE	Local Station Pressure
QNH	Altimeter Setting
QRH	Quick Reference Handbook
QTY	Quantity
R	
R	Right
RA	Radio Altitude or Resolution Advisory
RAD	Radio
RAS	Remote Access System
RAT	Ram Air Temperature or Ram Air Turbine
RCL	Request for Clearance
RDMI	Radio Distance Magnetic Indicator
RDR	Rudder
REC	Recorder
RECIR or RECIRC	Recirculation
REF	Reference
RET	Retract
RETD	Retard
REV	Reverse

RF	Radius-to-Fix (RF) Legs or Refill
RHM	Rudder Hook Monitor
RLS	Remote Light Sensor
RMI	Radio Magnetic Indicator
RON	Remain Overnight
RNAV or RNV	Area Navigation
RNP	Required Navigational Performance
RPL	Rudder Pressure Limiter
RPM	Revolutions Per Minute
RPR	Rudder Pressure Reducer
RSEP	Rudder System Enhancement Program
RSL	Rudder Stop Limiter
RST	Reset
RSVR	Reservoir
R/T	Radio Transmit
RTE	Route
RTO	Rejected Takeoff
RTP	Radio Tuning Panel
RUD	Rudder

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RVR	Runway Visual Range	SDF	Simplified Directional Facility
RVSM	Reduced Vertical Separation Minimum	SDP	System Display Panel
RWD	Right Wing Down	SEI	Standby Engine Indicator
RWY	Runway	SEL	Select
S		SELCAL	Selective Calling
SAAAR	Special Aircraft and Aircrew Authorization Required	SENS	Sensitivity
SAARU	Secondary Attitude Air Data Reference Unit	SERV	Service
SAT	Static Air Temperature or Satellite	SG	Symbol Generator
SATCOM	Satellite Communication System	SID	Standard Instrument Departure
SB	Service Bulletin	SISP	Source Input Select Panel
S/B	Speedbrake	SMGCS	Surface Movement and Guidance Control System
S/C	Step Climb	SMOK	Smoking
SCL	Secure Content Locker	SPD	Speed
SCP	System Control Panel	SPDBRK	Speedbrake
S/D	Step Descent	STA	Station
SD	System Display	STAB	Stabilizer
SDCP	System Display Control Panel	STAR	Standard Terminal Arrival Route
		STAT	Status
		STBY	Standby
		STD	Standard
		SW	Switch
		SYNC	Synchronizer
		SYS	System

T	
T or TRU	True
T or TK or TRK	Track (to a Navaid)
TA	Traffic Advisory
TAA	Terminal Arrival Area
TACAN	Tactical Air Navigation
TAC	Thrust Asymmetry Compensation
TAI	Thermal Anti-Ice
TAS	True Airspeed
TAT	Total Air Temperature
TBD	To Be Determined
T/C	Top of Climb
TCA	Terminal Control Area
TCAS	Traffic Alert and Collision Avoidance System
T/D	Top of Descent
TD	Traffic Display
TDZ	Touch Down Zone
TDZE	Touch Down Zone Elevation
TE	Trailing Edge
TEMP	Temperature
TERR	Terrain
TFC	Traffic

TFR	Transfer
TGT	Turbine Gas Temperature
THNDSTRM	Thunderstorm
THR	Throttle or Thrust
THR HOLD	Throttle Hold
THROT	Throttle
TMC	Thrust Management Computer
TMI	Track Message Identifier
TMSP	Thrust Mode Select Panel
TO or T/O	Takeoff
TOC	Top of Climb
TOD	Top of Descent
TO FLEX	Takeoff Flexible Derate
TO/GA	Takeoff/Go-Around
TOGW	Takeoff Gross Weight
TR	Traffic Resolution or Transformer Rectifier
TRK	Track
TRP	Thrust Rating Panel
TRU	Transformer Rectifier Unit
TURB	Turbine or Turbulence

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U	
UNBAL	Unbalanced
UNLKD or U/L	Unlocked
UNSCHD or UNSCHED	Unscheduled
UPR DSPL	Upper Display
U.S.	United States
USB	Upper Side Band
UTC	Universal Time Coordinated
UTIL	Utility
V	
VA	Design maneuvering speed
VAL	Valve
VANP	Vertical Actual Navigational Performance
Vapp	Approach Speed
VASI	Visual Approach Slope Indicator
VDC	Volts Direct Current
VDP	Visual Descent Point
VEF	Speed at Engine Failure
VERT	Vertical
Vfe	Flap Extend Speed
Vfr	Flap Retract Speed
VFR	Visual Flight Rules

VG	Vertical Gyro
Vge	Gear Extend Speed
Vgr	Gear Retract Speed
VHF	Very High Frequency
VIA	Versatile Integrated Avionics
VIB	Vibration
VLV	Valve
Vmax	FMC Calculated Max Operating Speed
Vmin	FMC Calculated Min Operating Speed
VMC	Visual Meteorological Conditions
VMCA	Minimum Control Airspeed or Single Engine Minimum Control Airspeed
VMCG	Minimum Control Speed Ground
VMO	Maximum Operating Speed
V NAV or VNAV	Vertical Navigation
VOL	Volume
VOR	VHF Omnidirectional Range
VR	Rotation Speed

VREF	Reference Speed
VRNP	Vertical Required Navigation Performance
V/S	Vertical Speed
Vs	Stall Speed
VSCF	Variable Speed Constant Frequency
VSD	Vertical Situation Display
Vse	Slat Extend Speed
VSI	Vertical Speed Indicator
Vso	Stall speed in landing configuration
Vsr	Slat Retract Speed
Vss	Stick-shaker Speed
VTK	Vertical Track
V1	Takeoff Decision Speed
V1 (MCG)	Minimum V1 for Control on the Ground
V2	Scheduled Takeoff Target Speed
V3	Final Segment Climb Speed
W	
W	Warm
WAGS	Windshear Alert Guidance System
WARN	Warning

WATRS	Western Atlantic Route System
WDR	Weight Data Record
WGS-84	World Geodetic System of 1984
WHL	Wheel
WINDSHR or WNDSHR	Windshear
WOW	Weight On Wheel
WPT	Waypoint
W/S	Windshear
WSC	Windshear Computer
WT	Weight
WX or WXR	Weather Radar
WXBRT	Weather Radar Brightness
WX+T	Weather and Turbulence
X	
X-FEED	Crossfeed
XFER or XFR	Transfer
XPDR or XPNDR	Transponder
XTK	Cross Track
Z	
ZFW	Zero Fuel Weight
ZFWCG	Zero Fuel Weight Center of Gravity

Preface

Revision Record

Chapter P1

Section 4

Revision Notification Transmittal Letter

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

Subject: Operations Manual Revision.

This revision reflects the most current information available to Delta Air Lines, Inc. through the subject revision date. The following revision highlights explain changes in this revision. General information below explains the use of revision bars to identify new or revised information.

Revision Record

No.	Revision Date	Date Filed	No.	Revision Date	Date Filed
0	April 1, 2013		1	June 6, 2013	
2	August 29, 2013		3	November 21, 2013	
4	January 16, 2014		5	May 8, 2014	
6	August 28, 2014		7	October 23, 2014	
8	July 14, 2015		9	September 8, 2015	
10	February 12, 2016				

General

Delta Air Lines, Inc. issues operations manual revisions to provide new or revised procedures and information. Formal revisions also incorporate appropriate information from previously issued Fleet Bulletins.

The revision date is the approximate date the revision material is distributed and considered current. The revision should be incorporated on the revision date, but may be incorporated as much as 21 days after the revision date.

Formal revisions include a Transmittal Letter, a new Revision Record, Revision Highlights, and a current List of Effective Pages. Use the information on the new Revision Record and List of Effective Pages to verify the operations manual content.

The Revision Record should be completed by the person incorporating the revision into the manual.

Filing Instructions

Consult the List of Effective Pages (P1.5). Pages identified with an asterisk (*) are either replacement pages, new (original) issue pages, or deleted pages. Remove corresponding old pages and replace or add new pages. Remove pages marked DELETED; there are no replacement pages for deleted pages.

Be careful when inserting changes not to throw away pages from the manual that are not replaced. The List of Effective Pages determines the correct content of the manual.

Revision Highlights

This section (P1.4) replaces the existing section P1.4 in your manual.

Pages containing revised technical and non-technical material have revision bars associated with the changed text or illustration.

Repaginated material not containing technical revisions are identified only by a new page date.

Chapter P1 - Preface

Section 1 - Model Identification

P1.1.4 - Added new ship to Model Id's.

Section 3 - Abbreviations

P1.3.14 - Added "RAS - Remote Access System" to abbreviations.

Chapter L - Limitations

Section 10 - Operating Limitations

Operational Limitations

L.10.1 - Removed references to "Green Pages."

Chapter NP - Normal Procedures

Section 12 - Operational Procedures

Automation Guidelines

NP.12.1 - Revised guideline to "All pilot-induced lateral, vertical, and speed mode changes should be verbalized by the PF and, after referencing the FMA, the PM should verbally confirm the appropriate FMA status."

NP.12.1 - Changed "verify" to "verbalize" in step.

Standard Callouts

NP.12.3 - Added statement "Crews should focus on the aircraft state during the level-off period."

NP.12.3 - Added "Approximately" to the statement "Approximately 1,000 feet below each assigned altitude."

NP.12.4 - Added "Approximately" to the statement "Approximately 1,000 feet above each assigned altitude."

NP.12.5 - Revised title "CAT I, II & III APPROACHES" to "Autoland."

NP.12.5 - Added Go-Around Callouts for cross fleet standardization initiative and to enhance flight path management.

NP.12.5 - Removed "ALL APPROACHES (ILS and Non-ILS)" Callout Table.

Clearance Verification Procedures

NP.12.8 - Updated reference to Airway Manual.

Lights Usage

NP.12.10 - Added logo lights to the list of lights not to be extinguished above 18,000 feet.

Section 20 - Amplified Procedures

Interior Inspection - First Officer

NP.20.2 - Removed Vol. 1, Vol. 2, ODM, from the list of required documents.

NP.20.2 - Added step to verify EFB mounts are on board.

Before Takeoff Procedure

NP.20.47-48 - Revised checklist to verify runway position to help correct a discrepancy between the actual aircraft position and the required runway position, per FB 16-01.

NP.20.49 - Switched order of steps to align with NCL.

Cruise Procedure

NP.20.55 - Updated reference to Airway Manual.

Go-Around Procedure

NP.20.63-64 - Updated Go-Around procedure for cross fleet standardization initiative and to enhance flight path management.

Shutdown Procedure

NP.20.69 - Revised statement, "Turn EMER PWR selector OFF if both pilots leave the aircraft and the APU is shut down."

Secure Procedure

NP.20.71 - Revised note, "Allow the APU automatic cool down cycle to complete prior to placing the battery switch off."

NP.20.71 - Revised step, "APU.....OFF."

NP.20.71 - Added step, "EXT power switch.....as reqd."

Chapter NOI - Normal Operational Information

Section 3 - Approach Guidance

NOI.3.3-4,7-10,12,16 - Updated reference to Airway Manual.

NOI.3.3 - Changed "controlling RVR" to "controlling visibility."

NOI.3.3 - Revised comments for clarity for LDA with GS approaches that have a MIN PROF box.

NOI.3.3 - Added note, "Do not use the four letter identifier for the ILS entry....."

NOI.3.11 - Removed references to "Green Pages."

NOI.3.11 - Added statement, "Verify waypoints, altitude constraints and descent angle."

NOI.3.12 - Changed "charted GS" to "charted descent path" for generalization due to various language on charts.

NOI.3.15 - Removed references to "Green Pages."

NOI.3.15 - Revised formatting.

NOI.3.16 - Revised "Set DDA rounded up to the next highest 100 feet in the FCP altitude window after the FMA altitude window displays "HOLD" in white." to "Set DDA in the FCP altitude window after the FMA altitude window displays "HOLD" in white."

NOI.3.16 - Changed "charted GS" to "charted descent path" for generalization due to various language on charts.

NOI.3.17 - Removed references to "Green Pages."

NOI.3.17 - Changed "charted GS" to "charted descent path" for generalization due to various language on charts.

NOI.3.19 - Added "FCP" to "FCP Altitude."

Chapter SP - Supplementary Procedures

Section 05 - Introduction

General

SP.05.1 - Revised opening paragraph into list for standardization.

Section 7 - Engines, APU

Engine Crossbleed Start

SP.7.7 - Added statement, "The area behind the aircraft should be considered", to check for clearance.

SP.7.7 - Changed "Cross-bleed" to "Crossbleed."

Manual Engine Start Procedure

SP.7.8 - Removed steps to simplify procedure.

Starting with APU Air or Ground Air Source (External AC electrical power available)

SP.7.12 - Removed steps to simplify procedure.

Section 11 - Flight Management, Navigation

FMS

SP.11.7 - Removed references to "Green Pages."

SP.11.7 - Reformatted note.

FMS Lateral Navigation

SP.11.18 - Added instructions for "LDA with GS."

SP.11.18 - Changed punctuation.

Section 16 - Adverse Weather

Cold Weather Operation

SP.16.1 - Revised statement to align with other fleets.

SP.16.8 - Updated reference to Airway Manual.

Guidelines for Takeoff on Contaminated Runways or Landing with Braking Action Less than Good

SP.16.13 - Removed reference to A330-200/300.

Takeoff Runway Contaminant Decision Tree

SP.16.14 - Removed "-200" from "A330 -200" as all A330 have the same information.

Ground De-Icing/Anti-Icing Procedure

SP.16.17 - Revised captain's response on the pre-gate departure communication to include ship numbers.

SP.16.27 - Removed references to "Green Pages."

SP.16.27-28 - Revised the pre-de/anti-icing (to include forced air) communication to include the deicer asking the captain confirming that the engines are at idle.

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Preface

Chapter P1

List of Effective Pages - FAA Approved

Section 5

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* Title Page	February 12, 2016
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* P1.TOC.0.1-2	February 12, 2016
* P1.1.1-4	February 12, 2016
* P1.2.1-6	February 12, 2016
* P1.3.1-18	February 12, 2016
* P1.4.1-6	February 12, 2016
* P1.5.1-2	February 12, 2016
Limitations (tab)	
* L.TOC.0.1-2	February 12, 2016
* L.10.1-10	February 12, 2016
Normal Procedures (tab)	
* NP.TOC.0.1-4	February 12, 2016
* NP.10.1-8	February 12, 2016
* NP.11.1-8	February 12, 2016
* NP.12.1-10	February 12, 2016
* NP.20.1-72	February 12, 2016
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* NOI.TOC.0.1-2	February 12, 2016
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* SP.3.1-2	February 12, 2016
* SP.4.1-2	February 12, 2016
* SP.5.1-32	February 12, 2016
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* SP.13.1-2	February 12, 2016
* SP.14.1-2	February 12, 2016
* SP.15.1-6	February 12, 2016
* SP.16.1-34	February 12, 2016

* = Revised, Added, or Deleted

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Limitations
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Limitations

Operating Limitations

Chapter L

Section 10

General

The 717 aircraft must be operated in compliance with the Certificate Limitations of the applicable FAA approved Airplane Flight Manual (AFM). This chapter contains Airplane Flight Manual (AFM) limitations and manufacturer recommended non-AFM operating limitations.

Limitations that are obvious, shown on displays or placards, or incorporated within an operating procedure or flight plan/performance documents are not published in this chapter.

Those AFM limitations that are incorporated into other chapters of this manual, into the Vol. 2, or into the QRH are identified with an [AFM] tag.

Note: The symbol (#) indicates recall limitations. Recall limitations are those operationally significant limitations that must be committed to memory. Memorization is necessary because there are no placards, display indications, or markings indicating a limitation exists.

Note: A logbook entry is required any time an aircraft limitation is exceeded, e.g., overweight landing, engine exceedance, etc.

Airplane General

Operational Limitations

Runway Slope	+1.7% to -2.0%
# Maximum Operating Altitude	37,000 feet
Maximum Takeoff and Landing Pressure Altitude	8,500 feet
# Maximum Takeoff and Landing Tailwind Component	10 knots, or as permitted by Delta Special Pages

Maneuvering Limit Load Factors

Flaps/slats retracted: +2.5g to -1.0g

Flaps or Slats extended: +2.0g to 0.0g

Evacuation System

Prior to departure movement from the passenger loading ramp to arrival at the unloading ramp:

- Slide girt bars must be inserted at the floor fittings at the forward entry and forward service door.
- The emergency operating handle on the aft pressure bulkhead door must be exposed and normal operating handle covered.

Landing Lights

Wing landing light motors should be allowed to cool for 1 1/2 minutes after initial extension or retraction and 3 1/2 minutes after each subsequent extension or retraction. Lamps should not be operated in still air for periods of over 10 minutes.

Winds

The Delta 717 crosswind limit is 38 knots for takeoff or landing, including gusts.

Note: The crosswind component may be further limited by low visibility approaches, autolands, contamination, or runway width.

Note: Refer to SP.16, Guidelines for Contaminated Runways.

For crosswind components greater than 40 knots or tailwind components greater than 10 knots, only taxi and ground handling is allowed, with engine N1 limited to 50%.

Penetration Airspeed

Severe turbulence air penetration speed is 275KIAS/.75M.

Weight Limitations

Maximum Weight Limitations

Weights	Pounds
Maximum Taxi Weight (MTW)	122,000
Maximum Take Off Weight (MTOW)	121,000
Maximum Landing Weight (MLW)	110,000
Maximum Zero Fuel Weight (MZFW)	100,500

Air Systems

Pressurization

Maximum cabin differential pressure is 7.86 psi.

Maximum emergency relief pressure is 8.27 psi.

Air Conditioning

For takeoff, the FLOW switch on the overhead panel must be in NORM.

Anti-Ice, Rain

Windshields

Do not operate windshield anti-ice or anti-fog on the affected windshield if windshield is cracked.

Do not exceed 315 KIAS below 10,000 feet when windshield heat is inoperative on any windshield.

Cracked captain, center, or first officer's windshield operating limits below 10,000 feet:

- Outer glass: 315 KIAS
- Inner glass: 235 KIAS

Wing Ice

Assure any ice on wing upper surfaces is removed prior to flight.

Do not take off with "WING ICE DETECTED" alert displayed.

Automatic Flight

Autopilot

During takeoff, do not engage the autopilot below 200 feet AGL.

Do not conduct an auto coupled (ILS or autoland) approach if STAB OUT OF TRIM alert illuminates for longer than 3 seconds after airplane is stabilized and tracking glideslope.

For non-ILS approaches, the autopilot must be disengaged no lower than the applicable minimums minus 50 feet.

Autoland

Maximum allowable wind speeds for autoland operations:

Headwind	25 knots
Crosswind	15 knots
Tailwind	10 knots

Do not conduct autoland operations if:

- ALIGN mode is not annunciated on an FMA by 100 feet radio altitude.
- Any unusual control position or other abnormal conditions exist in the flight control system.
- RUDDER PWR OFF alert is displayed.
- Airport field elevation exceeds 8,000 feet MSL.

Autoland authorized for flaps 40 with both engines operative, or flaps 25 with one engine inoperative.

Flight Management System (FMS)

For airplanes with GPS inoperative, it is required that for VOR approaches the appropriate bearing pointer or course deviation indicator must be displayed on at least one APPR or VOR display.

If the pilot modifies the FMS NAV database approaches, the modified approach must comply with the approved published procedures.

For ILS and IGS approaches, with an inoperative glideslope FMS PROF mode and its Vertical Deviation Indication must not be used for descent after the FAF.

FMS PROF mode must not be used below MDA or DA.

Communications

Aircraft Communications Addressing and Reporting System (ACARS)

ACARS is limited to the transmission and receipt of messages which do not create an unsafe condition if the message is improperly received, such as the following conditions:

- The message or parts of the message are delayed or not received,
- The message is delivered to the wrong recipient, or
- The message content may be frequently corrupted.

However, Pre-Departure Clearance, Digital Automatic Terminal Information Service, weight and balance, and takeoff data messages can be transmitted and received over ACARS/Data Link if they are verified per approved operational procedures.

Engines, APU

Engine Limits

Starter Duty Cycle

Three start attempts, with a minimum of 15 seconds between attempts. Maximum duration of each attempt is 3 minutes. Allow 15 minutes cooling time before further start attempts are made.

Instrument Limit Markings/Indications

Maximum and minimum limits are red.

Caution limits are amber

Note: The published operating limits for engines relate to predefined normal and abnormal operations. However, if any crew finds itself in a life-threatening situation which requires an application of thrust beyond the certified takeoff limits, they can feel confident that the engine(s) will operate satisfactorily for whatever reasonable time is required to maintain safe control of the aircraft.

Operation	Operating Conditions		
	Takeoff/ Go-Around	Maximum Continuous Thrust	Starting
Time Limit (Max)	5 minutes *	None	N/A
Maximum TGT	Red line	Amber line	Red line
Minimum Oil Pressure	Red box	Red box	Red box
Oil Temperature (Min/Max)	Red line/ Red box	Red line/ Red box	Red line/ Red box
Maximum Rotor Speeds (N1 and N2)	Red line	Red line	N/A
*10 minutes for engine failure during takeoff or go-around.			

Reduced Thrust Operations

Delta performance data ensures the availability of reduced takeoff thrust does not exceed authorized limitations.

Reduced thrust takeoffs are permitted on wet runways when using the wet runway takeoff performance.

Reduced thrust takeoffs are not authorized on runways contaminated with standing water, loose snow, slush, compacted snow or wet ice.

Reduced thrust takeoffs are not permitted when any unaccounted issues that will affect takeoff performance are present (e.g. MDM item).

Reverse Thrust

Ground use only.

Do not takeoff with U/L or REV displayed on primary engine display.

Do not use asymmetric reverse thrust for directional control.

APU

General

APU AIR switch must be OFF for takeoff and in flight operations.

Maximum operating altitude is 37,000 feet.

APU starter motor duty cycle is limited to three consecutive start attempts. Wait 30 minutes prior to further start attempts.

Flight Controls

Full application of pitch, roll, or yaw controls should be confined to speeds below the maneuvering speed. Rapid and large alternating control inputs, especially in combination with large changes in pitch, roll, or yaw, and full control inputs in more than one axis at the same time, should be avoided as they may result in structural failures at any speed, including below the maneuvering speed.

Rudder

The rudder hydraulic power must be on for takeoff.

Speedbrakes

Speedbrakes may not be used with flaps extended beyond 20°.

Do not move spoiler/speedbrake lever to ground spoiler position in flight.

Maximum Flap/Slat Extension Speeds

Configuration	Speed
Slats	280 KIAS / .57 M
Flaps 0-10	280 KIAS / .57 M
Flaps 11-20	240 KIAS / .57 M
Flaps 25	220 KIAS / .57 M
Flaps 40	200 KIAS / .57 M

Flight Instruments, Displays

Altimeters

Altitude Display Limits for RVSM Operations

The maximum allowable on the ground altimeter reading differences at a known field elevation for RVSM operations are:

Captain & F/O	Captain or F/O & Field Elevation	Captain and F/O (In Flight)
60 feet	75 feet	200 feet

Standby altimeters do not meet altimeter accuracy requirements of RVSM airspace.

Navigation

Weather Radar

Accuracy of the turbulence detection mode has not been evaluated. Flight must not be predicated on its use.

Do not operate the weather radar in a hangar or within 50 feet of any personnel or a fuel spill.

Note: The hangar and personnel restrictions do not apply to the weather radar test mode.

Fuel

Fuel Loading

Note: The following fuel management and loading limitations do not apply to ballast fuel.

If main tanks are not full, fuel may be added to the center tank until full only if the Zero Fuel Weight (ZFW) and Center of Gravity (CG) plus the center tank fuel do not exceed the Maximum Zero Fuel Weight (MZFW) and CG limitations.

Fuel Management

After takeoff, center tank fuel shall be emptied prior to using main tank fuel.

If ballast fuel is being carried, the center tank shall be emptied to the ballast value prior to using main tank fuel.

Ballast Fuel

Fuel may be loaded into the center tank for ballast purposes provided the following conditions are met:

- Completion of flight, including reserve fuel, does not require the use of ballast fuel, and
- the ZFW and CG includes the weight of ballast fuel.

Lateral Imbalance

Maximum permissible fuel imbalance is 1500 pounds.

Fuel Temperature

The maximum fuel temperature is 54°C for types: Jet A, Jet A1, JP-5, JP-8.

The maximum fuel temperature is 35°C for types: Jet B, JP-4.

Note: For Jet B and JP-4 do not continue to climb above 26,000 feet unless at least one main tank boost pump is operating in each tank.

The minimum fuel temperature is either the higher of the fuel freeze point, or the engine limits, as follows:

- -42°C for takeoff, climb, and go-around
- -48°C for flight above 15,000 feet

Fuel Pumps

Prior to engine start on any flight where center tank fuel is present and will be needed for that route segment, the center tank fuel pumps must be individually checked to verify pump operation.

Do not reset any tripped fuel pump circuit breakers.

Landing Gear

Maximum landing gear retraction speed is 250 KIAS.

Maximum landing gear extension speed is 300 KIAS/0.70 MACH.

The certified maximum tire speed rating is 195 knots.

Warning Systems

Ground Proximity Warning System (GPWS) Terrain Awareness

The following limitations apply to the GPWS Terrain Awareness features.

Navigation must not be predicated upon use of terrain awareness display.

Pilots are authorized to deviate from their current Air Traffic Control (ATC) clearance to the extent necessary to comply with a GPWS warning.

To avoid unwanted alerts, the terrain awareness alerting and display functions must be inhibited, by selecting the terrain override switch to OVRD:

- When landing at an airport not contained in the GPWS airport terrain database, or
- When the FMS NAV mode is IRS ONLY NAVIGATION (IRS NAV indicated on the ND), and the airplane is over land.

Predictive Windshear

Weather radar must be on for takeoff for predictive windshear to be operable.

Normal Procedures

Chapter NP

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Normal Procedures

Philosophy and Assumptions

Chapter NP

Section 10

General

A procedure, as used in this manual, is a series of tasks that are required during a particular phase of flight. Normal procedures are routinely performed on most flights and are outlined in Section 20 of this chapter. The procedures are arranged in chronological order.

Normal procedures assume:

- All aircraft systems are operating normally.
- The flight deck configuration is correct before the procedure commences.
- The pilot is employing the use of autoflight systems.
- The pilot has knowledge and understanding of aircraft systems and limitations.

The above assumptions allow normal procedures to be written to the appropriate level of detail. For additional details including recommendations and techniques, refer to the Flight Crew Training Manual (FCTM).

Philosophy and Compliance with Normal Procedures

Normal procedures provide Delta pilots with the fundamental guidance to operate a flight safely and efficiently. As such, pilots are expected to:

- have a sound knowledge and understanding of normal procedures, and
- routinely use and comply with the procedures on every flight.

Procedures are written considering a normal operating environment. The captain may authorize a deviation from normal procedures when considered in the best interest of safety and/or in the event of a non-normal operating environment.

Normal Procedures and CRM/TEM

Normal procedures are designed to embrace the principles of Delta Air Lines' Crew Resource Management (CRM) and Threat and Error Management (TEM) strategies. For example, embedded in normal procedures are the requirements to provide briefings at key times during the flight. It is not practical, however, to include all aspects of CRM/TEM into normal procedures. Pilots must have a comprehensive understanding of Delta's CRM/TEM philosophy and use it in conjunction with normal procedures.

Terminology

May - The word "may" is used in a permissive sense to state authority or permission. Compliance is not mandatory.

Should - The word "should" is used to indicate that compliance is expected. Deviations are permitted only where an operational requirement exists.

Will, Shall, and Must - The words "will", "shall", and "must" are used in an imperative sense to state the requirement to accomplish the act prescribed. Compliance is mandatory unless an emergency situation exists where compliance would not be in the interest of safety.

Guide - A "guide" is a document that assists the pilot in conducting a normal procedure. The use of a guide is not mandatory.

Crew Duties and Responsibilities

The captain retains final authority for all actions directed and performed.

Crew duties are divided between the pilot flying (PF), pilot monitoring (PM), captain (C), and first officer (F).

The captain's general responsibilities during ground operations include:

- calling for checklists, and
- taxiing.

The first officer's general responsibilities during ground operations include:

- monitoring taxi,
- checklist reading,
- communications, and
- tasks requested by the captain.

The captain is responsible for assigning the PF role. Normally the PF/PM roles remain unchanged throughout the flight but the captain may change the assignments at any time due to operational needs.

The PF's general responsibilities during flight are:

- flight path management and airspeed control,
- aircraft configuration,
- navigation, and
- calling for checklists.

The PM's general responsibilities during flight are:

- monitoring flight path, airspeed, aircraft configuration, and navigation;
- checklist reading;
- communications; and
- tasks requested by the PF.

Tasks Excluded from Normal Procedures

The following procedures are not addressed in NP.20:

- flight deck lighting,
- crew comfort tasks,
- exterior lighting (Refer to NP.12, Exterior Lights Usage.), and
- communication procedures.

Aircraft Configuration Changes During Normal Procedures

Prior to taxi, the flaps will be selected to the takeoff or default position.

During flight, the PF will call for any gear or flap change; the PM will verify that the airspeed is appropriate before accomplishing the change. If operational necessity requires an immediate configuration change and the PM is occupied with other duties, the PF may announce the change and move the appropriate control. This should be understood as the exception and not the rule.

After landing, no configuration changes shall be made until clear of the active runway, or until the aircraft has reached taxi speed when a 180° turn is required.

Sequence, Flow and Responsibility for Tasks

The specific tasks within a procedure are arranged in a logical order. The sequence of the tasks within a procedure may be changed as necessary.

Tasks are accomplished from memory (with the exception of the Secure procedure). This sequence is referred to as a flow pattern. Flow pattern guides assist in learning the sequence and are located in the Flight Crew Training Manual (FCTM).

Tasks are assigned to and normally performed by a specific pilot. The other pilot may perform the task.

Use of Triggers

A “trigger,” is an event that initiates a procedure or task. Procedures start with a trigger statement. For example, the trigger used to commence the Pushback procedure is:

When advised the ground crew is ready for pushback:

Triggers are also used within a procedure to define when a task or a series of tasks are normally accomplished.

Operational flexibility may dictate adjusting a particular trigger.

Aircraft Limitations in Normal Procedures

Aircraft limitations are generally found in the Limitations chapter of this manual and are not normally repeated in normal procedures. There are procedures, however, that are defined ideally when in context with a limitation. In these cases, the limitation will be referred to or embedded in the normal procedure. Pilots need to be aware that normal procedures do not always refer to limitations when they are applicable. Pilots must have a fundamental knowledge and understanding of aircraft limitations.

AFM limitations incorporated into a normal or supplementary procedure in the Volume 1, any section of the Volume 2, or any section of the QRH are identified with an [AFM] tag.

Relationship Between Procedures and Checklists

A normal checklist usually follows the completion of a normal procedure. The name of the checklist is either identical to the procedure that precedes it or is preceded with “After.” For example:

- After completing the Taxi procedure, the captain calls for the Taxi checklist
- After completing the Takeoff procedure, the PF calls for the After Takeoff checklist

Not all tasks within a procedure appear on the checklist that follows. Delta uses criteria that include input from human factor experts, FAA requirements, and fleet standardization to determine what tasks rise to the level that requires inclusion on a normal checklist.

Normal Procedures Construction

Table Header

Except for inspections and preflight procedures that are assigned to one crewmember, normal procedures are shown in a two-column table format. The column header indicates the crewmember responsible for each task. The pilot normally assigned the task is identified in the table header as follows:

- Pilot Flying,
- Pilot Monitoring,
- Captain,
- First Officer, or
- Any Crewmember (Secure procedure only).

Table Cells

Each cell represents either:

- a single task,
- multiple related tasks,
- a warning, caution, or note,
- clarifying information, or
- a trigger.

When the cell only appears in one column, the task is assigned to that pilot. When the table cell spans both columns, the task is applicable to both pilots. Due to space limitations and/or complexity, a task can span both columns but will be assigned to one pilot.

The following conventions are used to assign a task within a cell:

- (C) - captain,
- (F) - first officer,
- (PF) - pilot flying, or
- (PM) - pilot monitoring.

Cell Content

Triggers appear across both columns in bold text and do not have a bullet.

A task is identified with a bullet (●). When the task requires a control to be positioned, the name of the control device appears followed by the position in which it is to be placed. When either the control or position is labeled on the flight deck, the terms are capitalized. For example:

- EMERGENCY LIGHTS switch - OFF

Warnings and cautions appear before the task they affect. Notes will appear after the task they affect.

References

When it is deemed to be beneficial to refer the reader to another informational source, the notation “Refer to ____” is used.

Separate Tables within a Procedure

On some procedures a separate shaded table is used. The separate table contains tasks that are not part of the associated procedure and have one of the following characteristics:

- The tasks do not fit within the time-ordered flow of the procedure (e.g., transition altitude).
- The tasks are not required on every flight (e.g., runway change procedure).

System Discrepancies during Ground Operations

It is the crewmember's responsibility to verify correct system response.

Before engine start, if there is a discrepancy noted:

- Verify that the system controls are set correctly.
- Check the respective circuit breaker as required.
- Test the respective system light as required.
- Check the Mechanical Dispatch Manual (MDM) to decide if the condition has a dispatch effect.
- Decide if maintenance is needed.

During or after engine start, if there is a discrepancy noted:

- Complete the respective non-normal checklist (NNC).
- On the ground, check the MDM.

After engine start, the EIS and CAWS are the primary means of alerting the flight crew to non-normal conditions or incorrect configurations.

Any message that has an adverse affect on safe continuation of the flight appears as an EAD message.

Normal Procedures

Chapter NP

Normal Checklist Instructions

Section 11

General

The primary purpose of the normal checklists is to ensure that the crew has properly configured the aircraft and to verify essential and critical items have been accomplished.

The explanation of each checklist is found in NP.20, Amplified Procedures section of this chapter.

Checklist Content

The checklist has the minimum items needed to operate the airplane safely.

Normal checklist items meet one or more of the following criteria:

- items essential to safety of flight that are not monitored by an alerting system;
- items essential to safety of flight that are monitored by an alerting system but if not accomplished, would likely result in a catastrophic event;
- items needed to meet regulatory requirements;
- items needed to maintain fleet commonality;
- items that enhance safety of flight and are not monitored by an alerting system;
- items that could result in injury to personnel or damage to equipment if not accomplished.

Normal Checklist Use Policy

The crew will use the checklist on every flight and for every phase of flight for which a checklist has been established.

Normal Checklist Instructions

In the event such as taxi delays where all engines are shut down while off the gate, all procedures and checklists will be performed again starting with the Pushback checklist.

Procedure versus Checklist

Before accomplishing the checklist, each crewmember will configure all controls and systems in accordance with the associated normal procedure. The checklist is then used to verify essential procedural tasks. Additionally, when a checklist includes a challenge and response for a briefing, the associated briefing should be completed prior to calling for the checklist that contains the briefing. The checklist functions as a “check” list, not a “do” list.

The Secure checklist is the only exception to this verification philosophy. Since these items are not performed on every flight, the Secure checklist may be accomplished as a “read and do” checklist.

Procedural Errors or Omissions

If during the execution of a checklist the airplane configuration does not agree with the needed configuration:

- Stop the checklist.
- Complete the respective procedural steps.
- Continue the checklist.

If it becomes apparent that an entire procedure was not accomplished:

- Stop the checklist.
- Complete the entire procedure.
- Accomplish the entire checklist from the start.

Checklist Initiation and Completion

On the ground, the captain calls for the checklists and the first officer reads the checklists. In flight, the PF calls for the checklists and the PM reads the checklists. If a checklist is required but has not been called for, the other pilot should query the pilot responsible for calling for the checklist.

Whenever possible, accomplish checklists before or after high workload times.

Normally checklists are not called for until all associated procedural items are complete and there is an expectation that the checklist can be completed without interruption. The Preflight checklist, however, may be initiated before the completion of the logbook and/or fuel required tasks. If either or both of these tasks are not complete, the checklist will be read up to the last completed task. When the remaining task(s) has been completed, the checklist will be continued. Additionally, when the transition level is below 10,000 feet, the Approach checklist should be started, but will not be considered complete until the local altimeter is read.

Crewmembers may need to suspend a checklist for a short time to accomplish other tasks. The checklist should not be stowed prior to completion. If the interruption is short, continue the checklist with the next step. If a crewmember is not sure where the checklist was interrupted or the interruption is for an extended period of time, re-accomplish the checklist from the beginning.

After resuming the checklist, all checklist challenges and responses must be made by the designated pilot(s) before calling the checklist complete and stowing the checklist.

When all items of the checklist have been completed satisfactorily, the pilot reading the checklist shall announce “___ CHECKLIST COMPLETE” and may stow the checklist.

If all pilots vacate the flight deck after accomplishing the Preflight checklist, the checklist must be re-accomplished.

First-Flight-of-the-Day and After Shutdown Reminders

The Normal Checklist (hardcard) includes first-flight-of-the-day and after shutdown reminders. They are on the hardcard as a convenient means to recall tasks that may have to be performed.

Checklist Response Designators

Located on the right side of specific checklist response items are designators indicating which crewmembers must verbalize a response. Items that do not have designators are to be accomplished silently.

The following designators are used:

- C - captain,
- F - first officer,
- C&F - captain and first officer,
- PM - pilot monitoring, and
- All - All flight deck crewmembers.

If a checklist item is identified with a C&F, a dual response is required. The first response will be made by the pilot being challenged, the challenger will then respond.

Checklist Challenges

Checklist challenges identify the control or task to be checked. The pilot reading the checklist shall read the specific challenge as written.

When a checklist challenge does not end with “switch” or “lever”, the challenge refers to system status. For example, “Landing Gear...”, refers to the status of the landing gear, not just the position of the lever.

When a checklist challenge ends with “switch” or “lever”, the challenge refers to the position of the switch or lever. For example, “Engine start levers...” refers to the position of the levers.

Checklist Responses

Checklist responses are spoken as written although some items may use abbreviations due to hardcard space limitations.

When a checklist response is shown in all capital letters it refers to switch or lever position. For example, “Engine start levers...CUTOFF.”

When a checklist response is written in lower case it refers to the status of the associated system. For example, “Landing gear...down.”

Tailored responses are included where appropriate.

When a checklist response does not allow the use of a specific switch position, the following terms are used as a response:

- A blank line “_____” requires a unique response and is used when the response is a variable value; such as takeoff thrust, altimeters, bugs, flaps, slats, or stabilizer trim settings.
- **as reqd** means alternatives are available. Respond with the actual position of the control. For example, “Autobrakes.....3”.
- **ckd** means that controls or other systems have been evaluated/tested for proper system operation.
- **complete** indicates the associated procedure and/or procedural task in its entirety has been completed.
- **entered** indicates information, values or selections associated with the procedure have been correctly loaded in the appropriate location.
- **set** indicates panel switches, knobs, or bugs are verified to be in the correct position or the correct value has been entered.
- **verified** indicates the challenged items are correctly entered, annunciated, or have otherwise been confirmed to be correctly displayed.
- **xckd** indicates the associated value or setting has been confirmed to have been entered correctly at all locations, as specified.

An explanation of the checklist response appears in the Amplified Procedures section of this chapter when the response:

- is not obvious on how the procedure is verified and/or what needs to be verbalized,
- is not addressed at all in the procedure, or
- has a blank line “_____.”

Verification of Checklist Items

When performing a checklist requiring verbalization, the crew will progress to the next item only after the response is confirmed by the crewmember being challenged.

The crewmember responding to a checklist challenge must confirm the task or procedure was completed by:

- visually verifying the checklist item, or
- observing the item was completed, or
- confirming completion with the crewmember who accomplished the procedure.

When responding to a checklist item, a visual verification must be accomplished, when possible.

Runway, Intersection, Departure, Performance Data, or Approach Changes, or Go-Around

A ■ indicates items that should be considered for re-accomplishment in the event of a runway, intersection, departure, performance data, or approach change, or go-around.

Takeoff

In the event a runway, intersection, departure, or performance data change occurs after completing a checklist the captain should call for the runway/departure change items. After the necessary procedural steps are accomplished, the first officer will verbalize each change item by stating the challenge to the item. The designated crewmember(s) will respond with either:

- “NO CHANGE” for an item, or
- the appropriate checklist response for the item that changed.

Landing

In the event a runway or arrival change occurs after completing a checklist the pilot flying (PF) should call for the runway/approach change items. After the necessary procedural steps are accomplished, the pilot monitoring (PM) will verbalize each change item (if not previously briefed) by stating the challenge to the item. The designated crewmember(s) will respond with either:

- “NO CHANGE” for an item, or
- the appropriate checklist response for the item that changed.

Note: If the landing runway assignment is changed and the captain determines the runway change can be accomplished visually, the captain may choose to waive the runway change items.

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Normal Procedures

Operational Procedures

Chapter NP

Section 12

Multi-purpose Control Display Unit (MCDU)

Before taxi, the captain or first officer may make MCDU entries. The other pilot must verify the entries.

Make MCDU entries before taxi or when stopped, when possible. If MCDU entries must be made during taxi, the first officer makes the entries. The captain must verify the entries.

In flight, MCDU entries will normally be made by the PF. When the autopilot is off, or when operating in a high workload environment, the PF should direct the PM to make MCDU entries. Both pilots should verify MCDU entries affecting lateral or vertical flight path.

Automation Guidelines

The automation policy is described in the FOM. The following guidelines are used to achieve these policies:

- Briefing should include any uncommon levels of automation and related monitoring expectations.
- PROF should be used when available and appropriate during climb, cruise, and initial descent.
- Both pilots are responsible for comparing the performance of the autoflight system with the desired flight path of the aircraft.
- All pilot-induced lateral, vertical, and speed mode changes should be verbalized by the PF and, after referencing the FMA, the PM should verbally confirm the appropriate FMA status.
- Both pilots are responsible for monitoring the FMA and/or FCP whenever any component of the autoflight system is engaged and a flight mode change occurs.

Autopilot Guidelines

The PF will verbalize when the autopilot is engaged or disengaged.

When an autopilot is engaged:

- the PF should operate the FCP and
- the PM should verbalize that the proper selections have been set.

When an autopilot is not engaged:

- the PM should operate the FCP as directed by the PF and
- the PF should verbalize that the proper selections have been set.

Stabilized Approach

Delta defines a stabilized approach as maintaining a stable speed, descent rate, and lateral flight path while in the landing configuration.

WARNING: At any altitude, if the following stabilized approach criteria cannot be established and maintained, initiate a go-around. Do not attempt to land from an unstable approach.

No lower than 1000 feet AFE:

- Be fully configured for landing (gear and landing flaps extended).
- Maintain a stabilized descent rate not to exceed 1,000 fpm.
- Be aligned with the intended landing runway.

No lower than 500 feet AFE:

- Be on target airspeed.
- The engines are stabilized at the thrust setting required to maintain the desired airspeed and rate of descent.

Crossing the Runway Threshold:

- Positioned to make a normal landing in the touchdown zone.

Planned Deviations

- A circling maneuver and some published approaches (such as the River Visual at DCA) may require a planned deviation to the lateral stabilized approach criteria. Some published approaches require higher than standard descent rates. Verbalize all planned deviations during the approach briefing.

Unplanned Descent Rate Exceedance

- In the event of a momentary descent rate exceedance, crews may proceed as long as the descent rate exceedance is verbally acknowledged and corrective action is immediately initiated.

Normal Radio Management

Generally VHF #1 is to be used for ATC communications. VHF #2 is normally used for communications with ramp control, station operations, or other company communications. The first officer should clearly communicate to the captain the radio being used to receive taxi instructions. When VHF #2 is not used for ramp or company communications, a listening watch on 121.5 should be maintained as conditions permit.

Standard Callouts

The following callouts will be verbalized by the appropriate crewmember.

Crews should focus on the aircraft state during the level-off period.

Some callouts are made automatically by aircraft aural systems. When a required callout is made automatically, it may be omitted by the appropriate crewmember.

On any approach, when the pilot flying (PF) can maintain visual contact with the runway, the “APPROACHING MINIMUMS” and “MINIMUMS” callouts are not required.

Note: If the Radio Altimeter is inoperative, reference the barometric altimeter for the “1,000” and “500” callouts.

TAKEOFF		
Condition	Crew Member	Callout
At 80 KIAS	PM	“80 KNOTS, CLAMP, THRUST NORMAL”
At V1	PM	“V1”
At VR	PM	“ROTATE”
At positive rate of climb	PM	“POSITIVE RATE”

CLIMB		
Condition	Crew Member	Callout
Approximately 1,000 feet below each assigned altitude	PM	“OUT OF __ FOR __”
Approaching transition altitude (if other than 18,000 feet)	PM	“TRANSITION ALTITUDE”

DESCENT		
Condition	Crew Member	Callout
Approximately 1,000 feet above each assigned altitude	PM	“OUT OF __ FOR __”
Approaching transition level (if other than FL 180)	PM	“TRANSITION LEVEL”

ALL APPROACHES		
Condition	Crew Member	Callout
Any significant deviation from planned flight path, airspeed or descent rate	PM	“SPEED +/- __” or “SINK __”, etc.
At approximately 1,000 AGL	PM	“1,000, CLEARED TO LAND” or “1,000, NO LANDING CLEARANCE”
Below 1,000 AGL: Any descent exceeding 1,000 feet per minute	PM	“SINK __”
At approximately 500 AGL	PM	“500”
Prior to descending below 100 feet above TDZE/Rwy Threshold Elevation: • With runway in sight (if not already called) • With runway not in sight	C	“RUNWAY IN SIGHT” (F must acknowledge) Note: This call not required on CAT III and visual approaches. “GO AROUND” (F must acknowledge)

Autoland		
Condition	Crew Member	Callout
Autoland approaches. When annunciated (approximately 150 feet RA, 100 feet minimum)	PM	“ALIGN”

Non-ILS, CAT I, CAT II, & CAT III APPROACHES		
Condition	Crew Member	Callout
Approximately 100 feet above minimums	PM	“APPROACHING MINIMUMS”
At or before minimums	C	“APPROACH LIGHTS IN SIGHT,” or “RUNWAY IN SIGHT” or “GO AROUND” (F must acknowledge)
At minimums	PM	“MINIMUMS”

GO-AROUND ALL APPROACHES		
Condition	Crew Member	Callout
When a Go-Around is warranted	PF	“GO AROUND”
After proper FMA mode annunciation, announce pitch mode	PM	“GO AROUND VERIFIED”
	PF	“FLAPS 13”
At positive rate of climb	PM	“POSITIVE RATE”
	PF	“GEAR UP”

AFTER ALL LANDINGS		
Condition	Crew Member	Callout
Verify spoilers are up	PM	“SPOILERS UP”
If spoilers are not up	PM	“NO SPOILERS”
At 80 knots	PM	“80 KNOTS”

Clearance Verification Procedures

The pilot flying (PF) and pilot monitoring (PM) should monitor and confirm all issued ATC clearances, unless operational constraints (e.g., PAs, PM leaves flight deck) prohibit. If any pilot is unsure of the stated clearance, contact ATC to verify.

Note: If a clearance, departure procedure, or route is changed, reaccomplish the clearance verification procedure.

Clearance Type	Action	
	PF	PM
Pre-Departure Clearance (PDC)/Departure Clearance (DCL) via ACARS, CPDLC, or voice On voice clearances, both pilots should monitor and at least one pilot must write down the ATC clearance.		Referencing the departure clearance, verbalize the departure, route of flight, altitude, and any speed restriction to the PF.
	Referencing the FMS and FCP, verbalize the departure, route of flight, altitude, and any speed restriction to the PM.	
Taxi	The captain should repeat the taxi clearance after the first officer has read the clearance back to ATC. When issued complex and/or extensive taxi instructions, at least one pilot should write down, or enter into the FMS scratchpad, the taxi clearance.	
Takeoff	Acknowledge clearance items different than previously briefed.	

Clearance Type	Action	
	PF	PM
Altitude	Both pilots should verify the altitude specified by either an ATC clearance or a procedure has been set correctly by stating the altitude and pointing at the altitude display window. Ensure the proper altimeter reference - QNH, QNE, or QFE - is set.	
Crossing Restrictions, Headings, and Airspeeds	Acknowledge the clearance received by repeating the new clearance.	
Class I or II Airspace	Refer to Airway Manual, Airspace & Enroute Navigation, CDRC.	

Lights Usage

Exterior Lights Usage

The captain is responsible to ensure all exterior lights are set appropriately. Exterior lights should be used in accordance with the following:

Phase of Flight	Lights Usage
Aircraft is powered	Navigation/Position lights illuminated continuously. • NAV - ON • HI-INT - ON • LOGO lights - ON
Engines running/aircraft moving	Anti-collision lights (beacons) illuminated immediately prior to aircraft movement or engine start, whichever occurs first. • BCN - ON
Taxiing	Taxi light illuminated when moving or intending to move. • NOSE LT - TAXI/LAND
Crossing a runway	All exterior lights illuminated. Note: Avoid using LANDING lights if they will adversely affect the vision of other pilots. • LDG LT L and R - EXT ON • NOSE LT - LAND • WING/NACL - ON • GND FLOOD LT L and R - LEFT and RIGHT ON
Line up and wait	All exterior lights illuminated, except the landing lights. • NOSE LT - TAXI • WING/NACL - ON • GND FLOOD LT L and R - LEFT and RIGHT ON
Takeoff	All exterior lights illuminated. • NOSE LT - LAND • LDG LT L and R - EXT ON
In flight (at 10,000 feet)	Consider retracting the LDG LT as the aircraft accelerates through 250 knots, due to vibration.

Phase of Flight	Lights Usage
In flight (above 18,000 feet)	Exterior lights extinguished, except the anti-collision (beacon), logo, navigation/position, and strobe lights. • LDG LT L and R - RET • NOSE LT - OFF • WING/NACL - OFF • GND FLOOD LT L and R - OFF
In flight (below 18,000 feet)	All exterior lights illuminated. Note: Consider delaying the LDG LT until the aircraft slows through 250 knots, due to vibration. Note: The NOSE LT may remain OFF until landing clearance has been received. • LDG LT L and R - EXT ON • NOSE LT - LND • WING/NACL - ON • GND FLOOD LTS L and R - LEFT and RIGHT ON

Emergency Lights Usage

Emergency lights must be armed for taxi, takeoff, and landing. They are not required to be armed during either the boarding or deplaning process.

Normal Procedures
Amplified Procedures

Chapter NP
Section 20

Interior Inspection - First Officer

Normally the first officer accomplishes this procedure. However, it does not preclude the captain from completing all or part of the procedure if time and conditions dictate.

It is the responsibility of the flight leader/purser to verify the cabin emergency equipment inspection is completed. For flights without flight attendants on board, refer to SP.1, Cabin Inspection-Flights without Flight Attendants.

The Interior Inspection procedure assumes that the Electrical Power Up procedure is complete. Refer to SP.6, Electrical Power Up, if required.

WARNING: If a red A/C OUT-OF-SERVICE tag is installed, personnel are not to activate any system, control, switch, or circuit breaker without obtaining verbal approval of maintenance personnel (preferably the mechanic performing the repairs).

Flight deck security search Complete
Refer to FOM, chapter 4, Sensitive Security Information, for information and timing requirements.

Logbook Check

All crewmembers must review the logbook to become familiar with the history and maintenance status of the aircraft.

If there is doubt concerning the status of the logbook, contact MCC via the dispatcher.

- Ensure the logbook matches the aircraft ship number.
- Ensure the Airworthiness Release has been signed by maintenance.

Note: Airworthiness Release sign-off is not required at a Delta non-maintenance station when aircraft airworthiness discrepancies do not exist.

- Review any EP-19s for special equipment and/or operating instructions.
- Consult the MDM for any operating limitations or crew operating procedures as a result of existing MELs/CDLs.

Potable water and waste tanks Check

- Confirm the potable water supply is sufficient.
- Ensure lavatories have been serviced, if required.

Quantities Check

Check the following are sufficient for flight:

- minimum oxygen pressure 1,000 psi;
- hydraulic quantities:
 - Left: 7 quarts; Right: 7 quarts;
- engine oil:
 - Maintenance stations 9 quarts;
 - Non-maintenance stations 7 quarts.

Required documents Check

- Aircraft Logbook;
- Normal Checklists (2);
- Jeppesen Airside Flight Kits, refer to FOM 11.2, Jeppesen Airside Flight Kits;
- Quick Reference Handbook (QRH) (2);
- Mechanical Dispatch Manual (MDM);
- Quick Reference Card.

EFB Mounts Check

Verify 3 EFB mounts on board.

Circuit breakers Check

Verify circuit breakers are in or collared in compliance with dispatch requirements.

Flight deck emergency equipment	Check
• Fire Extinguisher - Check and stowed; • trigger safety pin in place, • seal intact, • pressure in green band, and • properly stowed. • Crash ax - stowed; • PASS OXY MASK release switch - NORM, guard closed; • Oxygen bottle valve - ON • PBE - check; • Verify the PBE is in its stowage bracket and both plastic seals are intact. • Escape ropes - stowed; • Life vests - stowed; • Gear pins - stowed. • ELT - ARMED • Verify properly stowed and the mode switch is in the ARMED position.	
Jumpseat	Secure
Crew luggage	Secure
Printer paper	Check
Flight deck door decompression panels	Check
Verify the decompression latch indicator for each panel is aligned with the green band.	

Exterior Inspection - Captain or First Officer

Before each flight the captain must verify the airplane is in satisfactory condition for flight. Make a complete exterior inspection, and report any discrepancies to the captain and to maintenance as soon as possible. Emphasis should be placed on tire wear, airframe or control damage, and leaking fluids.

Be aware of security issues. Refer to FOM, chapter 4, Sensitive Security Information.

Following the route below, complete the preflight at the point where the inspection began, ensuring a complete circuit around the aircraft.

Items at each location may be checked in any sequence.

Ensure that:

- surfaces and structures are clear, undamaged, not missing parts, and there are no fluid leaks;
- hydraulic lines and electrical wires are secure and undamaged;
- installed placards are readable;
- gear struts are not fully compressed;
- gear pins have been removed;
- engine inlets and tailpipes are clear, cowlings are secured and undamaged, and the reversers are stowed;
- doors and access panels that are not in use are latched;
- probes, sensors, ports, vents, and drains are unobstructed, clear, and undamaged;
- skin area adjacent to the pitot probes and static ports is not wrinkled;
- antennas are not damaged;
- light lenses are clean and not damaged;
- exterior lights are illuminated in accordance with NP.12, Lights Usage.

Notify maintenance if any:

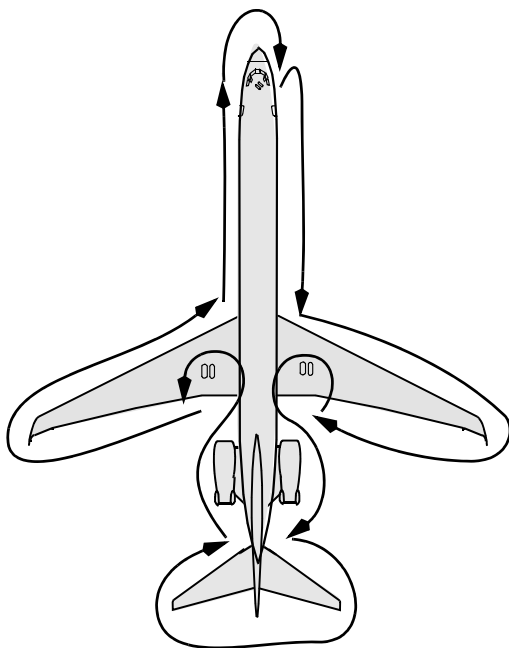
- tread groove is worn completely around the tire;
- tires are worn beyond limits, damaged, or tread is separating;
- layer of cord is showing;
- questionable cut exists;
- tire shows appearance of improper inflation;
- wheel through-bolt or nut is missing or damaged.

CAUTION: Airplanes that are exposed to high-sustained winds, or wind gusts, greater than 75 mph (approximately 65 knots) are susceptible to elevator damage and/or jamming. In accordance with the Aircraft Maintenance Manual, airplanes suspected to have been subjected to these conditions must have visual and physical inspections (moving the surfaces by hand) of all flight controls and an operational check of these systems.

For Cold Weather Operation, refer to SP.16.

Check the following specific items during the exterior inspection:

Inspection Route



Left Forward Fuselage

Probes, sensors, ports, vents and drains (as applicable)	Check
Doors and access panels (not in use)	Latched
Electrical ground service panel	Check
WHEEL WELL LIGHTS switch - ON	
Angle of attack vane	Check
Ensure vane is approximately parallel with the ground.	

Nose

Radome	Check
Diverter strips - Secure	
Probes, sensors, ports, vents and drains (as applicable)	Check
Wipers and windshield	Check

Nose Landing Gear and Wheel Well

Tires and wheels	Check
Gear doors	Check
Gear strut and nose wheel steering assembly	Check
Hydraulic lines and electrical wires	Check
Exterior lights	Check
Gear pin	Removed
Aft center deflector	Check
Nose wheel steering assembly.....	Check
Steering bypass lever	As required

If towbar is attached, towing lever set to bypass, pin installed.

Right Forward Fuselage

Probes, sensors, ports, vents, and drains (as applicable)	Check
Doors and access panels (not in use)	Latched
Exterior lights	Check
Oxygen pressure relief green disc	In place
Angle of attack vane	Check
Ensure vane is approximately parallel with the ground.	

Right Inboard Wing and Lower Fuselage

Probes, sensors, ports, vents, and drains (as applicable)	Check
Doors and access panels (not in use)	Latched
Exterior lights	Check

Right Wing and Leading Edge

Doors and access panels (not in use)	Latched
Probes, sensors, ports, vents, and drains (as applicable)	Check
Leading edge slats	Check
Vortilon	Check
Fuel sticks	Check

Right Wing Tip and Trailing Edge

Exterior lights	Check
Static discharge wicks	Check
Control surfaces	Check
Flaps and fairings	Check

Right Landing Gear and Wheel Well

Tires, brakes and wheels	Check
Gear strut, actuators, and doors	Check
Hydraulic lines and electrical wires	Check
Spray deflector	Check
Light	Check
Spoiler bypass handle (if installed)	ON
Gear pin	Removed

Right Aft Fuselage

Doors and access panels (not in use)	Latched
Probes, sensors, ports, vents, and drains (as applicable)	Check
Exterior lights	Check
Overwing emergency exits	Check

Right Engine

Probes, sensors, ports, vents and drains (as applicable)	Check
Engine inlet	Check
Rubber-tipped bullet nose	Check
Nacelle	Check
Doors and access panels (not in use)	Latched
Exhaust area	Check
Thrust reverser	Stowed
Reverser leading edge	Check
Thrust reverser lockout pins	Check
Verify lockout pins are not installed.	

Tail

Doors and access panels (not in use)	Latched
Probes, sensors, ports, vents, and drains (as applicable)	Check
Vertical stabilizer and rudder	Check
Horizontal stabilizer and elevator	Check
Static discharge wicks	Check
Lower aft fuselage surface	Check

Check for evidence of tail strike damage.

Tail skid	Check

Indicator horizontal and safety wired.

Tailcone assembly	Check

Left Engine

Probes, sensors, ports, vents and drains (as applicable)	Check
Engine inlet	Check
Rubber-tipped bullet nose	Check
Nacelle	Check
Doors and access panels (not in use)	Latched
Exhaust area	Check
Thrust reverser	Stowed
Reverser leading edge	Check
Thrust reverser lockout pins	Check

Verify lockout pins are not installed.

Left Aft Fuselage

Doors and access panels (not in use).....	Latched
Probes, sensors, ports, vents, and drains (as applicable).....	Check
Outflow valve	Check
Exterior lights	Check
Overwing emergency exits	Check

Left Landing Gear and Wheel Well

Gear strut, actuators, and doors	Check
Hydraulic lines and electrical wires	Check
Tires, brakes and wheels	Check
Spray deflector	Check
Light	Check
Spoiler bypass handle (if installed)	ON
Gear pin	Removed

Left Wing Tip and Trailing Edge

Exterior lights	Check
Static discharge wicks	Check
Flaps and fairings	Check
Control surfaces	Check

Left Wing and Leading Edge

Probes, sensors, ports, vents, and drains (as applicable).....	Check
Doors and access panels (not in use).....	Latched
Fuel sticks	Check
Leading edge slats	Check
Vortilon	Check

Left Inboard Wing and Lower Fuselage

Doors and access panels (not in use)	Latched
Probes, sensors, ports, vents, and drains (as applicable)	Check
Exterior lights	Check

Left Forward Fuselage

Doors and access panels (not in use)	Latched
Probes, sensors, ports, vents, and drains (as applicable)	Check
Potable water	Check
Confirm the potable water supply is sufficient.	
Positive pressure relief valves	Check
Electrical ground service panel.....	Check
WHEEL WELL LIGHTS switch - OFF	

Preflight Procedure - Pilot Flying

Normally the pilot flying (PF) accomplishes this procedure. However, it does not preclude another crewmember from completing all or part of the procedure if time and conditions dictate. In all cases both the pilot flying (PF) and pilot monitoring (PM) must confirm the FMS preflight entries.

After completing this procedure, the pilot flying (PF) should accomplish a visual scan to ensure the pilot monitoring (PM) has accomplished the flight deck set-up.

WARNING: If a red A/C OUT-OF-SERVICE tag is installed, personnel are not to activate any system, control, switch, or circuit breaker without obtaining verbal approval of maintenance personnel (preferably the mechanic performing the repairs).

IRS Panel Set

IRS Mode Selectors - NAV

Prior to aircraft movement, verify:

- NAV OFF light extinguished on IRS control panel,
- IRS IN ALIGN alert message extinguished on the EAD, and
- TAXI message displayed on the PFD.

FMS Set

REF key - Push

- A/C STATUS page - Select
- MODEL - Verify 717-200

CAUTION: Changing the database erases the flight plan as well as the stored data. The active database cannot be changed after engine start.

- ACTIVE DATA BASE - Verify

Note: Verify the current database is active based upon the local date of departure. Verify the database code begins with DL3.

- If desired, select SECOND DATA BASE and re-select ACTIVE DATA BASE to verify that all stored data has been erased.

F-PLN INIT page - Select

- Enter FROM/TO
- RETURN TO F-PLN INIT page - Select
- INITIALIZE IRS prompt - Select

Note: Manual route and performance initialization may be required after the IRS has been initialized. If uplinks are unavailable or incomplete, refer to SP.11, FMS Manual Entry Procedures.

MENU key - Push

- ACARS page - Select
- DATA INIT page - Select
- INIT RQST prompt - Select

Note: For through flights, select the CONFIRM prompt.

- Verify FLIGHT NO, FLT RLS DATE, DEPT STN, and DEST STN.
- Enter ETE.
- Enter/verify FOD.
- NEXT PAGE - Select
- Enter six digit employee numbers for LDG CAPT and LDG FO.
- Enter FLT RLS.
- SEND prompt - Select

Note: The Data Uplink messages cannot be viewed from the ACARS menu. Return to the FMC by pressing any MCDU key to view the Data Uplink messages.

Note: Queued messages will appear in the MCDU scratchpad. These messages can be viewed by using the CLR key.

Note: The correct sequence to insert the Data Uplinks is; route, then performance, then winds. If the correct order is not followed, data will be lost and manual entries must be made.

Note: In the case of corrupted or incomplete Data Uplinks, the process may be reinitiated by selecting the FMC RESET prompt on ACARS INIT DATA page 1. This can only be accomplished one time. If Data Uplink problems still persist, manual entries must be made.

REF key – Push

- AOC COMM page - Select

- REVIEW AOC ROUTE page - Select
- INSERT ACT prompt - Select
- REVIEW PERF DATA page - Select
- INSERT prompt - Select
- REVIEW WIND DATA page - Select
- INSERT ACT prompt - Select

F-PLAN key - Push

- LAT REV from departure airport - Select
- Enter RWY, SID, and TRANS, if required.
- LAT REV from last flight plan waypoint - Select
- Enter STARS, APPRS, and TRANS, if required and available.

Note: If unable to determine an approach, select the best approach available based on forecast winds and runway conditions.

- INSERT prompt - Select
- Clear F-PLN DISCONTINUITY, if required.

Note: Verify the correct LAT/LONG of all non-database waypoints (e.g. N32W081 or PBD01) against the flight plan. If doubt exists as to the correct LAT/LONG for a waypoint, refer to the LAT/LONG in the flight plan, the Jeppesen chart, or contact Dispatch.

NAV RAD key - Push

- Confirm autotune of NAVAIDs or enter NAVAID information, as required.

PERF key – Push

- Enter climb speed restrictions, if required.
- Review descent winds on PERF page 3, DESCENT FORECAST page.

INIT key – Push

- Enter 0 for ALTN ROUTE.
- Verify FLT NO, CRZ LEVELS, FROM/TO, and CI.
- WEIGHT INIT page - Select
- Verify TAXI, RTE RSV, FINAL, BLOCK, and ZFW.

Note: UFOB will not equal BLOCK until fueling is complete.

TO/APPR key – Push

- THRUST LIMITS page - Select
- CLB1 - Select

Verify EAD thrust rating indication is magenta.

SEC F-PLN key – Push

- Select COPY ACTIVE or enter SEC F-PLN, if desired.

FIX key - Push

- Enter fix information, if desired.

PROG key - Push

- Compare DTG with flight plan.

F-PLN key - Push

- Select ECP PLAN mode.
- Step through F-PLN using the MCDU up arrow key and compare to flight plan.

Departure briefing..... Complete

Refer to FOM, chapter 3, Briefings.

Preflight Procedure - Pilot Monitoring

Normally the pilot monitoring (PM) accomplishes this procedure. However, this does not preclude another crewmember from completing all or part of the procedure if time and conditions dictate. In all cases the pilot monitoring (PM) must confirm that the Preflight Procedure – Pilot Monitoring, has been completed.

WARNING: If a red A/C OUT-OF-SERVICE tag is installed, personnel are not to activate any system, control, switch, or circuit breaker without obtaining verbal approval of maintenance personnel (preferably the mechanic performing the repairs).

First-flight-of-the-day items (if required) Check
These checks or tests need only be accomplished prior to the first departure of the calendar day as noted in the aircraft logbook. These system tests are covered in the Supplementary Procedures chapter of this manual.

Procedure	Location
Flight Deck Access System Test	SP.1
Hydraulic System	SP.13
EGPWS	SP.15
Emergency Power	SP.6
Wing Ice Detection	SP.3
Fuel System	SP.12
Gear Warning	SP.14
Stabilizer	SP.9
Transponder/TCAS	SP.15
Observer Oxygen Mask Test	SP.1

Aft overhead panel	Check
GROUND SERVICE ELEC PWR switch - OFF	
OXY LINE PRESS - green band	
ENG FIRE DET SYS APU, L ENG, and R ENG LOOPS switches - BOTH	
CARGO SMOKE DET SYS FWD and AFT switches - NORM	
COCKPIT VOICE MICROPHONE MONITOR RECORDER ..	Check
Refer to SP.5, Cockpit Voice Recorder Test.	
FLIGHT DECK DOOR panel	Check
Full functional check required on first flight of the day.	
AUTO UNLK and LOCK FAIL lights - Extinguished	
ANTISKID OFF switch light	Extinguished
COMMUNICATIONS radio panel	Set
Verify DATA displayed in ACTIVE frequency readout.	
GASPER BOOSTER FAN switch light	As required
IRS panel	Set
IRS Mode Selectors - NAV	
1 and 2 NAV OFF lights - Extinguished	
CARGO SMOKE panel	Check
Refer to SP.8, Cargo Smoke Test.	
WARNING: Do not establish hydraulic power which will result in flap, slat, or spoiler movement unless the wing/flap area has been cleared of personnel and equipment. Use an outside observer.	
HYDRAULICS panel	Check
Full functional check required on first flight of the day.	
HYD CONT RUDDER switch light - Extinguished [AFM]	
L and R PUMP switches - ON	
TRANS pump switch - OFF	
AUX pump switch - OFF	

GROUND PROXIMITY WARNING panel	Check
Full functional check required on first flight of the day.	
TERRAIN OVRD switch light - Extinguished	
GND PROX WARN switch - NORM, guard down	
CABIN PRESSURIZATION panel	Set
VALVE - Open	
SYSTEM SELECT MANUAL switch light - Extinguished	
ELECTRICAL panel	Check & set
BATT switch - ON and locked	
Turn switch ON and rotate clockwise to lock.	
EMER PWR selector - ARM	
Full functional check required on first flight of the day.	
DC BUS TIE switch - AUTO	
L and R BUS TIE switches - AUTO	
GALLEY switch - ON	
L and R GEN switches - ON	
APU and EXT power switches - ON	
APU panel	Set
AIR switch - OFF	
FIRE CONT switch - NORM	
MASTER switch - OFF	
Refer to SP.7, APU Start, if required.	

AIR conditioning panel Set

AVIONICS COOLING switch - FAN

RAM AIR switch - OFF

Note: Do not use the ON position to ventilate the aircraft on the ground.

PACK SHUTDOWN switch - AUTO

FLOW switch - NORM [AFM]

CKPT and CABIN TEMP selectors - AUTO

L and R PACK switches - OFF

ISOL switch - OPEN

L and R BLEED switches - AUTO

ICE PROTECTION panel Set

AIR DATA HEAT switch light - Extinguished

Verify AIR DATA HEAT OFF alert extinguished on EAD.

AIR FOIL WING and TAIL switches - OFF

WINDSHIELD ANTI-FOG switch - OFF

WINDSHIELD ANTI-ICE switch - ON

WING ICE DET - Check

Full functional check required on first flight of the day.

ENG L and R anti-ice switches - OFF

ANNUNCIATOR LIGHTS Check

ANNUN LT TEST button - Push and hold

Verify MASTER WARNING and CAUTION lights and all annunciators and segmented filament readouts on all panels illuminate.

Note: L and R ENG START switches, STICK PUSHER PUSH TO INHIBIT switch lights and fire handles will not illuminate.

FUEL panel	Check
Full functional check required on first flight of the day.	
SDCP FUEL cue - Push	
Verify fuel quantity channel A.	
FUEL USED RESET button - Push	
Verify fuel used counters reset to 0.	
ENGINES panel	Set
IGNITION - AUTO	
START PUMP - OFF	
FADEC MODE, L and R ENG switch lights - Extinguished	
WINDSHIELD WIPER selectors	OFF
Verify wipers are parked.	
Exterior lights	Set
Refer to NP.12, Lights Usage.	
EMER LT switch - ARM	
CKT BKR LT - OFF	
NO SMOKE and SEAT BELTS switches - ON	
LDG LT L and R switches - RET	
NOSE LT switch - OFF	
WING/NACL switch - OFF	
GND FLOOD LT L and R switch lights - Extinguished	
NAV switch light - Extinguished	
LOGO switch light - As required	
BCN switch light - OFF	
HI – INT switch light - Extinguished	

Standby compass Check

STBY COMP switch - DIM/BRT

Mirror - set

Compare standby compass heading approximately agrees with aircraft heading.

STBY COMP switch - OFF

Flight control panel Check and set

IAS/MACH - select IAS and set 250 in window

HDG/TRK - select HDG and set window as desired

Bank angle selector - AUTO

AFS OVRD OFF switches - Up

Altitude display - set FEET and window as desired

V/S FPA button - V/S

FLIGHT NUMBER indicator Set

Engine fire panel Check

Refer to SP.8, Fire Warning Test.

FLOW indicator ON

Note: Check FLOW indication with one or both PACK switches OFF.

EAD and SD Check

Verify EAD and SD are powered and normal indications are displayed.

Review alerts and status messages.

Landing gear Check

Full functional check required on first flight of the day.

Landing gear lever - DOWN

LEFT, NOSE, and RIGHT gear green lights - Illuminated

LEFT, NOSE, AND RIGHT gear red lights - Extinguished

ISIS	Check and set
Red X and ATT FAIL - Not displayed	
BARO altimeter - Set	
ALIGN - Push to align attitude indicator, if required	
SPEED BRAKE lever	RET
SPEED BRAKE lever full forward and disarmed.	
SPEEDBRAKE alert message - Not displayed on EAD	
Takeoff warning	Check
Throttles - Advance to takeoff position	
Verify takeoff warning (CAWS) sounds.	
Throttles - Idle	
Verify takeoff warning silences.	
Throttles	Idle
Thrust reverser levers - Down	
FUEL CROSS FEED lever	OFF
FLAP/SLAT handle	UP/RET
FLAP TAKEOFF SELECTOR	5
Rotate FLAP T.O. SEL thumbwheel until 5 is shown in position indicator window.	
FUEL switches	OFF
Stabilizer trim	Check
Full functional check required on first flight of the day.	
Operate the ALT LONG TRIM switches in the NOSE UP and NOSE DN direction.	
Verify stabilizer trim indicator on SD moves the proper rate and direction.	
STABILIZER TRIM brake switch light	Set
OFF light - Extinguished	

Radios and transponder Check and set

VHF COMM radios - Set

Recommend COMM radio #1 for ATC and #2 for other
(company, ramp, ATIS, guard, etc.).

Transponder - Set

Full functional check required on first flight of the day.

Selector - STBY

ATC code - Enter, if available

1 or 2 selector switch - 1 for captain's leg or 2 for first officer's leg.

SDCP Check

Verify all BRT knobs are rotated out of OFF detent.

Push each SDCP cue button and review system status, alerts, and
messages.

**WARNING: Do not place radar in an operating mode during
ground operations unless aircraft is headed away
from people, large metal objects, any refueling
operation, flammable containers, or explosive
liquids.**

WEATHER RADAR Check

Refer to SP.15, Radar Test.

AILERON and RUDDER TRIM Set

SDCP ENG cue - Push

Verify AIL and RUD position indicators set at center position.

Flight interphone handset Check

Cabin interphone communication - Check

PA system communication - Check

Press and release switch light on overhead panel to connect to PA
system.

FMS entries Verify

Preflight Procedure - Captain

Logbook Check

All crewmembers must review the logbook to become familiar with the history and maintenance status of the aircraft.

If there is doubt concerning the status of the logbook, contact MCC via the dispatcher.

- Ensure the logbook matches the aircraft ship number.
- Ensure the Airworthiness Release has been signed by Maintenance.

Note: Airworthiness Release sign-off is not required at a Delta non-maintenance station when airworthiness discrepancies do not exist.

- Review any EP-19s for special equipment and/or operating instructions.
- Consult the MDM for any operating limitations or crew operating procedures as a result of existing MELs/CDLs.

Electronic Flight Bag Set

Prior to the Pushback checklist, turn Airplane mode ON to ensure WiFi and Bluetooth® are turned off. The EFB must be operated in Airplane mode with WiFi disabled from the start of the Preflight checklist through the completion of the Shutdown checklist.

Enabling Airplane mode with Bluetooth® off will also conserve battery life.

To turn Airplane mode ON, accomplish the following steps:

- Select SETTINGS
- Select Network icon
- Slide the Airplane mode ON/OFF switch to ON.

JEPPESEN application - Configure

The following steps are mandatory:

- Select the Jepp FliteDeck PRO tile
- Select the route icon.
- Select the down arrow to expand the route drawer
- Select New Flight, if necessary
 - In pop-up window, select OK
- Enter ORIGIN and DESTINATION airports

The following steps are optional:

- Enter ALTERNATE airport as desired
- Enter Navaids, Airways, and/or Waypoints, as desired
- Select SID
 - Select applicable departure procedure
- Select STAR
 - Select applicable arrival procedure
- Select Terminal Charts View (airplane) icon
- Select REF
 - Select applicable reference documents, e.g., local ramp procedures
- Select CO
 - Select applicable Delta Special Pages, e.g., Engine Out Departure Procedure
- Select TAXI
 - Select applicable taxi charts
- Select enroute icon
 - Select appropriate HIGH/LOW portion of enroute charts and set an appropriate chart scale

Airwatch Secure Content Locker (SCL) - Configure

- Select the DELTA CONTENT LOCKER (Airwatch SCL) tile
- Open the appropriate documents/operating manuals as desired

Seat Adjust

Adjust the seat for optimum eye reference.

Whenever the seat is adjusted, verify a positive horizontal (fore and aft) seat lock by pushing against the seat.

Rudder pedals Adjust

Adjust the rudder pedals to allow for full rudder pedal and brake pedal movement.

Oxygen mask Check

Refer to SP.1 Oxygen Mask and Interphone Test for test procedure.

Audio control panel Set

Parking brake Set

Note: Do not set the PARK BRAKE if additional cooling is required.

SISP Set

EIS SOURCE - 1

All lights - Extinguished

Window Close and lock

EIS control panel Set

VOR 1 and VOR 2 buttons - As required

In/HP button - IN

BAROSET collar - QNH

Note: The inner collar is used to select QNH and the outer knob is used to set the altimeter.

MAG/TRU button - MAG

MAP, TRFC, and DATA buttons - As required

MINIMUMS knob - Set as required

WX/TERR switch - As required

Verify all selections appear on PFD or ND.

Flight and nav instruments Check

PFD - Check

Display powered with no abnormal alert messages.

No red "X" fail indications observed on any display.

Note: Autopilot box will remain amber, A/P NOT AVAIL alert message will not extinguish, and pitch steering bar will not be visible until V-speeds are entered. Autothrottle box will remain amber and NO TAXI alert message will be displayed until IRUs are aligned. After IRUs are aligned T/O CLAMP will be displayed in the FMA altitude window.

ND - Check

Display powered with no abnormal alert messages.

No red "X" fail indications observed on any display.

Altimeter Set

Set the local altimeter setting.

Verify RVSM and altimeter crosscheck are within limits. Refer to L.10, Flight Instruments, Displays.

Verify no flag displayed.

Stabilizer trim Check

Operate the control wheel trim switch in the nose up and nose down direction.

Verify stabilizer position indicator moves the proper rate and direction.

Fuel required Verify

Compare flight plan block fuel and actual fuel on board.

If actual fuel onboard is less than flight plan block fuel, ensure MIN FUEL FOR T/O plus flight plan TAXI FUEL is on board. Refer to FOM, chapter 5.

Flight attendant briefing Complete

Accomplish a flight attendant briefing. Refer to FOM, chapter 3, Communications

ATC clearance Verify

Refer to NP.12, Clearance Verification Procedures.

Call for the Preflight checklist.

Preflight Procedure - First Officer

Logbook Check
Refer to Interior Inspection - First Officer.

Electronic Flight Bag Set

Prior to the Pushback checklist, turn Airplane mode ON to ensure WiFi and Bluetooth® are turned off. The EFB must be operated in Airplane mode with WiFi disabled from the start of the Preflight checklist through the completion of the Shutdown checklist. Enabling Airplane mode with Bluetooth® off will also conserve battery life.

To turn Airplane mode ON, accomplish the following steps:

- Select SETTINGS
- Select Network icon
- Slide the Airplane mode ON/OFF switch to ON.

JEPPESEN application - Configure

The following steps are mandatory:

- Select the Jepp FliteDeck PRO tile
- Select the route icon.
- Select the down arrow to expand the route drawer
- Select New Flight, if necessary
 - In pop-up window, select OK
- Enter ORIGIN and DESTINATION airports

The following steps are optional:

- Enter ALTERNATE airport as desired
- Enter Navaids, Airways, and/or Waypoints, as desired
- Select SID
 - Select applicable departure procedure
- Select STAR
 - Select applicable arrival procedure
- Select Terminal Charts View (airplane) icon
- Select REF
 - Select applicable reference documents, e.g., local ramp procedures
- Select CO
 - Select applicable Delta Special Pages, e.g., Engine Out Departure Procedure
- Select TAXI
 - Select applicable taxi charts
- Select enroute icon
 - Select appropriate HIGH/LOW portion of enroute charts and set an appropriate chart scale

Airwatch Secure Content Locker (SCL) - Configure

- Select the DELTA CONTENT LOCKER (Airwatch SCL) tile
- Open the appropriate documents/operating manuals as desired

Seat Adjust

Adjust the seat for optimum eye reference.

Whenever the seat is adjusted, verify a positive horizontal (fore and aft) seat lock by pushing against the seat.

Rudder pedals Adjust

Adjust the rudder pedals to allow for full rudder pedal and brake pedal movement.

Oxygen mask Check

Refer to SP.1 Oxygen Mask and Interphone Test for test procedure.

Audio control panel Set

- SISP Set
 - EIS SOURCE - 2
 - All lights - Extinguished
- Window Close and lock
- EIS control panel Set
 - VOR 1 and VOR 2 buttons - As required
 - In/HP button - IN
 - BAROSET knob - QNH
 - Rotate inner knob to local altimeter setting.
 - MAG/TRU button - MAG
 - MAP, TRFC, and DATA buttons - As required
 - MINIMUMS knob - Set as required
 - WX/TERR switch - As required
 - Verify all selections appear on PFD or ND.

Flight and nav instruments Check

PFD - Check

Display powered with no abnormal alert messages.

No red "X" fail indications observed on any display.

Note: Autopilot box will remain amber, A/P NOT AVAIL alert message will not extinguish, and pitch steering bar will not be visible until V-speeds are entered. Autothrottle box will remain amber and NO TAXI alert message will be displayed until IRUs are aligned. After IRUs are aligned, T/O CLAMP will be displayed in the FMA altitude window.

ND - Check

Display powered with no abnormal alert messages.

No red "X" fail indications observed on any display.

Altimeter Set

Set the local altimeter setting.

Verify RVSM and altimeter crosscheck are within limits. Refer to L.10, Flight Instruments, Displays.

Verify no flag displayed.

Stabilizer trim Check

Operate the control wheel trim switch in the nose up and nose down direction.

Verify stabilizer position indicator moves the proper rate and direction

Fuel required Verify

Compare flight plan block fuel and actual fuel on board.

If actual fuel onboard is less than flight plan block fuel, ensure MIN FUEL FOR T/O plus flight plan TAXI FUEL is on board. Refer to FOM, chapter 5.

ATIS Obtain

ATC clearance	Obtain
After receiving the clearance:	
• Set the FCP, as required. • Set the transponder code. • Verify ATC clearance. Refer to NP.12, Clearance Verification Procedures.	
Read the Preflight checklist when requested.	

Preflight Checklist

Interior & exterior inspection	complete	C
Captain ensures the interior and exterior inspections are complete.		
Circuit breakers.....	ckd	C
Oxygen mask	ckd	ALL
Refer to SP.1, Oxygen Mask and Interphone System Test.		
Voice recorder	ckd	C
Cargo smoke	ckd	C
Air conditioning panel	set	C
Ice protection panel	set	C
Annunciator lights	ckd	C
Passenger signs	ON	C
Windows	closed & locked	C&F
■ Flight control panel	set	C
Altimeters	___, xckd	C&F
Confirm the captain's, first officer's, and standby altimeter settings are correctly set.		
Flight & nav instruments	ckd	C&F
Fire warning.....	ckd	C
Parking brake	set	C
Takeoff warning	ckd	C
Fuel switches	OFF	C
■ Radios & transponder	set	C
Ensure the communication radios are set as appropriate.		
Ensure the transponder code is set as appropriate and the Transponder mode select switch is set to STBY.		

Radar	OFF	C
Aileron & rudder trim	set	C
Flight attendant briefing	complete	C
■ Departure briefing	complete	C
Logbook and QRHs	onboard	C
Ensure the logbook is onboard and logbook review is complete.		
Ensure that each QRH is onboard.		
Fuel required	___ onboard ___	C&F
Compare and verbalize flight plan block fuel and actual fuel on board.		
If actual fuel onboard is less than flight plan block fuel, ensure MIN FUEL FOR T/O plus flight plan TAXI FUEL is on board. Refer to FOM, chapter 5.		

Pushback Procedure

Captain	First Officer
Operate the APU in accordance with FOM chapter 3, Aircraft Operational Policy.	
When advised the ground crew is ready for pushback:	
• Exterior doors - verify closed on EAD • Verify CABIN IS READY FOR PUSHBACK advisory has been received.	• HYDRAULICS panel - Set • TRANS and AUX pump switches ON • FUEL panel - Set • All FUEL PUMP switches ON for all tanks containing fuel. • Flight deck door - Closed and locked • Transponder - ALT ON, or as required by local airport operating procedures
Call "PUSHBACK CHECKLIST."	Accomplish the Pushback checklist.
Note: The Pushback checklist must be completed prior to aircraft movement.	
When the Pushback checklist is complete:	
Direct the first officer to call for pushback or engine start clearance as appropriate.	When requested by the captain, call for pushback or engine start clearance.
When pushback clearance has been received:	
• BCN - ON • Parking Brake - OFF Note: Do not turn the beacon on until just prior to aircraft movement or engine start.	
Call "BEACON ON, BRAKES RELEASED, CLEARED TO PUSH."	
CAUTION: Do not use the brakes to stop the airplane during pushback or towing. This can damage the nose gear or the tow bar.	
When initial aircraft movement:	
If not immediately cleared for engine start, "ARE WE CLEAR TO START ENGINE(S)?"	Plan engine start to be prepared to taxi upon ground crew salute.

Pushback Checklist

Doors	closed	F
Ensure all door alert messages are extinguished on the EAD.		
Hydraulic panel	set	F
Ensure TRANS and AUX HYDRAULICS pump switches ON.		
Fuel panel	set	F
Flight deck door	closed & locked	F
Ensure the LOCK FAIL light is extinguished.		
Transponder	ALT ON	F

Engine Start Procedure

Captain	First Officer
Single engine taxi unless an operational necessity dictates otherwise. The captain should determine engine taxi configuration after considering aircraft weight, ramp conditions, taxiway, and maneuvering requirements. Single engine taxi out using the left engine is the normal procedure, conditions permitting. Single engine taxi out using the right engine is permitted. The tug driver will advise the captain when it is clear to start engine(s).	
Note: One pilot will accomplish the engine start procedure while the other will monitor the pushback. Normally the first officer accomplishes the engine start procedure.	
When cleared and ready to start:	
Announce the engine(s) to be started.	
	• SDCP ENG cue - Push • L and R PACK switches - OFF

Captain	First Officer
	• ENG START switch – Pull • Switch light illuminates Note: If ENG START switch will not remain latched pull and hold. • Observe: • N2 • OIL PRESS • N1 Note: N1 indication may take up to 1 minute for a normal engine start. Note: If tailwind component is less than 10 knots and there is no N1 indication, place the FUEL switch ON at max motoring (minimum 20% N2). Note: For tailwind components of 10 knots or greater, see SP.7, Engine Start with No N1 Indication. • At N1: CAUTION: After moving the fuel switch to ON, jiggle the switch to ensure it is seated properly in the detent. • FUEL switch - ON • Observe: • FF • TGT rise

Captain	First Officer
	• At 39% N2: • Observe: • ENG START switch - Retracts • Switch light extinguished. Note: If ENG START switch remains latched or was manually held in position, push in ENG START switch at 39% N2. • Observe engine idle indications
Accomplish the Aborted Start, QRH, NNC.7 for any of the following: • no ENG OIL PRESS • no N1 • no TGT 10 seconds after FF • hung start • Rate of TGT increase may exceed 700°C • ENG L/R START ABORT alert message.	

After Start Procedure

Captain	First Officer
After starting engine(s):	
	In preparation for single-engine taxi: • ENG anti-ice - As required • Refer to SP.16. • AIR conditioning panel - Set • L and R PACK switches - AUTO • ISOL switch - AUTO
	In preparation for two-engine taxi: • ENG anti-ice - As required • Refer to SP.16. • AIR conditioning panel - Set • L PACK switch - AUTO • ISOL switch - AUTO
	• Engine start procedure - Accomplish
	• ENG anti-ice - As required • Refer to SP.16. • AIR conditioning panel - Set • R PACK switch - AUTO • APU panel - Set • AIR switch - OFF • MASTER switch - OFF
Call “AFTER START CHECKLIST”.	Accomplish the After Start checklist.
Receive and return the marshalling agent’s taxi salute.	
Prior to aircraft movement:	
Call “SALUTE RECEIVED, “FLAPS ____.”	Select flaps as directed and arm the spoilers.
Note: If the WDR is not available, select flaps to the default setting of flaps 5.	

After Start Checklist

- Engine anti-ice as reqd **C**
 Ensure the anti-ice switches are in the correct position for the
 current environmental conditions.
- Air conditioning panel set **F**

Taxi Procedure

Captain	First Officer
After WDR has been received:	
Performance data may be loaded into the FMS at any point after receipt of the WDR but should not interfere with other critical crew duties and responsibilities.	
The captain's analysis of the WDR shall not be completed while the captain is taxiing the aircraft. The balance of the Taxi procedure and the reading of the Taxi checklist should be completed during low workload times.	
• Verify the header block for the correct: • flight number, • ship number, • date, and • release number. • Verify the performance data is available for the FMS entered takeoff runway/position • Perform a complete analysis of the following WDR blocks: • FMS, • weather, • performance, and • notes.	
Refer to FOM, chapter 5, Weight Data Record (WDR).	
For PACKS OFF takeoff, refer to SP.2, Takeoff with Air Conditioning Packs Off.	
Note: Manual takeoff performance data entries are permitted when takeoff data uplinks are unavailable. Refer to SP.11, Performance Initialization.	
After PERF DATA UPLINK READY or TAKEOFF DATA UPLINK READY message received:	
Referencing the WDR data:	
	• F-PLN page 1 • Verify FMS selected runway and WDR runway/takeoff position agree.

Captain	First Officer
	• INIT key - Push • PAGE key - Push • Verify WEIGHT INIT page TOCG and ZFWCG. • Compare WDR TOWT with TOGW.
	• TO/APPR key - Push • Verify FLEX, FLAP, V1, VR, V2, SLOPE/WIND, and OAT. • NADP2 - Verify CLB THRUST, ACCEL, and EO ACCEL at 1000 (AGL). • NADP1 - Enter CLB THRUST, at 1500 (AGL), ACCEL at 3000 (AGL), and EO ACCEL at 1000 (AGL). Note: All entries may be manually changed if required. STABILIZER TRIM - Set • SDCP ENG cue - Push • Set STAB to FMS or WDR STAB value. Note: The FMS computed value may be used in lieu of the WDR value if the difference is 0.5 units or less.
	FLAP T.O. SEL - Set • Rotate thumb wheel to WDR flap setting, if required.
	Spoilers - ARM • Pull SPEED BRAKE lever straight up to lock in the armed position • Red band and ARM visible.

Captain	First Officer
When workload and conditions permit:	
CAUTION: Performing a flight controls function check in strong crosswind or tailwind conditions, or moving the controls very abruptly, may result in a column disconnect. If resistance is encountered, move the column slowly with a constant steady force to allow elevator surfaces to respond.	
• Rudder - Check • Hold the nose wheel steering wheel during the rudder check to prevent nose wheel movement. • Move rudder pedals to full travel in both directions and verify: • freedom of movement • rudder pedals return to center • Observe RUD boxes green.	• SDCP CONFIG cue - Push • Ailerons and spoilers - Check • check for freedom of movement and full travel turning the control wheel full deflection to each side, and center. • observe SPOILER boxes green.
	• Elevators – Check • move control column full aft and observe ELEV deflection, then full forward and hold • observe ELEV boxes green in full forward position.
EFBs - Set • Display applicable REF, CO, and Taxi page(s), as needed. • Select the planned assigned SID prior to Departure, as desired.	
Call “TAXI CHECKLIST.”	Accomplish the Taxi checklist.

For extended ground time:

Consider shutting down one or more engines. When departing from ramp areas where taxiing is restricted to both engines, consider shutdown of one engine after exiting the restricted area.

Taxi Checklist

- Flaps ____, ____, ____ C&F
 Ensure the FMS and WDR flap values agree.
 Confirm and verbalize:
- FLAP/SLAT handle position,
 - FLAP value from the FMS, and
 - indicated flap position on the PFD.
- Spoilers ARM F
- Takeoff speeds ____, ____, ____ C&F
 Ensure the WDR and PFD values agree. Confirm and verbalize V1, VR, and V2 speeds.
- Thrust ____, ____ C&F
 Referencing the Thrust Rating Display, verbalize T/O LIM, T/O FLEX, T/O1 LIM, or T/O2 LIM for the first blank and, if applicable, assumed temperature for the second blank.
- Stab Trim set C&F
 Ensure the SD STAB indicator is set to the trim value from the WDR or the FMS. The FMS computed value may be used in lieu of the WDR value if the difference is 0.5 units or less.
- Flight controls ckd C&F

Delayed Start Procedure

Captain	First Officer
Initiate the Delayed Start procedure to ensure proper engine warm up. If performing a crossbleed start, refer to SP.7, Engine Crossbleed Start.	
When ready to start:	
Announce engine start.	
	• SDCP ENG cue - Push • R PACK switch - OFF
	• Engine Start procedure - Accomplish
After engine start:	
	• ENG anti-ice - As required • Refer to SP.16. • AIR conditioning panel - Set • R PACK switch - AUTO • APU panel - Set • AIR switch - OFF • MASTER switch - OFF
Call “DELAYED AFTER START CHECKLIST”.	Accomplish the Delayed After Start checklist.

Delayed After Start Checklist

Engine anti-ice	as reqd	C
Ensure the anti-ice switches are in the correct position for the current environmental conditions.		
Air conditioning panel	set	F

Before Takeoff Procedure

Captain	First Officer
When a runway, intersection, departure, or performance change occurs prior to takeoff:	
- FMS data must be modified using the most recent WDR information. Refer to the Taxi Procedure for specifics. - After updating/verifying any changed items, complete the runway change boxed items and any associated procedural steps for all previously completed checklists. Note: Performance data for an intersection departure is also valid for all other takeoff positions on that runway that afford additional runway length.	

Captain	First Officer
Operate the engines for a minimum of 3 minutes if engines have been shutdown for more than 2 hours. Engine oil temperature must be above the amber line (20°C) before takeoff.	
When in proximity to the departure runway:	
	Notify the flight attendants to finalize preparations for takeoff with the following PA, “FLIGHT ATTENDANTS, PLEASE PREPARE THE CABIN FOR DEPARTURE.”
	Receive “THE CABIN IS READY FOR TAKEOFF” report from the flight leader/purser via the interphone. Refer to FOM chapter 3.

Takeoff briefing - Complete

The Pilot Flying (PF) will verify and verbalize:

- runway - outside reference and ND/FMS runway
- departure
- first fix
- H: heading mode
- A: altitude constraints
- A: Airspeed constraints

Captain	First Officer
Approaching takeoff position: AUTOPILOT REL button - Push EAD - Check • Verify green box • Check alert and status messages • (F) Brake Temperature - Check • SDCP CONFIG cue - Push • Brake temperature does not exceed 115°C for airport elevations up to 2,200 feet MSL. Note: Temperature limits are based on a 120,000 pound aircraft and a V1 of 140 knots. To confirm actual brake temperature limits based on different conditions, reference ODM, chapter 7, Brake Cooling, Maximum Recommended Takeoff Brake Temperature.	
	• SDCP ENG cue - Push
• Fuel - Check • Fuel quantity is equal to or greater than MIN FUEL FOR T/O	
	• Transponder - TA/RA
Call “BEFORE TAKEOFF CHECKLIST.”	Accomplish the Before Takeoff checklist.
Turn radar on and manage terrain display as required.	
WARNING: Prior to crossing a runway hold short line to either take off from or cross a runway, both crewmembers should confirm their position by comparing taxiway and runway identification signs to the taxi chart.	

Before Takeoff Checklist

- Runway position C&F
Verify and verbalize:
 - the inserted runway/intersection displayed in the MCDU, and
 - the actual runway takeoff position observed.
- Flaps C&F
Confirm and verbalize:
 - the inserted flap position displayed in the MCDU, and
 - indicated flap position.
- Takeoff briefing complete C
Ensure the takeoff briefing has been completed by the PF.

Brake temp	ckd	F
EAD	ckd	F
Transponder	TA/RA	F
Flight attendants	notified & acknowledged	F

Takeoff Procedure

Pilot Flying	Pilot Monitoring
When cleared for takeoff:	
Confirm alignment with the intended departure runway by reference to the ND.	
Verify brakes are released. Advance throttles to a minimum of 1.2EPR. Ensure both engines are accelerating symmetrically.	
Call “AUTO FLIGHT”	Push FCP AUTO FLIGHT button Verify T/O THRUST is displayed in FMA altitude window
Verify takeoff thrust is set by approximately 60 knots. Adjust as necessary.	
	Monitor engine instruments throughout the takeoff.
After takeoff thrust is set, the captain's hand must be on the throttles until V1.	
Monitor airspeed.	
At 80 knots:	
Verify 80 knots.	Announce, “80 KNOTS, CLAMP, THRUST NORMAL.”
At V1:	
Verify V1 speed	Announce “V1”.
At VR:	
Rotate to the takeoff pitch attitude	Announce, “ROTATE.”
	Monitor airspeed and vertical speed. Verify a positive rate of climb and announce “POSITIVE RATE.”

Pilot Flying	Pilot Monitoring
Verify a positive rate of climb on the altimeter. Call “GEAR UP.”	Position the landing gear lever to UP.
Above 400 feet AGL:	
Verify NAV or call “HEADING SELECT” as required.	Verify NAV or select HEADING as directed.
At thrust reduction height:	
Verify thrust reduction to climb power.	
At the acceleration height:	
Reduce pitch attitude and begin acceleration. Verify acceleration.	
At the flap retraction speed:	
Call “FLAPS RETRACT.”	Move FLAP/SLAT handle to 0/EXT.
At the slat retraction speed:	
Call “SLATS RETRACT.”	Move FLAP/SLAT handle to UP/RET.

Pilot Flying	Pilot Monitoring
After SLATS are retracted:	
	• GASPER BOOSTER FAN - OFF • HYDRAULICS panel - Set • TRANS and AUX pumps OFF • APU panel - Set • Verify APU AIR and MASTER switch OFF • Verify APU data block not displayed on SD • FLAP T.O. SEL - 5 • Spoilers - Disarm • Push SPEED BRAKE handle down • EAD - Check • Check for alert and status messages
Call “AFTER TAKEOFF CHECKLIST.”	Accomplish the After Takeoff checklist.

After Takeoff Checklist

- Hydraulic panel set
 Ensure TRANS and AUX HYDRAULICS pump switches OFF.
- APU off
- Landing gear up
 Ensure landing gear lever UP and landing gear up indications normal.
- Flaps & slats up & retracted
 Ensure:
 • FLAP/SLAT handle in UP/RET position, and
 • indications normal.
- Flap takeoff selector 5
- Spoilers disarmed
- EAD ckd

Climb Procedure

Pilot Flying	Pilot Monitoring
Approaching transition altitude:	
	If other than 18,000 feet, call "TRANSITION ALTITUDE."
• Altimeters - Set	

Pilot Flying	Pilot Monitoring
• Anti-Ice - As required	
After climbing through approximately 10,000 feet AFE, signal the end of sterile cockpit environment by:	
• (C) NO SMOKE switch - Cycle to sound cabin chime twice. Or, if conditions permit: • (C) SEAT BELTS sign - OFF • (C) Ensure PA is made advising passengers to keep seat belts fastened while seated.	
After passing 18,000 feet:	
Call "CLIMB CHECKLIST."	Accomplish the Climb checklist.
When sustained climb rate decreases to less than 1,000 feet per minute:	
• Verify CLB power on EAD. • If required, select CLB on THRUST LIMITS page.	

Climb Checklist

Altimeters 29.92, xckd C&F
 Verify the captain, first officer, and standby altimeters are correctly set.

Cruise Procedure

Pilot Flying	Pilot Monitoring
After reaching top of climb:	
• Anti-ice - As required	
Enroute:	
• Apply Tactical Cost Index procedures as necessary per FOM. • Monitor fuel trend • Send turbulence report as necessary. • Send position reports as necessary.	
	When SEL CTR PUMPS OFF alert message is shown: • CTR AFT and FWD PUMPS switches - OFF
• EFB - Manage: • Select enroute icon. • Select appropriate HIGH/LOW portion of enroute charts and set an appropriate chart scale. • Monitor the battery power indicator and connect the powered keyboard when necessary. Note: An electrical outlet in the flight deck is not an approved power source. If possible, charge EFBs on rest break in the cabin or crew rest facility. • Connect the powered keyboard when the EFB battery power indicator displays 20% or less. • Conserve battery power as much as possible. During extended cruise, consider shutting down an EFB to preserve battery life. Note: All EFBs may not be off simultaneously. Maintain at least one EFB in sleep or ON mode to provide ready access to data when operational needs dictate.	

Pilot Flying	Pilot Monitoring
When approach procedure is known:	
• STAR page - Select • Select or verify STD STARS and APPRS • POS REF page - Select • TO/APPR key - Push • Select or verify runway and flap data • Modify VAPP speed, if required • NAV RAD key - Push • Confirm autotune of NAVAIDS	
• Set RADIO or BARO minimums, as appropriate. Note: Refer to NOI.3, Approach Selection Table.	
To ensure adequate obstacle clearance in conditions of extreme cold weather (-10°C or lower, or as specified in the Delta Special Page), refer to Airway Manual, Weather, Altimeter Corrections.	

Pilot Flying	Pilot Monitoring
EFB - Configure: • JEPPESEN application - Configure • Select the Jepp FliteDeck PRO tile. • Select the airport (airplane) icon. • Select DESTINATION airport. • Select REF. • Select applicable reference documents, e.g., local ramp procedures. • Select CO. • Select applicable Delta Special Pages, e.g., Critical Performance procedures. • Select TAXI. • Select applicable taxi chart(s). • Select APP. • Select applicable approach chart(s). • Select STAR. • Select applicable arrival procedure charts. • Airwatch Secure Content Locker (SCL) - Configure • Select the DELTA CONTENT LOCKER (Airwatch SCL) tile. • Open the appropriate document/operating manual as desired. • Check the EFB mount for security. Pilots may hold their respective EFBs in their hands when conducting required briefings. Secure EFB in the mount after completing briefings. EFBs must be secured during critical phases of flight.	
After FMS data has been entered:	
	• FMS data - Verify
• Approach briefing - Accomplish. Refer to FOM, chapter 3.	

Descent Procedure

Pilot Flying	Pilot Monitoring
• Anti-Ice - As required	
At top of descent or approximately 20 minutes prior to landing:	
Notify the flight attendants with a PA that includes “FLIGHT ATTENDANTS PLEASE PREPARE THE CABIN FOR ARRIVAL.”	
• (C) SEAT BELTS sign - ON.	
	• HYDRAULICS panel - Set. • TRANS and AUX pumps ON • WINDSHIELD ANTI-FOG switch - As required. • ON for descent into high humidity conditions when flight has been conducted above FL250.
Approaching transition level:	
	If other than FL 180, Call “TRANSITION LEVEL.”
• Altimeters - Set local altimeter setting	
At FL180 or reaching top-of-descent, whichever occurs later:	
Call “DESCENT CHECKLIST.”	Accomplish the Descent checklist.

Descent Checklist

Altimeters	____, xckd	C&F
Verify the captain, first officer, and standby altimeters are correctly set. Verbalize the altimeter setting (local or 29.92).		
■ Minimums	____, ____ xckd	C&F
Ensure the captain's and first officer's PFD minimums are set to the approach chart value.		
Verbalize “RADIO” or “BARO” and the numeric value.		
■ Landing data	____, ____	C&F
Referencing the FMS, verbalize the landing flaps and Vref speed.		
■ Approach briefing	complete	PM
Ensure the Approach Briefing has been completed by the PF.		
Hydraulic panel	set	PM
Ensure TRANS and AUX HYDRAULICS pump switches ON.		
Seat belt signs	ON	PM

Approach Procedure

Pilot Flying	Pilot Monitoring
Approaching transition level:	
	If other than FL 180, call “TRANSITION LEVEL.”
Altimeters - Set local altimeter setting	

Pilot Flying	Pilot Monitoring
When arrival, approach, or runway changes prior to landing:	
- FMS data must be modified. - After updating/verifying any changed items, complete the Runway Change boxed items for the Descent and Approach checklists and their associated procedures. Note: If the landing runway assignment is changed and the captain determines the runway change can be accomplished visually, the captain may choose to waive the “runway change” items.	

Pilot Flying	Pilot Monitoring
Anti-Ice - As required	
Before descending through approximately 10,000 feet AFE:	
- Flight and navigation instruments - Set - Verify correct arrival and approach selected in FMS.	
At approximately 10,000 feet AFE:	
(C) NO SMOKE switch - Cycle to sound cabin chime twice.	
Call “APPROACH CHECKLIST.”	Accomplish the Approach checklist.

Approach Checklist

- Flight & nav instruments verified C&F
 Ensure correct arrival and approach procedures
 are entered.

- Cabin notification complete C
 Ensure that the cabin chime signal has been
 sounded twice.

- Altimeters ____, xckd C&F
 Ensure the captain, first officer, and standby altimeters are
 correctly set.
 Verbalize the local altimeter setting.

Landing Procedure

Pilot Flying	Pilot Monitoring
When ready to configure the aircraft for landing:	
Call “SLATS EXTEND” according to the slat extension schedule. Call “FLAPS ____” according to the flap extension schedule.	Set the FLAP/SLAT handle as directed.
Call “GEAR DOWN.”	Set the landing gear handle to DOWN.
Call “FLAPS ____” as needed for landing.	Set the FLAP/SLAT handle as directed.
	Spoilers - ARM. • Pull SPEED BRAKE lever straight up to lock in the armed position. • Red band and ARM visible.
	EAD - Check • Check alert and status messages.
Call “LANDING CHECKLIST.”	Accomplish the Landing checklist.

Pilot Flying	Pilot Monitoring
No later than 1,000 feet AFE:	
Verify: • Missed approach heading, • Missed approach altitude, and • Green box on EAD.	
Note: Provided stabilized approach criteria are observed, the timing of the configuration may be modified as necessary for a more fuel-efficient operation.	

Landing gear.....	down	C&F
Ensure the gear handle is in the DOWN position with 3 green lights illuminated and red lights extinguished.		
Flaps	____, ____	C&F
Confirm and verbalize:		
• FLAP/SLAT handle position, and • indicated flap position on PFD.		
Spoilers.....	ARM	C&F
Ensure the SPEED BRAKE lever is locked in the ARM position.		
EAD	ckd	PM

Go-Around Procedure

Pilot Flying	Pilot Monitoring
When a go-around is warranted:	
Push either GA switch and announce "GO AROUND".	Verify FMA displays PITCH, HEADING, and GO AROUND. Announce altitude mode "GO AROUND VERIFIED"
Call "FLAPS 13."	Set FLAP/SLAT handle as directed.
Verify: • Rotation to go-around pitch attitude • Thrust setting • Proper FMA mode annunciation	
Verify thrust is sufficient for the go-around or adjust as needed.	
	Monitor rotation, pitch and vertical speed. Verify a positive rate of climb and announce "POSITIVE RATE."
Confirm a positive rate of climb on the altimeter.	
Call "GEAR UP."	Position landing gear lever to UP.
	Verify missed approach altitude is set.
Above 400 feet RA:	
Verify or call for appropriate roll mode.	Select or verify roll mode.
At acceleration height (normally 1,000 feet AFE):	
Call "SPEED SELECT 180" and "LEVEL CHANGE". Verify 180 knots in speed window and missed approach altitude in altitude window.	Pull speed select knob and set 180 knots in speed window. Pull level change knob and verify missed approach altitude in altitude window.

Pilot Flying	Pilot Monitoring
If another approach is warranted at the destination airport:	
Consider leaving flaps at 13 or establish the appropriate configuration for the desired airspeed.	Set the FLAP/SLAT handle as directed.
If a diversion is required:	
Call “FLAPS __ and/or SLATS __” Accelerate to desired airspeed and retract the flaps and slats on schedule.	Set the FLAP/SLAT handle as directed.
When at planned flap configuration:	
Call “AFTER TAKEOFF CHECKLIST.”	Accomplish After Takeoff checklist.

Landing Roll Procedure

Pilot Flying	Pilot Monitoring
At main gear touchdown:	
Verify throttles at idle.	
	Verify the SPEED BRAKE lever is up and fully aft. Call "SPOILERS UP."
WARNING: After reverse thrust is initiated, a full stop must be made. CAUTION: If difficulty in maintaining directional control is experienced during reverse thrust operation, reduce reverse thrust to reverse idle (or forward idle thrust if required), regain directional control, and reapply reverse thrust as necessary. Do not attempt to maintain directional control by using asymmetric reverse thrust.	
After main gear touchdown and once nose lowering has commenced, normal reverse should be used.	Verify normal reverse thrust operation.
At 80 knots initiate movement of reverse thrust levers to reach idle detent prior to 60 knots.	At 80 KIAS call "80 KNOTS."

After Landing Procedure

Captain	First Officer
When clear of the active runway and workload permits:	
Note: Engine may be shutdown after cool down requirements have been met.	
• Spoilers - RET • Push SPEED BRAKE lever down and full forward. • Verify SPEEDBRAKE alert message extinguished on EAD.	• FLAP/SLAT handle – UP/RET • Verify flaps and slats are not extended on PFD • APU - As required (refer to FOM 3.4, APU Policy) • Anti-Ice - As required (refer to SP.16) • Radar - OFF • Transponder - ALT ON
Call “AFTER LANDING CHECKLIST.”	Accomplish the After Landing checklist.

After Landing Checklist

Spoilers retracted

Flaps & slats up & retracted

Radar OFF

Shutdown Procedure

Captain	First Officer
Shutdown engine(s) when the ENGINE COOL alert message illuminates, or after 3 minutes (whichever occurs first).	
After engine cool down requirements have been met and single engine taxi is desired:	
Call for engine shutdown. Note: Normally the right engine is shut down.	• FUEL switch - OFF • AIR conditioning panel - Set • ISOL switch - OPEN
After stopping at the gate:	
• PARK BRAKE - Set • SEAT BELTS switch - OFF/AUTO • Call for engine shutdown	• FUEL switch(es) - OFF • BCN - OFF • HYDRAULICS panel - Set • TRANS and AUX pumps - OFF • AIR conditioning panel - Set • L and R PACK switches - As required Note: If the APU is required for cooling air and both pilots leave the flight deck, turn the L or R PACK switch OFF. • ISOL switch - OPEN • FUEL panel - Set • All PUMPS switches OFF • RIGHT AFT PUMP switch - ON, if APU operating

Captain	First Officer
	• ICE PROTECTION panel - Set • AIR DATA HEAT switch light - OFF • AIRFOIL WING and TAIL switches - OFF • WINDSHIELD ANTI-FOG switch - OFF • WINDSHIELD ANTI-ICE switch - OFF • ENG anti-ice switches - OFF • Transponder - STBY
When engines are shut down:	
• PARK BRAKE - As required After the chocks are inserted, the brakes should be released for cooling. Refer to FOM, 6.1, Parking, Brake Release. Refer to SP.16, Cold Weather Operations.	
Call “SHUTDOWN CHECKLIST.”	Accomplish the Shutdown checklist.

Shutdown Checklist

Seat belt signs	OFF	C
Hydraulic panel	set	C
Ensure TRANS and AUX HYDRAULICS pump switches OFF.		
Air conditioning panel	set	C
Fuel panel	set	C
Ice protection panel	set	C
Beacon	OFF	C
Fuel switches	OFF	C
Transponder	STBY	C
Parking brake	as reqd	C

Captain	First Officer
After the Shutdown Checklist is complete:	
When external power is available:	
• L and R PACK switches - OFF • APU AIR switch - OFF • APU MASTER switch - OFF • RIGHT AFT FUEL pump switch - OFF • ACARS information - Enter • Complete ACARS Postflight procedures. Refer to SP.5. Do not send FLT SUMMARY report, the report will auto-send after five minutes. • SDCP STATUS Messages - Check • Record abnormal messages in the aircraft logbook. • Engine oil, oxygen, and hydraulic quantities - Check • If quantities are less than the following values, make a logbook entry and notify maintenance as soon as possible. • Engine oil: • Maintenance stations: 9 quarts • Non-maintenance stations: 7 quarts • Oxygen: 1,000 psi • Hydraulic fluid: • Left: 7 quarts; Right: 7 quarts. • Logbook - Make required entries for maintenance discrepancies. • Flight deck lights and electronic displays - Set as required. • EMER PWR selector - As reqd • Turn EMER PWR selector OFF if both pilots leave the aircraft and the APU is shut down.	

After shutdown reminders:

- Enter appropriate ACARS information.
- Check oxygen, engine oil, and hydraulic quantities.
- Check status messages.
- Make appropriate logbook entries.
- Shutdown the APU, unless required for environmental reasons.

Secure Procedure

Captain	Any Crewmember
After coordination with local maintenance or operations:	
Accomplish the Secure checklist only when the aircraft is to remain for six hours or more. The captain will designate a crewmember to accomplish the Secure checklist. When operating the last flight of any day into a limited or non-maintenance station, accomplish the following: • If a maintenance discrepancy is noted and entered in the logbook, the MCC must be contacted through the dispatcher as soon as possible to facilitate corrective action and avoid delays. If a flight crew placard is applicable, it should be installed prior to departing the aircraft. • Perform a complete exterior inspection, in accordance with the Exterior Inspection - Captain or First Officer. If the aircraft will layover in cold weather, ensure it is configured as described in SP.16.	
When ready to secure the aircraft:	
Call “SECURE CHECKLIST.”	Accomplish the Secure Checklist as a “read and do” checklist.
• IRS mode selectors - OFF • GALLEY switch – OFF • L and R PACK switches - OFF • EMER LTS switch - OFF	

Captain	Any Crewmember
Note: Allow the APU automatic cool down cycle to complete prior to placing the battery switch off. Ensure APU doors are fully closed by the absence of APU information block on SD display. • APU and External power - Set as required • If only ground service power is required: • GROUND SERVICE ELEC PWR available light - Verify illuminated • GROUND SERVICE ELEC PWR switch - ON • EMER PWR selector - OFF • BATT switch - OFF • EXT power switch - OFF • If electrical power is not required: • APU MASTER switch - OFF • EMER PWR selector - OFF • BATT switch - OFF Note: At some stations, external power may not be available. After confirming with stations personnel, leave APU MASTER switch ON and BATTERY switch ON and rotate battery switch from lock to unlock.	

Secure Checklist

IRS mode selectors	OFF
Galley power	OFF
Pack switches	OFF
Emergency lights	OFF
APU	OFF
Emergency power	OFF
Battery switch	OFF
EXT power switch	as reqd

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Normal Operational Information

Normal Ops Info

Chapter NOI

Section 1

Normal Ops Info

The Normal Ops Info section includes the Approach Guidance. This section provides quick reference tools for the experienced crew member. For more detailed information, refer to the Airway Manual, the FCTM, the ODM, and the FOM.

Approach Guidance

The approach guidance section begins with the Approach Selection Table. The table lists the approach type, any qualifiers for the approach, and the FCP or FMS selection(s). A page number will then direct the pilot to the recommended approach guide to be used.

Following the Approach Selection Table are the Approach Guides. The guides have been developed for each type of authorized approach and are intended to help the pilot prepare for, brief, and conduct the approach procedure. The use of an approach guide is recommended, but not required.

Following the Approach Guides is the RADIO/BARO Minimums Chart. The chart contains the landing minimum settings for all approaches.

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Reserved

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Section 2

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Normal Operational Information

Approach Guidance

Chapter NOI

Section 3

Approach Selection Table

Approach Type	Qualifier	FCP and/or FMS Selection(s) Page
ILS	For PRM considerations also see pg NOI.3.5	APPR/LAND CAT I pg NOI.3.3 CAT II pg NOI.3.7 SA CAT II pg NOI.3.7 CAT III pg NOI.3.9
LDA with GS	For PRM considerations also see pg NOI.3.5	APPR/LAND pg NOI.3.3
RNAV (RNP)	GPS Required	NOT AUTHORIZED
RNAV (GPS) RNAV (GNSS) GPS NDB	GPS Required Procedure in FMS Database with PROF	NAV PROF pg NOI.3.11
	GPS Required Procedure in FMS Database without PROF	NAV FPA or V/S pg NOI.3.15
LOC LDA (without GS) VOR	Procedure in FMS Database with PROF	NAV or LOC ONLY PROF pg NOI.3.11
	NO Procedure in FMS Database	LOC ONLY or VOR ARMED FPA or V/S pg NOI.3.15
ILS (GS out) LDA (without GS) VOR	Procedure in FMS Database without PROF	NAV or LOC ONLY FPA or V/S pg NOI.3.15
Charted Visual Flight Procedures	Procedure in FMS Database	NAV PROF pg NOI.3.17
	NO Procedure in FMS Database	Fly using visual references
Circling Maneuver		pg NOI.3.19

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ILS CAT I, LDA with GS - Approach Guide APPR/LAND Mode

For inoperative equipment, refer to the QRH, Non-Normal Ops Info tab, ILS Approach Equipment Requirements.

For any inoperative ground based equipment, refer to the Airway Manual, Ops Specs, IAP.

For ILS Precision Runway Monitor (PRM) Approach, refer to the ILS Precision Runway Monitor (PRM) Approach Breakout Procedures Approach Guide.

Note: Approach may continue to DA(H) if established on the final segment and the controlling visibility decreases below the authorized minimums. Specific foreign country exceptions may apply. For further information, refer to the Airway Manual, Ops Specs, IAP.

Airport diagram Review

Autopilot As required

If operable, both the Autopilot and Flight Director will be utilized for all ILS approaches when the reported weather is below 4,000 feet RVR or 3/4 mile.

Autoland procedures may be used. If autoland is not used or APPR ONLY appears in FMA altitude window, disconnect the autopilot no later than 50 feet below published minimums.

For LDA with GS, autopilot must be disconnected no later than 50 feet below published minimums.

FMS approach procedure Select and verify

For LDA with GS approaches that have a MIN PROF box:

- Set MIN PROF to Apt Elev plus 200 feet rounded up to the nearest 10 feet.
- Enter the ILS frequency and course in ILS/CRS (4L) on the NAV RAD page.

Note: Use the numeric frequency and not the four letter identifier for the ILS entry so APPR/LAND can be armed and the AFS and FD can track both the localizer and glideslope.

Flight and nav instruments Set

Minimums Set DA

When cleared for the approach:

APPR/LAND Select
Select when established on a published inbound segment of the approach or when on a final approach course intercept heading. Adhere to all published step down fix altitudes located outside the final approach segment.

No later than 1,000 feet AGL:

Missed approach altitude Set
Set lowest initial level off altitude on missed approach procedure.

Execute a missed approach if any of the following occur:

- criteria listed in the Airway Manual, Ops Specs, IAP, or
- In IMC, a navigation radio or flight instrument failure occurs which affects the ability to safely complete the approach, or
- In IMC, full scale deflection of the localizer or glide slope.

ILS Precision Runway Monitor (PRM) Considerations

PRM procedure Brief Jeppesen 11-XX Pages

Primary and Monitor Frequencies - Brief

Breakout procedure Briefed

“Breakout” Procedure

Note: All “Breakouts” must be hand flown.

Pilot Flying	Pilot Monitoring
A/P - Disengage	Set the ATC directed heading and altitude in the FCP. Push APPR/LAND when outside 1/2 dot deviation to break the localizer and glideslope lock. Set the ATC assigned heading in the heading window and pull the heading select knob. Set the ATC assigned altitude in the altitude select window. Rotate the pitch wheel to approximately 500fpm climb or descent.
Maneuver as directed by ATC. Disregard flight director guidance. Little to no change in pitch is required on a descending breakout. For a climbing breakout, set approximately 7.5° nose up. Use approximately 10° of bank to comply with the ATC directed heading. Note: If ATC “breakout” instructions coincide with a TCAS RA, follow the vertical guidance of the RA and the lateral guidance directed by ATC. Note: If descending, vertical speed should not exceed 1,000 fpm.	Communicate with ATC as required.

Pilot Flying	Pilot Monitoring
Follow flight director guidance.	Notify the PF when flight director guidance can be followed. Notify the PF when the autopilot is available.
When “breakout” is complete, reset automation to appropriate level. Note: In order to clear LAND ARMED from the FMA altitude window, push heading hold when established on the ATC assigned heading.	

ILS CAT II or SA ILS CAT II - Approach Guide APPR/LAND Mode

For inoperative equipment, refer to the QRH, Non-Normal Ops Info tab, ILS Approach Equipment Requirements.

For any inoperative ground based equipment, refer to the Airway Manual, Ops Specs, IAP.

Note: Approach may continue to DA(H) if established on the final segment and the controlling RVR goes below minimums. Specific foreign country exceptions may apply. For further information, refer to the Airway Manual, Ops Specs, IAP.

Approaches must be flown using autoland procedures.

Maximum reported wind component to initiate approach and land:

25 knots headwind, 15 knots crosswind, 10 knots tailwind

Airport diagram and SMGCS chart Review

FMS approach procedure Select and verify

Flight and nav instruments Set

Minimums Set

RA Authorized:

- Set radio altimeter bug to published RA

RA Not Authorized:

- Set baro altimeter bug to published DA
- IM required
- DA is determined by the IM or the first officer's BARO Altimeter, whichever occurs first.

Marker beacon audio (RA Not Authorized) ON

Callouts Review

Call “ALIGN” when ALIGN appears in the FMA roll window.

FMA Review

Refer to FCTM, chapter 5, ILS Approach Profile, for FMA progression.

When cleared for the approach:

APPR/LAND Select
Select when established on a published inbound segment of the approach or when on a final approach course intercept heading. Adhere to all published step down fix altitudes located outside the final approach segment.

No later than 1000 feet AGL:

Missed approach altitude Set
Set lowest initial level off altitude on missed approach procedures.

Execute a Missed Approach for any of the following:

- criteria listed in the Airway Manual, Ops Specs, IAP, or
- navigation radio or flight instrument failure occurs which affects the ability to safely complete the approach, or
- full scale deflection of the localizer or glide slope.
- APPR ONLY appears in the FMA altitude window.

ILS CAT III - Approach Guide **APPR/LAND Mode**

For inoperative equipment, refer to the QRH, Non-Normal Ops Info tab, ILS Approach Equipment Requirements.

For any inoperative ground based equipment, refer to the Airway Manual, Ops Spec, IAP.

Note: If the aircraft is established on the final approach segment and the controlling RVR decreases below the authorized minima, the approach shall not continue to DA(H).

Approaches must be flown using autoland procedures.

Maximum reported wind component to initiate approach and land:

25 knots headwind, 15 knots crosswind, 10 knots tailwind

Airport diagram and SMGCS chart Review

FMS approach procedure Select and verify

Flight and nav instruments Set

Minimums Set

Set radio altimeter bug to 50 feet.

Callouts Review

Call "ALIGN" when ALIGN appears in the FMA roll window.

FMA Review

Refer to FCTM, chapter 5, ILS Approach Profile, for FMA progression.

When cleared for the approach:

APPR/LAND Select

Select when established on a published inbound segment of the approach or when on a final approach course intercept heading. Adhere to all published step down fix altitudes located outside the final approach segment.

No later than 1000 feet AGL:

Missed approach altitude Set
Set lowest initial level off altitude on missed approach
procedure.

Execute a Missed Approach for any of the following:

- criteria listed in the Airway Manual, Ops Specs, IAP, or
- any controlling RVR goes below minimums, or
- navigation radio or flight instrument failure occurs which affects the ability to safely complete the approach, or
- full scale deflection of the localizer or glide slope.
- APPR ONLY appears in the FMA altitude window.

RNAV (GPS or GNSS), GPS, LOC, LDA (without GS), VOR, or NDB - Approach Guide

NAV or LOC ONLY & PROF Modes

If the ground based navaid is out of service or compatible avionics is either not installed or not operational, the NDB, NDB/DME, VOR, or VOR/DME approach may be flown using RNAV procedures as long as one GPS is operational and the approach is authorized on the Delta Special Page or flight plan remark.

For RNAV approaches with inoperative equipment refer to QRH, Non-Normal Ops Info tab, RNAV Approach Equipment Requirements.

Autopilot Required in IMC

FMS approach procedure Select and verify

Set MIN PROF to Apt Elev plus 200 feet rounded up to the nearest 10 feet.

Verify waypoints, altitude constraints and descent angle.

Flight and nav instruments Set

Minimums Set DA

Set approach chart MDA and use as a DA

- For RNAV approaches use LNAV(MDA)
- For approaches outside the US and its associated territories set DDA (MDA + 50)

Note: LPV and LNAV/VNAV minimums are not authorized.

Raw data and PATH ERROR Monitor

RNP Set 0.3 by FAF

When cleared for the approach:

NAV or LOC ONLY prompt Select

PROF Select or verify

Verify the mode in the FMA altitude window is magenta.

Active/TO waypoint altitude verify

Verify the active waypoint altitude is in large font.

When:

- established on a published segment of the approach, or
- cleared direct to an approach waypoint:

On course Verify

Verify the aircraft is on course by confirming the aircraft symbol on the MAP display is on the magenta line.

FCP Altitude Set

Set MDA/DDA in the FCP altitude window.

CAUTION: If the airplane is NOT on the magenta line and a lower altitude is set in the FCP, the airplane will NOT honor the hard altitudes in the FMS and will begin an immediate descent. Be prepared to intervene with altitude HOLD.

No later than 1000 feet AGL:

FPA Select

Rotate the pitch wheel to charted descent path.

Missed approach altitude Set

Set lowest initial level off altitude on missed approach procedure.

No later than 50 feet below MDA or 100 feet below DDA:

Autopilot Disconnect

Execute a missed approach for any of the following:

- Criteria listed in Airway Manual, Ops Specs, IAP, or
- In IMC, a navigation radio or flight instrument failure occurs which affects the ability to safely complete the approach, or
- In IMC, full scale deflection of the localizer, or
- In IMC, actual course deviates from published inbound course by more than 10 degrees during a VOR approach.

Additional Considerations:

Non-localizer based approaches with raw data unavailable, execute a missed approach for any of the following:

- ADIRU FAULT alert message
- FMS FAIL alert message
- GPS FAIL alert message
- UNABLE RNP alert message
- XTK error greater than 0.3

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RNAV (GPS or GNSS), GPS, ILS (G/S Out), LOC, LDA (without GS), VOR, or NDB - Approach Guide NAV, LOC ONLY, or VOR ARMED & FPA or V/S Modes

Approach Considerations

Use this procedure for:

- Approaches without a MIN PROF box
- Approaches without a published Descent Angle
- Approaches not in the FMS database
- PROF unavailable or unreliable

If the ground based navaid is out of service or compatible avionics is either not installed or not operational, the approach may be flown using RNAV procedures as long as one GPS is operational and the approach is authorized on the Delta Special Page or flight plan remark.

For RNAV approaches with inoperative equipment, refer to QRH, Non-Normal Ops Info tab, RNAV Approach Equipment Requirements.

Autopilot Required in IMC

FMS approach procedure Select and verify

Flight and nav instruments Set

If required, set MIN PROF to Apt Elev plus 200 feet rounded up to the nearest 10 feet.

Minimums Set DDA

For RNAV approaches, add 50 feet to the charted LNAV (MDA) value.

RNP Set 0.3 by FAF

Set RNP 0.3 for approaches in the FMS database.

When cleared for the approach:

NAV or LOC ONLY prompt or VOR ARMED prompt Select

When:

- established on a published segment of the approach, and
- level at FAF altitude:

On course Verify

FCP Altitude Set

Set DDA in the FCP altitude window after the FMA altitude window displays "HOLD" in white.

When approximately 0.2 nm from the descent point:

FPA or V/S Select

Rotate the pitch wheel to charted descent path. Use FPA 3.0 or V/S 800 if no descent path is published.

No later than 1000 feet AGL:

Missed approach altitude Set

No later than 100 feet below DDA:

Autopilot Disconnect

Execute a missed approach for any of the following:

- Criteria listed in Airway Manual, Ops Specs, IAP, or
- In IMC, a navigation radio or flight instrument failure occurs which affects the ability to safely complete the approach, or
- In IMC, full scale deflection of the localizer, or
- In IMC, actual course deviates from published inbound course by more than 10 degrees during a VOR approach.

Additional Considerations:

Non-localizer based approaches with raw data unavailable, execute a missed approach for any of the following:

ADIRU FAULT alert message

FMS FAIL alert message

GPS FAIL alert message

UNABLE RNP alert message

XTK error greater than 0.3

Charted Visual - Approach Guide (Procedure in FMS Database)

NAV & PROF Modes

The following guidance supplements visual approach preparations. FMS guidance is an aid to promote more precise ground track and altitude control. Do not sacrifice outside visual vigilance while using FMS capabilities.

Delta Special Pages
and Attention All Users page Reference as applicable

Autopilot As desired

FMS approach procedure Select and verify
RNAV Visuals are normally coded in the FMS database as RNV or RNVV.

Charted Visual Approaches may include waypoints or reference points which differ by name from FMS coded waypoints.

RNV Glidepath angles may exceed 3.0 degrees.

Set MIN PROF to Apt Elev plus 200 feet rounded up to the nearest 10 feet.

Note: For approaches with an ILS available, hard tune the frequency and course on the NAV RAD page. If authorized by the procedure, APPR/LAND, may be selected on final approach and normal CAT I ILS procedures used to touchdown.

When cleared for the approach:

NAV Select or verify

PROF Select or verify

FCP Altitude Set

Set 1,000 feet AFE rounded up to the nearest 100 feet.

No later than 1,000 feet AGL:

FPA or V/S Select

Rotate the pitch wheel to charted descent path.

Missed approach altitude Set as desired

Set lowest initial level off altitude on missed approach procedure.

Additional information:

If missed approach instructions are not published, straight-out guidance may be coded into the approach for crew convenience.

Circling Maneuver

Note: Do not use APPR/LAND mode.

Note: For approaches with a MIN PROF box, set MIN PROF to Apt Elev plus 200 feet rounded up to the nearest 10 feet.

The following guidance supplements normal approach preparations and procedures for the type of approach to be flown.

Weather requirements Check

- Visibility - 3 miles (4800m) or published visibility for the highest circling speed category, whichever is higher.
- Ceiling - 1000 feet (300m) or the published HAA (height above airport) for the highest circling speed category, whichever is higher.

Autopilot Required in IMC

Minimums Set MDA

Set published MDA or airport elevation plus 1000 feet (300m), whichever is higher.

When cleared for the approach:

LOC ONLY prompt or NAV Select

FCP Altitude Set

Set published MDA or airport elevation plus 1000 feet (300m), rounded up to the next higher 100 feet.

At configuration point:

Landing gear and landing flaps Set

Aircraft should be fully configured for landing prior to FAF.

At FAF or descent point:

FPA or V/S Select

When level at the MDA:

When ready to descend from MDA, rotate the pitch wheel to allow for a normal rate of descent to landing. Do not exceed 1000 fpm.

Missed approach altitude Set

Set lowest initial level off altitude on missed approach procedure.

When needed to execute circling maneuver:

HEADING Select

No later than 50 feet below MDA:

Autopilot Disconnect

Execute a missed approach if visual contact with the airport is lost.

Conducting a missed approach:

Use normal missed approach procedures except:

- Make the initial climbing turn towards the landing runway to reach the missed approach heading. Turn may be more than 180 degrees and not in the shortest direction.
- Fly the published missed approach corresponding to the instrument approach procedure just flown until alternate instructions are received.

FMS utilization techniques:

Enter the landing runway in the fix page and any radials to assist in situational awareness.

For example:

KJFK ILS 04R circle to land 31R

FIX key – Push

Type KJFK31R in scratchpad and enter in 1L

Type 135 in scratchpad and enter in 3L

This will depict a dotted line from the end of runway 31R.

RADIO/BARO Minimums Chart

APPROACH TYPE	BARO MIN REF	RADIO MIN REF
ILS to CAT I	PUBLISHED DA	N/A
CAT II	N/A	PUBLISHED RA
CAT II - RA NOT AUTH	PUBLISHED DA	N/A
CAT III	N/A	50 FT
NON-ILS	PUBLISHED DA/MDA or DDA (1)	N/A
CIRCLE TO LAND	HIGHER OF: PUBLISHED MDA or FIELD ELEV + 1,000 ft	N/A
VISUAL	APPROACH MINS(2)	N/A

(1) The DDA is the published MDA + 50 feet.

(2) Set the approach minimums for the instrument approach used to back up the visual approach. If no instrument approach is available, any number may be set to aid in the approach. Both the captain's and first officer's reference bugs should agree.

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Procedure Guidance	SP.16.10
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Supplementary Procedures

Introduction

Chapter SP

Section 05

General

This chapter contains procedures that are organized by system and covers:

- Procedures (adverse weather operation, etc.) that are accomplished as required rather than routinely performed on each flight,
- Any first-flight-of-the-day test or other systems test,
- Guidance on lengthy operating procedures, and
- Adverse weather procedures and guidance.

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Cabin Inspection

Flights without Flight Attendants

For a flight without a flight attendant staff (ferry flight, test flight, delivery flight, training flight, etc.) the pilots verify the following:

- Doors - Secured and at least the forward entry door armed
- Beverage cart - Stowed and locked in position
- Galley (coffee pots, doors, and drawers, etc.) - Secured
- Overhead bins - Closed
- Closets - Closed and locked
- Lavatories - Inspect for general security; doors closed.

After block-in, pilots must disarm all doors and partially open the main entry door, to be fully opened by the gate agent.

Electronic Flight Bag (EFB) Mount

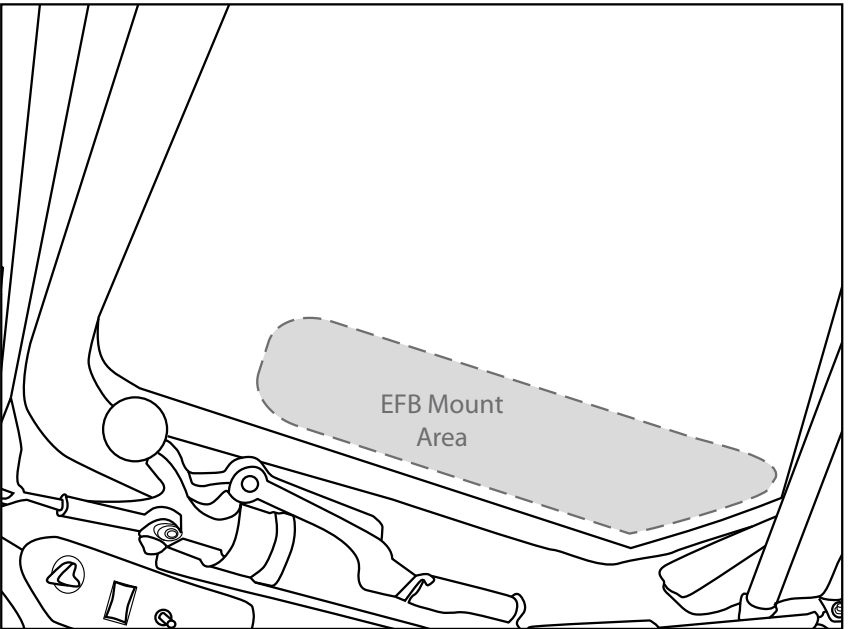
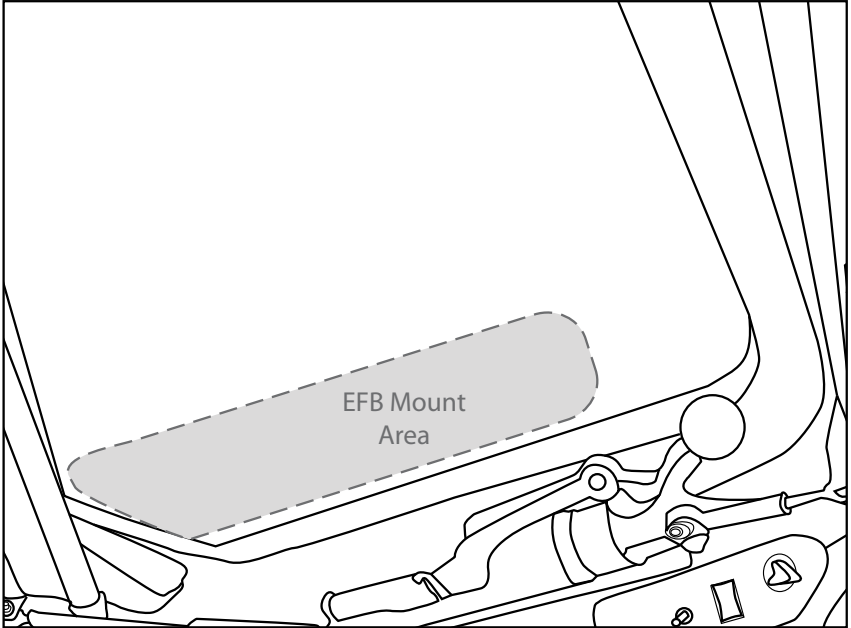
Note: Prior to the first flight of the day, the EFB mounting system must be installed/reinstalled to ensure the mount attachment is secure. During subsequent flights, mount security may be verified with a gentle tug. Reinstall the mount as required.

CAUTION: Do not place the EFB in direct sunlight on the glareshield.

Do not use any other mounting or securing system other than the provided approved system.

To secure the EFB mount in the aircraft:

- Ensure the side window and suction cups are clean. If necessary, wipe with pretreated lens/screen cloth or moist cloth.
- Sunshades (as installed) should be stowed prior to securing the mount.
- Ensure the locking levers are in the OFF position.
- Position the suction cups in the mounting zone indicated in the following diagrams.
- To remove trapped air, press each cup against the window until completely compressed.
- Move the locking levers to the ON position.
- Ensure the EFB and mount are free and clear of all flight controls, and do not restrict access to egress, tiller, oxygen mask, or line of sight.
- Squeeze the gray tabs together to expand the mounting tabs and insert the EFB into the mount.
 - If the EFB is in the portrait mode, the fixed tabs should be positioned at the bottom of the mount to prevent the EFB from slipping.
- Use caution when deploying sunshades with the EFB mount installed to avoid damage.



Flight Deck Access System Test

Full functional check required on first flight of the day. [AFM]

With the flight deck door open:

Access code Enter

Enter access code into keypad followed by the # key.

Verify aural alert sounds.

Verify amber keypad LED illuminates.

Verify amber AUTO UNLK light on FLT DECK DOOR panel illuminates.

FLT DECK DOOR rotary switch..... DENY

Hold FLT DECK DOOR rotary switch to DENY while observing AUTO UNLK light extinguishes.

Verify red keypad LED illuminates.

Release FLT DECK DOOR rotary switch and wait 30 seconds. No aural alert should sound.

FLT DECK DOOR rotary switch..... UNLK

Hold FLT DECK DOOR rotary switch to UNLK while observing LOCK FAIL light illuminates.

Verify aural alert sounds.

Verify green keypad LED illuminates.

Release FLT DECK DOOR rotary switch and verify LOCK FAIL light extinguishes.

Verify aural alert silences.

Oxygen Mask and Interphone System Test

Oxygen mask, regulator, and interphone Test

Verify mask stowed and storage box doors closed.

Rotate regulator control knob to EMER.

Push and hold TEST/RESET button.

Verify yellow cross in oxygen flow indicator.

Verify oxygen flow is audible.

Release TEST/RESET button.

Verify oxygen flow indicator turns black.

Rotate regulator control to 100%.

Verify operation of mask microphone.

Push INT volume control knob on the audio control panel and adjust volume.

Adjust overhead speaker volume.

Push and hold TEST/RESET button.

Audio control panel RADIO/INT switch INT.

Tap on stowage box and verify tapping is audible through the overhead speaker.

Release INT switch.

Release TEST/RESET button.

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Supplementary Procedures

Air Systems

Chapter SP

Section 2

APU Ground Air Conditioning

ISOL switch OPEN
APU AIR switch ON
L and R PACK switches AUTO
CKPT and CABIN TEMP selectors AUTO
SDCP AIR cue - Push

Adjust supply temperature as desired.

Takeoff with Air Conditioning Packs Off

TO/APPR key Push
PACKS – Line select ON to OFF.

Observe PACKS ALL OFF alert message on EAD.

Note: Air conditioning packs will shut off at throttle advance and will come on at 3,000 feet AGL. If an engine failure occurs prior to 3,000 feet AGL, an air conditioning pack will be restored when the PACK SHUTDOWN switch is placed to OVRD.

Pressurization Control Operation – Landing at Destination Not in the Database

SDCP AIR cue Push
CABIN PRESS MANUAL LDG ALT switch INCR or DECR
Set SDCP AIR CABIN LAND value to landing field elevation.

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Supplementary Procedures

Anti-Ice, Rain

Chapter SP

Section 3

Anti-Ice Use

Requirements for use of anti-ice and operational procedures for engine and wing anti-ice are contained SP.16, Adverse Weather.

Wing Ice Detection Test

Full functional check required on first flight of the day.

Wing ice detection Test

Hold AIRFOIL WING ICE DET switch in RESET for 1 second and release.

Verify no wing ice alert messages displayed on EAD.

Hold AIRFOIL WING ICE DET switch in TEST.

Verify WING ICE DET PASS alert message displayed on EAD.

Release AIRFOIL WING ICE DET switch.

Note: Do not preform test during refueling operations as the system will not test properly.

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Supplementary Procedures
Automatic Flight

Chapter SP
Section 4

General

Reserved for future use.

Intentionally
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Supplementary Procedures Communications

Chapter SP Section 5

Cabin Medical Communications System

At the captain's discretion, this procedure may be used during a medical emergency to allow direct communication between the cabin and a ground based medical consultant.

Cabin medical headset jacks are located:

- Above seats 12CDE and 22CDE

When communication between the cabin and a ground based medical consultant is required:

On observer's audio control panel:

VHF2 MIC SELECTOR/CALL switch Push

VHF2 volume control knob Set

Push VHF2 volume control knob and adjust volume.

Cabin communications Initiate

Inform flight attendants that communication with the medical consultant has been established and is available for their use.

If flight deck duties permit, monitor the cabin/medical communication.

When cabin medical communication is no longer required:

Observer's audio control panel Reset

Reconfigure observer's audio control panel and instruct flight attendants to restow the headset.

Note: Under no circumstances should a passenger be allowed to plug a personal headset into a cabin medical communications audio jack.

Cockpit Voice Recorder Test

Cockpit voice recorder Test

Push and hold TEST button.

STATUS light illuminates for approximately 1 second.

Release TEST button.

Aircraft Communication Addressing and Reporting System (ACARS)

Main Menu

The prompts on the main MENU are divided into three general categories: data, requests, and reports.

- Data includes:
 - DATA INIT (1L)
 - DEPT / ENROUTE (3L)
 - SUMMARY / ARR DATA (4L)
 - SENT MESSAGES (5L)
 - RECEIVED MESSAGES (3R)
- Requests include:
 - ATC REQUESTS (1R)
 - DAL REQUESTS (2R)
- Reports include:
 - REPORTS FLT PROGRESS (4R)
 - REPORTS MAINTENANCE (5R)



Most pages contain RETURN (6L) and MENU (6R) prompts. The RETURN prompt will take you back to the most recently viewed page. The MENU prompt will always return you to the main menu and will appear any time there is not a higher priority message at (6R). For instance, the MENU prompt will be temporarily replaced with a MESSAGE prompt when a new message is received. After the message is read, the MENU prompt will return to (6R).

INIT DATA

INIT DATA 1/2

INIT RQST (5L) initializes the ACARS for your flight and requests the data uplink information.

Estimated Time Enroute, ETE (1R), must be manually entered.

This page displays a UTC clock with seconds (2R) as does the DEPT menu page.

FMC RESET (3R) resets the datalink function if necessary.

Fuel On Departure, FOD (4R), should be verified or entered.

INIT DATA 2/2

INIT DATA menu page 2/2 is provisioned to record LDG CAPT (1L), LDG F/O (2L), FLT RLS # (3R), and RLS AMEND (4R). The employee numbers for the captain and first officer should be entered in 1L and 2L, otherwise the ACARS will prompt the pilots to enter these fields after the IN event.

ACARS-NNNN INIT DATA 1/2	ACARS-NNNN INIT DATA 2/2
FLIGHT NO. ETE	LDG CAPT CAPT 2 ID
 	[]
FLT RLS DATE UTC	LDG F/O F/O 2 ID
HHMMSSZ	[]
DEPT STN FMC RESET*	F/A FLT RLS #
[]	
DEST STN LBS FOD	RLS AMEND
ID/RLS DATA	[]
* INIT RQST NEXT PAGE>	< HELP
< RETURN HH:MM MENU*	* SEND
	< RETURN HH:MM MENU*

ATC REQUESTS

The ATC REQUEST menu page contains request prompts for US/Canada Predeparture Clearance (PDC RQST) (1L), International DEPART CLX (1R), OCEANIC CLX (2R), and digital ATIS (3R). Only PDC RQST and ATIS will be used.

PUSH RQST (2L) and TAXI RQST (3L) functions are provided for future use.



DAL REQUESTS

The Delta Air Lines (DAL) REQUESTS menu page provides options to address FREE TEXT (1L) downlinks to various ground based users, and to make both WEATHER (3L) and PERF TAKEOFF (3R) requests.

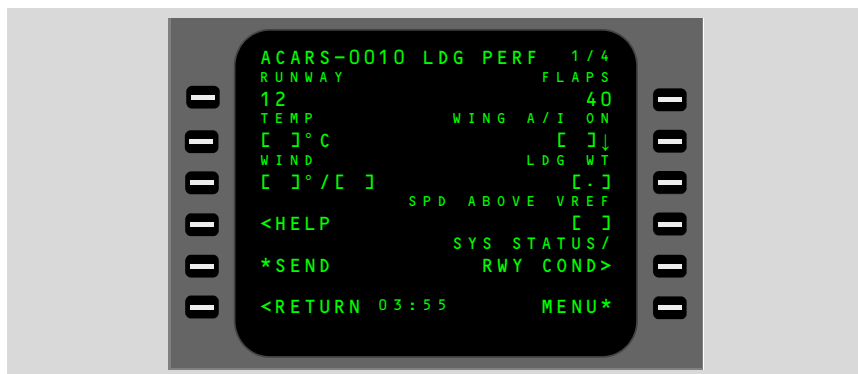
The following are all provisioned for future use: PERF CRUISE (4R), PERF LANDING (5R), REQUEST VOICE (4L), and CONNECTING GATES (1R).



Landing Performance Request

Note: LPR is intended for normal landing distances and is based on max manual braking. For non-normal landing configurations, use the ODM charts.

From the ACARS main menu page, line select DAL REQUESTS, then PERF LANDING.



Desired runway must be entered. If flap and landing weight are not entered, they will default to Flaps 40 and estimated or max landing weight. Temperature and wind are automatically captured but may be entered manually if desired. Wing A-ICE can be toggled on if necessary.

Calculations assume the aircraft will decelerate during the flare and touchdown at VREF minus 5 knots. Speed above VREF is not entered for headwinds; however, additives for gusts are carried through to touchdown and should be entered.

Entering a value in the SPD ABOVE VREF block increases the touchdown speed by the same amount and landing distance will increase.

Select the RWY COND prompt, then line select the desired Runway Condition Code (e.g. 5) or Braking Action Report (e.g. GOOD).



Select SYS STATUS to display page 3.

Pg 3 also allows calculation adjustments for inoperative braking systems. LOW MIN is not used.

Defaults: If the blocks for flaps, and landing weight are left blank, the system will default to Flaps 40 and estimated or max landing weight. The system is based on max manual braking. Crews must always enter weight when landing above the aircraft max landing weight.

Landing Performance Request Uplink

'*' Indicates fields selected or default.

LDIST = Calculated Landing Distance includes a 1500' air run from threshold to touchdown, plus stopping distance, plus a 15% safety margin. LDIST will never be greater than the available runway length.

LTP = Latest Touchdown Point to protect the LDIST on the available runway (default is 1500'). LTP varies between 1000' to 3000'. A landing beyond the LTP reduces the 15% safety margin included in the LDIST.

'()' = The LDIST and LTP are in parentheses when LTP is less than 1500'.

'- - - -' = Dashes appear when the 15% safety margin cannot be met or data is not available for requested conditions.

Page 1: Provides station, runway and available runway landing distance.

ATW 12		6501
5*GOOD	LDIST	LTP
F40*B-OFF	5300	2200
W 142/10G16	HW09	XW07
*PRINT		

Flaps 40, and GOOD braking action were requested (*).

The LDIST for the requested conditions is 5300'. The actual stopping distance is less since LDIST includes a 15% safety margin. LDIST is 2201' shorter than the available runway length. LTP will never be greater than 1/3rd of the runway length up to 3000'. In the example below, LTP is 2200' (1/3rd of runway).

Page 2: Provides additional data for requested conditions as well as other Runway Condition Codes or Braking Actions Reports.

F40 B-OFF	LDIST	LTP
6 DRY	4100	2200
5*GOOD	5300	2200
4 G/M	5700	2200
3 MED	6200	1800
2 M/P	----	----
1 POOR	----	----
*PRINT		

Page 3: System status page. Includes ship number, flight number/date, landing weight, as well as braking system status and production time stamp.

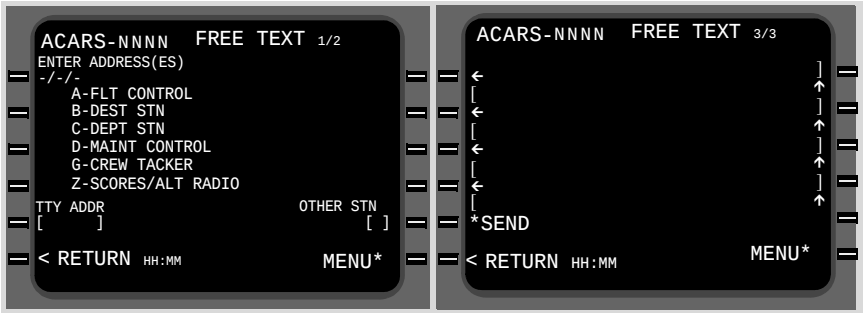
```
SHIP 9572   FLT 2562/18  
WT 103.6   VREF PLUS 00  
TEMP  4    A30.23  
REVSER OK   WING AI OFF  
ANTSKD OK   ASPOIL OK  
END ACARS LPR 1757Z
```

```
*PRINT
```

FREE TEXT REPORT

A FREE TEXT prompt allows the flight crew to designate an address for free text message routing by entering the corresponding code letter(s) at 1L. (e.g., to send a message to Flight Control, enter “A” in the scratchpad and select (1L)).

FREE TEXT messages support eight lines of text. Also, no “Edit Text” selection is necessary, as text may be entered directly on the applicable pages. To assist in text entry, each line of text (indicated by a bracket symbol “[]”) has an adjacent arrow symbol (<-) that points to its corresponding line select key. So the first line of text is entered at 1L, the second line is entered at 1R, followed by 2L, 2R, 3L, 3R, 4L and 4R.



DEPT/ENROUTE

The DEPT/ENROUTE data page conveniently consolidates flight progress information on one page. It can be selected anytime, and is displayed automatically at the OFF event.

The OUT time (1L) is not associated with the beacon; instead, it records the first time the parking brake is released after all cabin and cargo doors are closed. Two additional metrics capture the time when all cabin and cargo doors are closed (2L).

Additionally, the INS/GPS OUT time records the first aircraft movement during pushback. This page also displays a Time-To-Go (TTGO) field that counts down the remaining flight time based on the most recent arrival estimate.

The estimated time of arrival is called Estimated On (EON), and ALL arrival estimates are based on this time. This also synchronizes FMC Datalink ETA reporting for aircraft that automatically report ETA updates.

The following are all provisioned for future use: GATE *REQUEST (5L), GATE/ELEC/AIR indications (4L), and DLY REASONS (4R).

The screenshot displays the DEPT/ENROUTE data page with the following layout:

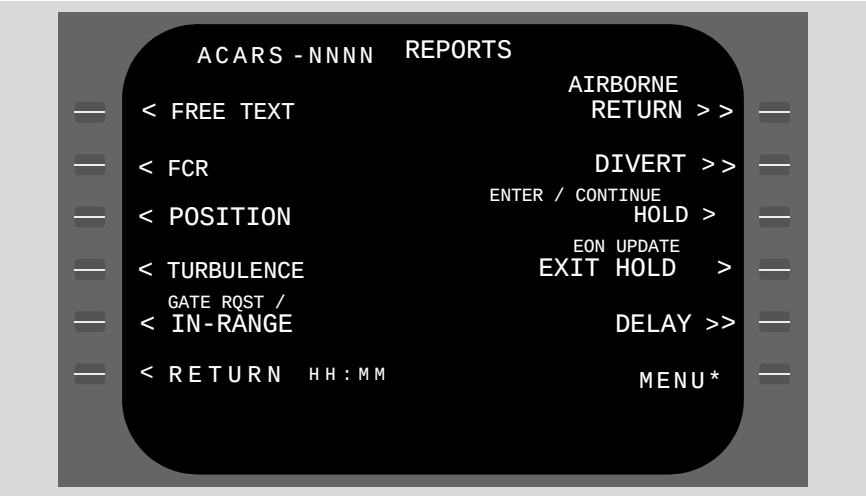
ACARS - NNNN	DEPT	HHMMSS Z
OUT / OFF		INS / GPS OUT
- - - - / - - - - Z		- - - - Z
CAB / CARGO CLSD		TTGO
- - - - / - - - - Z		- - : - -
EST GATE OPEN		EON
- - - - Z		- - - - Z
GATE / ELEC / AIR		DLY REASONS >
- - - / - / -		! T/O PWR &
GATE		! T/O + LAND ID >
*REQUEST		
< RETURN		MENU *

FLT PROGRESS REPORTS

In addition to the Free Text prompt, the REPORTS menu page provides prompts to send In-range Gate Requests and communicate flight progress updates to Flight Control. POSITION (3L), TURBULENCE (4L), AIRBORNE RETURN (1R),DIVERT (2R), ENTER/CONTINUE HOLD (3R), EON UPDATE / EXIT HOLD (4R) and Taxi Out/In DELAY (5R) reports are all contained here.

The HOLD report structures communication between pilot and Dispatcher during holding, and has an option to complete “Considering Divert”. This report will alert dispatch to a possible divert decision.

The FCR (Flight Crew Report) prompt at (2L) is provisioned for future use.



ACARS-NNNN

DEPT STN
KJFK

EON
□□□□z

SEND

< RETURN HH : MM

RETURN

1/2

REMARKS>

MENU*

ACARS-NNNN

ENTER REMARKS

[
←
[
←
[
←
[
←
SEND

< RETURN HH : MM

RETURN

2/2

] ↑
] ↑
] ↑
] ↑
] ↑
] ↑
] ↑
] ↑
MENU*

ACARS-NNNN

NEW DESTINATION

0000

EOM OLD/NEW

I819/0000z

CURRENT FUEL

000.0

SEND

< RETURN

HH:MM

REMARKS>

MENU*

1/2

ACARS-NNNN

ENTER REMARKS

[←]

[←]

[←]

[←]

[←]

SEND

< RETURN

HH:MM

MENU*

2/2

[↑]

[↑]

[↑]

[↑]

[↑]

SUMMARY/ARR DATA

The ARRIVAL menu page displays OUT/OFF/ON/IN times (1L) and (2L), as well as the total (actual) ACT BLOCK (3L) time for the segment. Fuel Remaining (FREM) (1R) will be automatically filled. RNP APPR (2R) and AUTOLAND (3R) allow for reporting and tracking of those events.

Flight times for current or previous flights can be viewed and/or printed by selecting PREV FLTS (5L). PREV FLTS captures the number of seconds that elapse from the IN time until the cabin door is opened.

The “!” symbol next to an item indicates that required data has not yet been entered. Select (5R) to access the T/O + LAND page, then (5L), which allows selection of TO, TO1, or TO2. Enter Assumed Temp (AT) at (5R).

ACARS-NNNN ARRIVAL		FREM	
OUT/OFF	----	----	000.0
ON/IN	----	----	
ACT BLOCK		RNP APPR>	
		AUTOLAND>	
GATE/ELEC/AIR		TAXI IN	
---		DLY REASON>	
		!T/O PWR &	
< PREV FLTS		ID>	
< RETURN	HH:MM	MENU*	

ACARS-NNNN T/O+LAND		LAND	
TAKEOFF			
* CAPTAIN			*
* F/O			*
T/O PWR		PWR DERATE	
↓000		AT []	
< RETURN	HH:MM	MENU*	

Arrival Delay Reporting

The Arrival Delay Reporting program will use common arrival delay categories to identify delays affecting ramp and gate operations at destination airports.

Flight crews should use the ACARS Taxi-In Delay Reason function to report the reason(s) for delays incurred while taxiing to the gate. This function is selected directly from the ACARS Arrival Data page, which is automatically displayed after landing. A recent enhancement displays the arrival gate number on this page (including any gate change after landing). After reviewing the gate assignment, Delay Reasons can be selected, and delay times should be entered by delay category (in minutes). Additional text is not necessary in this report. This data will be automatically sent with the Arrival Data.

The following graphics provide a step-by-step summary of this delay reporting feature.

1. Select Arrival Data page:



2. Select Delay Reason page:



3. Enter delay minutes in applicable categories:



Below is an example of a completed arrival delay report with three entries:

- 3 minute delay for safety zone not clear,
- 12 minutes for gate occupied, and
- 2 minutes awaiting marshaller.

ACARS - DLY REASONS

TAXI	CONGEST	GATE	AGENT
[:]	(HH:MM)	[:]	
RAMP	CONGEST	SAFETY	ZONE
[:]			00:03
GATE	OCCPD	MARSHALLER	
00:12		00:02	
APURUN DUE TO DELAY CONNECTING			
EXT	ELEC	EXT COND	AIR
[:]		[:]	
<RETURN 05:26		MENU>	

4. Return to the Arrival Data page. Data is automatically sent with the Arrival/Summary Data Report.

Printing Arrival Times

The ARRIVAL page does not have a print prompt. Flight time for the current or previous flights can be viewed and/or printed by selecting PREV FLTS at 5L.

1. Select PREV FLTS at 5L:

ACARS - 1492 ARRIVAL

OUT / OFF	FREM
0217 / 0223Z	007.0
ON / IN	
0423 / 0435Z	RNP APPR>
ACT BLOCK	
02:18	AUTOLAND>
GATE / ELEC / AIR	TAXI IN
--- / - / -	DLY REASON>
	T / O PWR &
	T / O + LND ID>
<PREV FLTS	
<RETURN 02:36	MENU*

FREE TEXT Entries

The FREE TEXT page supports up to eight lines of text. However, the first line of text must be entered at 1L or the SEND prompt will not appear.



MAINTENANCE REPORTS

Cabin FRC codes or other maintenance discrepancies may be sent using the WRITE-UP ENROUTE MAINT (1L) prompt on the REPORTS MAINTENANCE menu.

Cabin FRC codes may be entered in CABIN FRC CODE (1L). Enter the numeric code (e.g. 253-12). Do not enter "FRC." Use LOCATION (2L) to enter the three character location (e.g. 401 or 01A).

FRM CODE (1R) is not currently used. For other discrepancies use REMARKS (5R). On page 2, use EDIT TEXT to submit the maintenance write-ups.

Engine Data and APU Time/Cycle data is sent automatically and therefore is not displayed with use of this menu.

HELP (2L), APU COLD START (3L), and DIAGNOSTICS (3R) are provisioned for future use.

The diagram illustrates the ACARS display layout, showing two screens with various buttons and text. The left screen displays 'ACARS-NNNN REPORTS' and 'WRITE-UP <ENROUTE MAINT>'. The right screen displays 'ACARS-XXXX WRITE-UP 1/2' and 'CABIN FRC CODE FRM CODE'. Both screens have a 'DIAGNOSTICS' button and a 'MENU*' button at the bottom.

FMC Data Link

Initialization

Ensure ACARS is in the DATA mode and the FMS has the current navigation database. Changing the database during or after the uplink process erases all route-related FMS entries, deletes any waiting uplinks, and may block incoming uplinks.

CAUTION: Verification procedures remain unchanged. Once the Data Uplink is received, crews can either INSERT or REJECT the uplink. In either case, flight crews must verify the uplinked and/or manual FMS entries with the most recent flight plan, ATC clearance, and WDR.

Perform the ACARS INIT RQST. Data fields update automatically, with the exception of ETE and FOD.



The INIT RQST function automatically generates uplink requests for additional FMC preflight data. Uplinks are annunciated by the CDU MSG lights, along with the following CDU scratchpad messages:

- ACT FPLN UPLINK READY (Flight Plan Route Data)
- PERF DATA UPLINK READY (Flight Plan Performance Data)
- WIND DATA UPLINK READY (Cruise and Descent Winds)

The order of receipt may vary, but all three data streams should be ready for loading in less than a minute after the INIT RQST has been sent.

The Data Uplink messages cannot be viewed from the ACARS menu. Return to the FMC by pressing any MCDU key to view the Data Uplink messages.

Queued messages will appear in the MCDU scratchpad. Scroll through the messages by using the CLR key. Depressing the CLR key will clear the displayed message so that you can view the next message in line.

The correct sequence to insert the Data Uplinks is; route, then performance, then winds. If the correct order is not followed, data will be lost and manual entries must be made.

FPLN Data

The following is an example of the ACT FPLN UPLINK READY message:

Select REVIEW AOC ROUTE (1L) from the AOC COMM MENU. Review the flight plan data and select the INSERT ACT prompt (5L).

Note: The route uplink includes only the main body of the planned route. The runway, SID, and STAR must be entered manually.

REF INDEX

= DEFINED	
= <WAYPOINT	
= <WAYPOINT	AOC COMM>
= CLOSEST	
= <AIRPORTS	NAVAID>
= <POS REF	DOC DATA>
= <A/C STATUS	MAINT>
= <SENSOR STATUS	

AOC COMM MENU

FPLN REQUEST	REVIEW
[]/[]	AOC ROUTE>
T/O REQUEST	
[]/[]	
REQUEST	
*PERF DATA	
<POS REPORT	
	STATUS
	READY
ACT FPLN UPLINK READY	

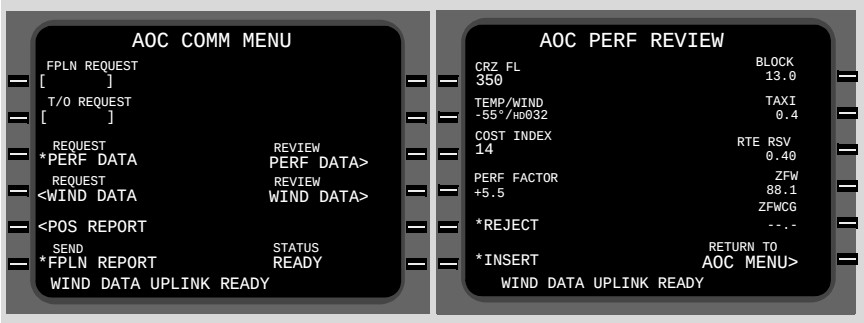
AOC ROUTE REVIEW 1/1

NEW ROUTE	
KATL/KEWR	DAL1942
DISCONSPA	J14 CREWE
J51 FAK	

INSERT ACT	REJECT
	RETURN TO
	AOC MENU>
ACT FPLN UPLINK READY	

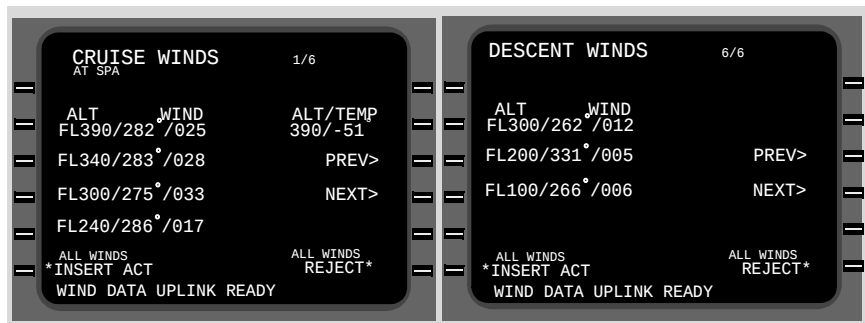
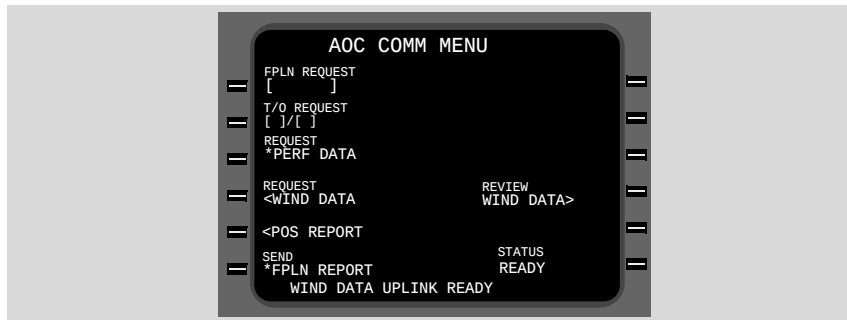
Performance Data

Performance data is loaded in a similar manner. Observe the PERF DATA UPLINK READY message, select REVIEW PERF DATA (3R), and select the INSERT prompt (6L).



Wind Data

Cruise and Descent Winds are also loaded in a similar manner. Observe the WIND DATA UPLINK READY message, select REVIEW WIND DATA (4R), and select the INSERT ACT prompt (6L).



Note: The uplink reflects forecast winds along the entire route, including any planned altitude changes. You may also note the wind direction may differ slightly from values listed on the flight plan. The flight plan winds are rounded; uplinked winds are more precise.

While the flight plan may contain five separate descent wind values, the FMS is only capable of accepting four values. After the winds are inserted, only three descent wind values will be displayed on the descent page.

Taxi Procedure

The D-7 Pre-Pushback Message provides crews with the available runways and intersections that will be published on the WDR.

Only one takeoff position per runway will be uplinked. If a runway and position are published on the WDR, then the intersection has priority, unless it is OVERWT.

The current reported airfield conditions will determine the data to be uplinked, including contaminated runways.

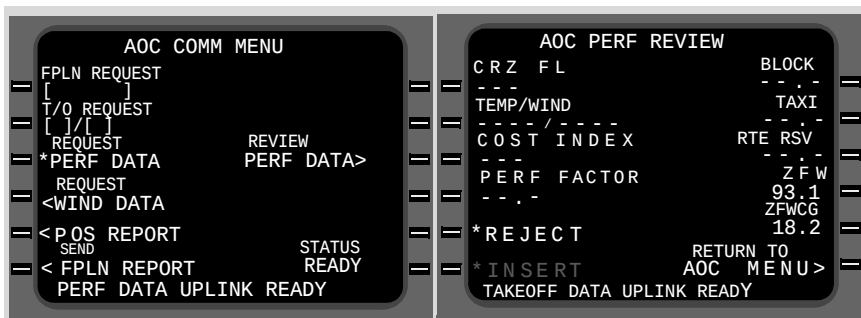
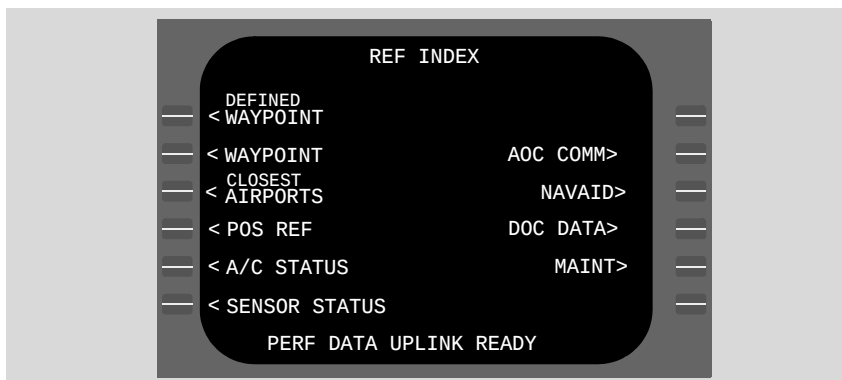
- Runways that are dry (D) will have no code next to the number (e.g. 26L).
- Runways that are contaminated will have the letter "W" next to the runway (e.g. 26LW).

Note: "W" can mean slippery wet (W), icy (I), quarter clutter (Q), or half clutter (H). Confirm the uplinked contaminant with the WDR.

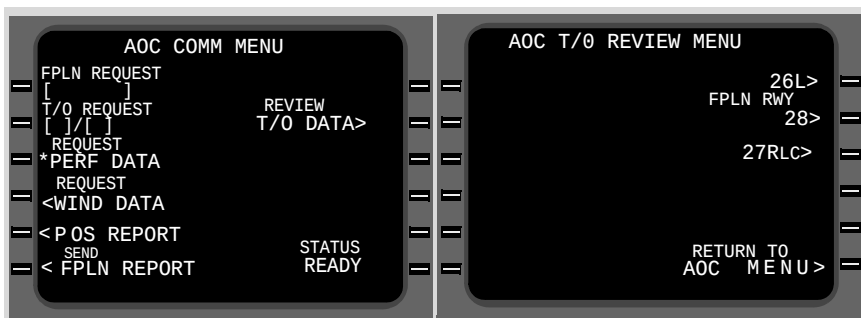
Cutback runways are not supported by Data Uplink. Manual entries from the WDR are required. If a runway is desired that is not published on the D-7 message and the WDR, request the new runway through the ACARS PERF TAKEOFF page from the DAL REQUEST menu. Only the requested runway and position (e.g. 09L-M2) will then be uplinked.

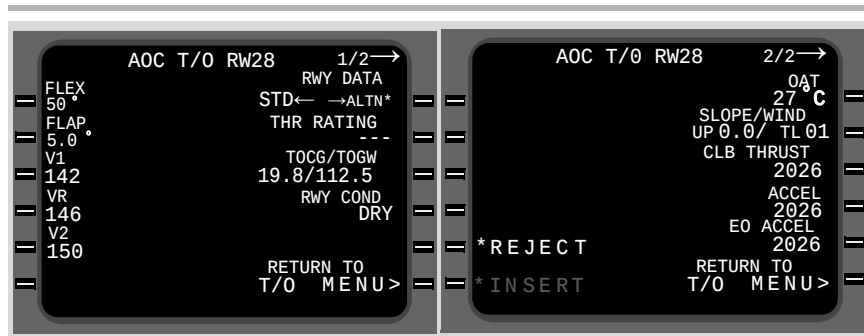
Takeoff Performance Data

When a WDR is sent, two new data uplinks will follow. Observe the PERF DATA UPLINK READY or TAKEOFF DATA UPLINK READY message. First select the AOC COMM MENU then REVIEW PERF DATA (3R). Select the INSERT prompt (6L).



Then select REVIEW T/O DATA (2R), page forward, and select the INSERT prompt (6L).





Uplink Logic for Thrust

Data Uplink logic uses the second reduced thrust selection from the WDR. This thrust selection was chosen to minimize being overweight when taxi fuel burn is required.

If there is only one reduced thrust selection or no reduced thrust selection, Data Uplink logic uses the normal (full) thrust selection.

Crews may select STD or ALTN on the REVIEW T/O DATA page.

- STD is the default selection (large font) and provides the Data Uplink thrust selection.
- ALTN provides T/O1 thrust.

Note: If normal (full) thrust is desired and not selected by the Data Uplink, manual entry is required.

Intersections

If multiple takeoff positions for the same runway exist on the WDR, (e.g., JFK 31L and 31L-KE or EWR 4L and 4L-PB), data for the shortest available intersection will be uplinked. If no intersection is available, full length will be sent.

If full length runways are your only WDR options and ATC assigns you an intersection takeoff, request the new intersection runway data through the ACARS PERF TAKEOFF page.

Manual Downlink Requests

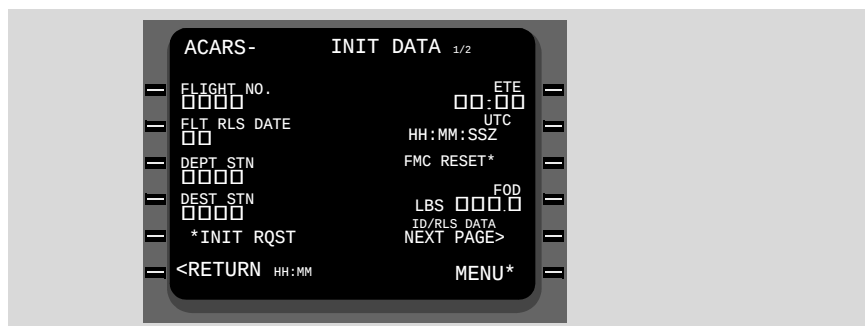
Since data is automatically uplinked during the preflight process when the ACARS INIT RQST is sent, crews should not normally need to perform a manual downlink request. However, if the situation requires the dispatcher to amend previously uplinked data, or if a specific uplink was not received, the REQUEST function is available. Selecting a REQUEST prompt will start a downlink request for data.

CRUISE WINDS are available when not in a descent and both a cruise altitude and a flight plan route exist. DESCENT WINDS are available if a cruise altitude exists. Currently, if winds are requested enroute, the uplinked winds will reflect the values calculated when the dispatcher prepared the existing flight release. If, for example, the crew received a new routing from ATC or desired amended wind information for a different cruising level, the crew should first contact the dispatcher. Once the dispatcher has amended the flight parameters in the Delta Flight Planning System (FPS), or performed an in-flight revision when a new wind forecast became available, the crew could REQUEST an updated cruise wind uplink.

FMC Data Link Reset

Uplink of FMC data is limited to one time per release number. A new release number unlocks this limit and will allow FMC requests (one each) of the needed data.

In the case of corrupted or incomplete Data Uplinks, the process may be reinitiated by selecting the FMC RESET prompt on ACARS INIT DATA page 1. FMC RESET is a fully automatic function that resets the FMC Data Link server and does not involve the dispatcher or the FMC itself. This can only be accomplished one time. If Data Uplink problems still persist, manual entries must be made.



CDU Data Link Status Displays

When the Data Link system is not operating and unable to process FMC downlinks, CDU page prompts change to FAIL, VOICE, NO COMM, or FULL and the line title changes to DATALINK.

The status messages mean:

- FAIL - The ACARS management unit is inoperative.
- VOICE - Radio is operating in Voice Mode.
- NO COMM - Radio is operational but not available.
- FULL - All available Data Link space is full.

Flights with Nontraditional Call Signs

Delta flights occasionally operate with an ATC-filed call sign that differs from the Delta flight number. This occurs on certain military charter flights (e.g. "Camber") and on stub flights. (Refer to FOM chapter 5.2, Stub Flights.)

Verify or enter the ATC-filed call sign in the FMS. This will assure ADS and transponder information are properly transmitted to ATC. Pilot must enter the Delta flight number into ACARS.

The flight plan will include the following dispatcher remarks for any flight operated with a call sign differing from the Delta flight number:

FLIGHT PLAN FILED AS CMBxxx

CMB CALL SIGN MUST BE ENTERED IN THE FMS AND USED
FOR ALL ATC COMMUNICATIONS

ENTER DELTA FLIGHT NUMBER IN ACARS FOR COMPANY
COMMUNICATIONS

Intentionally
Blank

Supplementary Procedures

Electrical

Chapter SP

Section 6

Electrical Power Up

WARNING: If a red A/C OUT-OF-SERVICE tag is installed, personnel are not to activate any system, control, switch, or circuit breaker without obtaining verbal approval of maintenance personnel (preferably the mechanic performing the repairs).

WARNING: Do not establish any hydraulic power which will result in flap movement unless the wing/flap area has been cleared of personnel and equipment. Use an outside observer.

Logbook	Check
Circuit breakers	Check
TRANS and AUX HYDRAULIC pump switches	OFF
L and R PACK switches	OFF
Throttles	Idle
Thrust reverse levers	Down
FUEL switches	OFF
WX RADAR	OFF
Electrical panel	Set

If external power is desired:

BATT switch – ON and lock

Rotate BATT switch clockwise to lock

EMER PWR selector – OFF

DC BUS TIE switch – AUTO

L and R BUS TIE switches – AUTO

L GEN, APU, EXT, and R GEN switches – ON

Emergency Power Test - Accomplish

Refer to SP.6, Emergency Power Test.

If APU power is desired:

BATT switch – ON and lock

Rotate BATT switch clockwise to lock

EMER PWR selector – ON

DC BUS TIE switch – AUTO

L and R BUS TIE switches – AUTO

L GEN, APU, EXT, and R GEN switches – ON

Fire Warning Test – Accomplish

Refer to SP.8, Fire Warning Test.

APU - Start

Refer to SP.7, APU Start.

Emergency Power Test

Full functional check required on first flight of the day.

Note: This test will be invalid if the BATT CHARGING alert is displayed or the APU is in the start cycle. If the BATT CHARGING alert is displayed, perform this test later in the preflight procedure.

EMER PWR selector OFF, then ARM

Rotate the selector from OFF to ARM to initiate system test.

Verify EMER PWR ON light illuminates.

Verify EMER POWER TEST alert message displayed.

Verify EMER PWR TEST FAIL alert message is not displayed after approximately 1 minute.

Supplementary Procedures

Engines, APU

Chapter SP

Section 7

APU Start

APU panel Set

MASTER switch – OFF

NO 1 and NO 2 FIRE AGENT switches – OFF

AIR switch – OFF

FIRE CONT switch – NORM

Ground Start

Note: This procedure assumes the Electrical Power Up procedure has been accomplished.

External power not available:

START PUMP switch ON

APU MASTER switch START

Hold switch to START momentarily, then release to RUN.

Note: DUs may blank momentarily when the starter engages.

Note: The start will be delayed approximately 40 seconds to allow the inlet door to open.

After APU is started:

EMER PWR selector OFF, then ARM

RIGHT AFT PUMP switch ON

START PUMP switch OFF

Emergency Power Test - Accomplish

Refer to SP.6, Emergency Power Test.

If APU air is desired:

APU AIR switch ON

L and R PACK switches AUTO

External power available:

RIGHT AFT PUMP switch ON

APU MASTER switch START

Hold switch to START momentarily, then release to RUN.

Note: The start will be delayed approximately 40 seconds to allow the inlet door to open.

If APU air is desired:

APU AIR switch ON

L and R PACK switches AUTO

In Flight Start

APU MASTER switch START

Hold switch to START momentarily, then release to RUN.

Note: The start will be delayed approximately 40 seconds to allow the inlet door to open.

If APU has not started within 2 minutes after release of start switch to RUN, the APU will auto abort the start.

Normal wear and deterioration of the APU may adversely affect starting capability. If time and conditions permit, consider descending below FL 330.

APU Shutdown

APU AIR switch OFF

APU MASTER switch OFF

Note: After turning the APU MASTER switch OFF ensure the APU shutdown cycle is complete by verifying the absence of the APU information block on the SD ENG display. This takes approximately 1 minute after APU RPM begins decreasing.

Note: With no external power, the BATT switch and EMER PWR selector must remain on until APU shutdown is complete. After AC power is lost, push the SD CP ENG cue to observe APU information block on DU#2.

Note: With external power connected, the EXT power switch or the GROUND SERVICE ELEC PWR switch must remain ON until APU shutdown is complete.

Battery Start

This procedure is to be used when APU and ground electrical power are unavailable. Both engines should be started prior to taxi.

Interior inspection Complete

Complete all applicable items.

Exterior inspection Complete

Ensure aircraft is chocked.

BATT switch ON

EMER PWR selector ON

Fire Warning Check

Refer to SP.8, Fire Warning Test.

Parking Brake SET

Brake pressure indication is not available until normal ac power is established.

START PUMP switch ON

Verify ENG START PUMP ON alert message displayed on EAD.

BCN ON

Note: Ensure air pressure is available for start.

When cleared and ready to start:

IGNITION switch. ON

Verify ENG IGN OVRD ON alert message displayed on EAD.

CAUTION: Auto abort protection is not available during a battery start.

Right ENG START switch Pull

Note: If ENG START switch will not remain latched, pull and hold ENG START switch and observe N2 rotation.

Observe:

- N2
- OIL PRESS
- N1

Note: N1 indication may take up to 1 minute for a normal engine start.

Note: If tailwind component is less than 10 knots and there is no N1 indication, place the FUEL switch ON at max motoring (minimum 20% N2).

Note: For tailwind components of 10 knots or greater, see SP.7, Engine Start with No N1 Indication.

At N1 with TGT below 150°C:

FUEL switch. ON

Observe:

- FF
- TGT rise

At 39% N2:

ENG START switch Retracts

Note: If ENG START switch remains latched or was manually held in position, push in ENG START switch at 39% N2.

Observe:

- Engine idle indications

Accomplish the Non-Normal Checklist, Aborted Start, for the following (refer to QRH, chapter 7, Aborted Start):

- No N2
- No OIL PRESS
- No N1
- No FF
- No TGT rise 10 seconds after FF
- Hung start
- Rate of TGT increase may exceed 700°C
- TGT exceeds 700°C

IGNITION switch. AUTO

EMER PWR selector OFF, then ARM

Note: Verify system display panel indications are normal after
normal ac and dc power is applied.

HYDRAULICS, ELECTRICAL, and
AIR conditioning panels. Set

After FCCs are powered:

Preflight checklist. Complete

Note: An emergency power check is not required for a BATTERY
start as it cannot be accomplished with the FUEL switch ON.
Accomplish an emergency power check at the next destination.

Pushback checklist Complete

Left engine Start

Start left engine using normal start procedure.

After start checklist. Complete

Engine Crossbleed Start

The area behind the aircraft should be considered.

Crossbleed start guidelines while attached to the tug:

- Crossbleed starts are not permitted during pushback or when an aircraft is under tow.
- Crossbleed starts are permitted when attached to a pushback tug provided the parking brake is set.

Accomplish the following delayed start procedure:

L and R PACK switches OFF
 ISOL switch OPEN
 SDCP AIR cue Push
 Throttle Advance
 Pneumatic pressure Check
 32-43 psi.

Note: Approximately 40-50% N1.

Accomplish the normal start procedure.

Accomplish the following delayed after start procedure:

Throttle Idle
 ENG anti-ice As required
 ISOL switch AUTO
 L and R PACK switches AUTO

Manual Engine Start Procedure

CAUTION: Auto abort protection is not available during a manual start.

Note: This procedure is to be used when directed by the MEL if the automatic start system or any of the ignition systems are inoperative.

Normal pushback procedure and checklist Complete

When cleared and ready to start:

IGNITION switch ON

Verify ENG IGN OVRD ON alert message displayed on EAD.

Normal Engine start procedure complete

Note: If required, motor engine for 30 seconds before moving
FUEL switch to ON.

IGNITION switch AUTO

Normal after start procedure and checklist Complete

Accomplish the Non-Normal Checklist, Aborted Start, for the following (refer to QRH, chapter 7, Aborted Start):

- No N2
- No OIL PRESS
- No N1
- No FF
- No TGT rise 10 seconds after FF
- Hung start
- Rate of TGT increase may exceed 700°C
- TGT exceeds 700°C

Engine Start with No N1 Indication

If possible, position the aircraft into the wind so the tailwind component is less than 10 knots. A normal start can then be accomplished. For normal engine starts, no N1 indication is required until after the FUEL switch has been placed ON.

Use the following procedure for engine starts with no N1 indication on the EAD Primary Engine Display when tailwind component is 10 - 25 knots.

CAUTION: If tailwind component is 10 knots or greater, delay moving FUEL switch to ON position until there is an indication of increasing N1 rotation. Failure to do so may result in an engine fire.

CAUTION: If tailwind component is greater than 30 knots, the aircraft must be positioned into the wind (+/- 10°). Failure to do so may result in an engine fire.

Ground communications Establish

Confirm with ground personnel that the rotation of the fan blades will be in a counterclockwise direction (as viewed facing the front of the engine) once the engine start sequence has been initiated.

Perform the normal Engine Start procedure. Refer to NP.20, Engine Start.

At max motoring (minimum of 20% N2):

FUEL switch ON

N1 indication required after FUEL switch placed ON.

Start Valve Manual Operation

Note: Use this procedure when directed by the MEL.

MAINT INTPH switch light ON

Establish communications with ground crew at engine maintenance interphone location.

SDCP ENG cue Push

L and R PACK switches OFF

ENG START switch Pull

- Switch light illuminates.

Note: If ENG START switch will not remain latched, pull and hold.

Command ground crew to open start valve.

Observe:

- N2
- OIL PRESS
- N1

Note: N1 indication may take up to 1 minute for a normal engine start.

Note: If tailwind component is less than 10 knots and there is no N1 indication, place the FUEL switch ON at max motoring (minimum 20% N2).

Note: For tailwind components of 10 knots or greater, see SP.7, Engine Start with No N1 Indication.

At N1:

FUEL switch ON

Observe:

- FF
- TGT rise

At 41% N2:

- Command ground crew to close start valve.

Observe:

- ENG START switch - retracts
- Switch light extinguished

Note: If ENG START switch remains latched or was manually held in position, push in ENG START switch at 41% N2.

Observe:

- Engine idle indications

Starting with APU Air or Ground Air Source (External AC electrical power available)

Prior to start:

Ground personnel briefing Accomplish

Communication between captain and ground personnel required prior to start. The communication should include:

- Engine(s) to be started
- Timing of removal of pre-conditioned air and electrical power

BCN ON

Perform the normal Engine Start procedure. Refer to NP.20, Engine Start.

Prior to ground personnel removing external power:

EXT power switch..... OFF

This will eliminate the possibility of a break power transfer which could cause various alerts to be displayed on the EAD. If alerts are displayed that cannot be cleared, it may be necessary to shut down and restart the engines.

Prior to reconnecting external power:

- External power AVAIL light - Verify illuminated
- If engine(s) shutdown is desired:

EXT power switch ON

Engine Performance Report

Procedure

When the aircraft is stabilized in cruise:

Autothrottles Disengage

Allow engines to stabilize (3 to 5 minutes).

Engine Parameters Record

ACARS is the primary method.

Access the report under MAINTENANCE Reports >ENG RPT.

Enter 0.0 for Throttle Position.

Enter TGT in EGT blocks.

Alternatively, paper Engine Performance Reports may be found in the Engine Performance Logbook.

Autothrottles Re-engage

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Supplementary Procedures

Fire Protection

Chapter SP

Section 8

Fire Warning Test

External power available:

Fire warning Test

All MASTER WARNING and MASTER CAUTION lights extinguished.

Hold FIRE TEST switch down.

Verify aural alerts sound:

“FIRE LEFT ENGINE”

“FIRE RIGHT ENGINE”

“APU FIRE”

Verify MASTER WARNING lights illuminate.

Verify L and R ENG FIRE PULL handle lights illuminate.

Verify EAD alert messages illuminate:

ENG L FIRE

ENG R FIRE

APU FIRE

PODS TEST PASS

Note: PODS alert messages (TAIL MANF FAIL, TAIL TEMP L HI, TAIL TEMP R HI, or WING MANF FAIL) may illuminate on the EAD, but are not required for a successful system test.

Push either MASTER WARNING light or press the illuminated SDGP ENG cue and verify aural alerts silence.

Release FIRE TEST switch and observe all alerts and warnings extinguish.

External power not available and an APU or battery start is required:

- BATT switch ON
- EMER PWR selector ON
- Fire warning Test

Accomplish the “external power available” Fire Warning Test.

All indications will be the same except the first officer’s MASTER WARNING light will not illuminate and the PODS TEST PASS alert message on the EAD will not be displayed.

After APU is started and all busses are powered, the Fire Warning Test must be accomplished again to confirm all correct test indications.

Cargo Smoke Test

Note: The Cargo Smoke Test is disabled for up to 6 minutes after establishing electrical power.

- Cargo smoke Test

- Push and hold CARGO SMOKE TEST button.
- Verify aural “CARGO SMOKE” alert sounds.
- Verify CARGO SMOKE panel PUSH lights illuminate.
- Verify MASTER WARNING lights illuminate.
- Push either MASTER WARNING light or press the illuminated SDCP AIR cue and verify aural alert silences.
- Verify EAD alert messages illuminate:
 - CARGO SMOKE FWD
 - CARGO SMOKE AFT
- Release CARGO SMOKE TEST button and verify CRG SMK TEST PASS alert message on EAD.

Supplementary Procedures

Flight Controls

Chapter SP

Section 9

Stabilizer Test

Full functional check required on first flight of the day.

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

Stabilizer trim brake Test

SDCP CONFIG cue – Push

Move the control wheel trim switches.

Verify stabilizer trim indicator on SD moves the proper rate and direction.

While holding the trim switches, raise STABILIZER TRIM switch light guard and select OFF.

Verify OFF light illuminates, STAB TRIM OFF and USE ALTERNATE STABILIZER TRIM alert messages displayed, and trim indicator stops moving.

Release control wheel trim switches.

Operate the ALT LONG TRIM switches in the NOSE UP and NOSE DN direction.

Verify stabilizer trim indicator on SD moves the proper rate and direction.

Push STABILIZER TRIM switch light and verify OFF extinguishes and STAB TRIM OFF alert message is not displayed.

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Supplementary Procedures
Flight Instruments, Displays

Chapter SP
Section 10

General

Reserved for future use.

Intentionally
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Supplementary Procedures

Flight Management, Navigation

Chapter SP

Section 11

IRS Operation

Full Alignment

Full alignment is required on all Class II navigation flights and for first flight of the day.

Prior to commencing procedure the airplane must be parked and not moved until procedure is complete and NAV OFF lights extinguish.

IRS mode selectors NAV

Alignment time is approximately 10 minutes.

NAV OFF lights will flash if ADIRU does not receive present position initialization within 10 minutes of positioning mode selectors to NAV.

MCDU Set

Select A/C STATUS page.

Verify MODEL 717-200

Verify ACTIVE DATA BASE.

Verify database code begins with DL3

The SECOND DATA BASE may be activated by selecting and activating the prompt. This will also clear all FMS entries.

Note: Verify the current database is active based upon the local date of departure.

Note: The active data base cannot be changed after engine start.

Select F-PLN INIT page.

Enter FROM/TO.

RETURN TO F-PLN INIT page – Select

Select INITIALIZE IRS prompt.

Fast Alignment

Prior to commencing procedure the airplane must be parked and not moved until procedure is complete and NAV OFF lights extinguish.

Note: A fast alignment is not desired on through flights.

IRS MODE selectors NAV

Cycle mode selectors from NAV to OFF then back to NAV within 5 seconds.

Alignment time is approximately 3 minutes.

Select A/C STATUS page.

Verify MODEL 717-200

Verify ACTIVE DATA BASE.

Verify database code begins with DL3

The SECOND DATA BASE may be activated by selecting and activating the prompt. This will also clear all FMS entries.

Note: Verify the current database is active based upon the local date of departure.

Note: The active data base cannot be changed after engine start.

Select F-PLN INIT page.

Enter FROM/TO.

RETURN TO F-PLN INIT page – Select

Select INITIALIZE IRS prompt.

Shutdown

IRS mode selectors OFF

NAV OFF Light(s) Flashing

IRS mode selectors OFF

After 25 seconds, place mode selectors ON.

If NAV OFF light(s) stops flashing, continue with preflight.

If NAV OFF light(s) continues to flash:

INIT key Push

Confirm GNS/ALIGN POS at 3L and 3R.

Push keypad up arrow key.

Push keypad down arrow key.

Select INITIALIZE IRS prompt.

Note: Pushing the arrow keys re-enters the aircraft position.
This procedure (confirming GNS/ALIGN POS, pushing the arrow keys, then selecting INITIALIZE IRS) may have to be accomplished several times for the NAV OFF light(s) to stop flashing.

FMS

Route Initialization

F-PLN key Push

Enter runway and departure.

Select LAT REV page for origin airport.

Select SID pages.

Select RWY, STD SID, and TRANS.

Select INSERT prompt.

Enter route.

To enter a waypoint:

Type the waypoint identifier and enter into appropriate position using line select key.

Type a fix, radial, and DME as XXX/XXX/XX.

To enter an airway:

Select LAT REV page for waypoint to begin entry of airway.

Select AIRWAYS.

Type airway identifier and enter in VIA box. Type airway end identifier in TO box. Continue with airway entries, as required. After completion, select INSERT prompt.

To enter an intersection of two airways, type the first airway identifier in 1L VIA box and the second airway identifier in 2L VIA box. This will create a waypoint labeled PBDXX in the TO box.

Enter arrival and runway, if known.

Select LAT REV page from the last waypoint entered from flight plan.

Select STAR.

Select STD STARS, TRANS, and STD APPR.

Select INSERT prompt.

Select approach TRANS prompt, if desired.

Correct any F-PLN DISCONTINUITY, if required.

Confirm desired route.

Select ECP PLAN mode and use FMS arrow keys to step through entered route.

Verify flight plan, clearance, and Jeppesen chart route waypoints, airspeed, and altitude restrictions agree with entered F-PLN.

Note: At or above altitudes are displayed with a plus sign (+). At or below altitudes are displayed with a minus sign (-). For waypoints with two altitude restrictions (i.e. at or above 5000 and at or below 8000 at PERCH), one restriction will be displayed on the F-PLN page and the other will be displayed on the VERT REV page. Do not modify these altitudes as one of the restrictions will drop out of the FMS and cannot be reentered.

Performance Initialization

PERF key Push

Enter any climb speed restriction in EDIT and select prompt, if desired.

Note: Editing the CLIMB page also edits the CRZ page. Editing the CRZ page does not edit the DES page.

Enter CLIMB FORECAST winds, if desired.

Push PAGE forward key to access CRZ page (2/3).

Note: To enter flight plan COMPUTED ENROUTE WINDS push the F-PLN key. Select VERT REV (right side prompts) from the first waypoint after the flight plan computed TOC, then select page 2.

Push PAGE forward key to access DES page (3/3).

Enter DESCENT FORECAST winds, if desired.

INIT key Push

Enter ALTN ROUTE.

Enter 0. This will populate NONE in the ALTN boxes.

Enter FLT NO.

Enter DALXXXX.

Note: Use leading zeros, if required.

Enter CRZ LEVELS.

Enter flight plan FL.

Enter TEMP/WIND.

After CRZ LEVELS entry, TEMP and WIND will default to ISA temperature and 0. Use flight plan ISA deviation to correct the TEMP entry. For example, if the TEMP value is -15 and the flight plan ISA deviation is P05, then enter -10 in TEMP. WIND entry may be left at 0.

Enter CI.

Enter flight plan INITIAL COST INDEX.

PAGE key Push

Note: WEIGHT INIT page should be displayed.

Enter TAXI.

Enter flight plan TAXI BURN.

Enter RTE RSV.

Enter flight plan FMS RESERVE FUEL.

Enter 0 for ALTN.

Enter or verify 0 for FINAL.

Enter BLOCK.

Verify flight plan BLOCK FUEL has been loaded. Refer to FOM, chapter 5.4, Flight Plan Fuel Block.

After fuel has been loaded and verified, select UFOB.

Enter ZFW.

Enter WDR ZFWT.

Enter TOCG.

Enter WDR TOCG.

Enter ZFWCG

Enter WDR ZFWCG.

Note: No entries are required on the FUEL INIT page 3.

TO/APPR key Push

THRUST LIMITS page – Select

Enter/select/confirm WDR takeoff thrust and select climb thrust.

For normal power, confirm T/O and select CLB1.

For FLEX, enter WDR derate as XX in 1R, and select CLB1.

Note: FLEX may be entered on the TAKEOFF page.

For T/01 or T/02, select appropriate prompt and CLB1.

RETURN TO TAKEOFF page – Select

Enter FLAP.

Enter WDR FLAP.

Enter SLOPE/WIND.

Enter 0/0. The WDR includes slope and wind calculations.

Enter OAT.

Enter ATIS temperature followed by “C”.

Enter V1, VR, and V2.

Enter WDR V1, VR, and V2 speeds to clear CHECK/CONFIRM VSPDS message.

Enter or confirm CLB THRUST, ACCEL, and EO ACCEL.

For NADP2 takeoffs, enter 1000 (AGL) in CLB THRUST, ACCEL, and EO ACCEL. For NADP1 takeoffs, verify 1500 (AGL) in CLB THRUST, verify 3000 (AGL) in ACCEL, and enter 1000 (AGL) in EO ACCEL.

Note: For Delta Special Pages enter specified engine out acceleration altitude in EO ACCEL.

FMS Preflight for Origins/Destinations not contained in FMS Database

Note: Certain Offline Airports may not be in the FMS Database. If necessary use the following procedures when FMS database support is unavailable.

REF key Push

Select DEFINED WAYPOINT page.

Select NEW WAYPOINT page.

Type the pilot defined runway in IDENT.

Note: RW must be used for the first two characters,
e.g. RW24 or RW08L.

Type the LAT/LONG, ELEV, LENGTH, and CRS.

Note: If possible, use the latitude and longitude of the approach
end of the runway.

Select ENTER.

Note: You have now provided the FMS with a defined origin or
destination that can be used for either the FROM or TO
on the INIT page.

Note: Only a localizer based approach or a VOR may be flown.
Use the "Approach Not in FMS Database" procedure.

Departure runway change:

F-PLN key Push

Select LAT REV (left side prompts) page from current takeoff runway.

Select SID page.

Select new RWY, SID, and TRANS.

Select INSERT prompt.

Clear any F-PLN DISCONTINUITY, if required.

Confirm new route.

Select ECP PLAN mode and use FMS arrow keys to step through new route.

Verify flight plan, clearance, and Jeppesen chart route waypoints, airspeed, and altitude restrictions agree with the new F-PLN.

Note: MCDU message, CHECK/CONFIRM VSPDS will be displayed.

Data Uplink:

REF key – Push

- AOC COMM page – Select
- REVIEW T/O DATA page – Select

If the runway selected on the F-PLN page is one of the three menu choices:

- Confirm the FPLN RWY
- FPLN RWY – Select
- PAGE key – Push
- INSERT STD prompt – Select

If the runway selected on the F-PLN page is **not** one of the three menu choices:

- Request the runway through the ACARS PERF TAKEOFF page.

Observe PERF DATA UPLINK READY or TAKEOFF DATA UPLINK READY message.

REF key – Push

- AOC COMM page – Select
- REVIEW PERF DATA – Select
- INSERT prompt – Select
- REVIEW T/O DATA page – Select
- Confirm the FPLN RWY
- FPLN RWY – Select
- PAGE key – Push
- INSERT STD prompt – Select

TO/APPR key – Push

THRUST LIMITS page – Select

Enter/select/confirm WDR takeoff thrust and select climb power, if required.

RETURN TO TAKEOFF page – Select

Confirm SLOPE/WIND or enter 0/0.

Enter/confirm WDR V1, VR, and V2 speeds to clear
CHECK/CONFIRM VSPDS message.

Enter/confirm CLB THRUST, ACCEL, and EO ACCEL.

FMS Lateral Navigation

Proceeding Direct to a Waypoint

DIR INTC key Push

Line select desired waypoint.

Observe desired waypoint in 1L.

Note: ABEAM POINTS prompt may be selected, if desired.

Select 1L prompt.

Confirm active waypoint on ND.

Select or confirm NAV.

Intercepting a Leg (Course):

DIR INTC key Push

Select desired waypoint that you will proceed FROM and enter in 1L.

Observe desired waypoint in 1L.

Select 1L prompt.

Clear T-P by pushing CLR key and 1L.

Confirm active waypoint on ND.

Select NAV.

Note: Wait until wings level (the heading select dashed line disappears on the ND MAP display) before arming the NAV function. This will ensure the airplane stays on the ATC assigned heading until intercept and not the FMS computed intercept heading.

Linking a Route Discontinuity:

F-PLN key Push

Push CLR key.

Line select the key adjacent to F-PLN DISCONTINUITY.

Intercepting a Jet or Victor Route Not in the F-PLN:

DIR INTC key Push

Determine waypoint to proceed from using airway chart and enter in DIR TO (1L).

Observe desired waypoint in 1L.

Select 1L prompt.

Select LAT REV page for the entered waypoint.

Select AIRWAYS prompt.

Enter desired airway in VIA (1L).

Determine waypoint to proceed to using airway chart and enter in TO (1R).

Select INSERT prompt.

Clear T-P by pushing CLR key and 1L.

Confirm active waypoint on ND.

Select NAV.

Intercepting a Radial (Course) to a Waypoint:

Option 1

DIR INTC key Push

Create a waypoint or select waypoint from F-PLN.

Enter waypoint and inbound course in INTC FIX/CRS (1R).

Confirm desired waypoint and course in 1R.

Select insert prompt.

Note: Wait until wings level (the heading select dashed line disappears on the ND MAP display) before selecting the prompt.

Select NAV.

Note: APPR/LAND may be armed instead of selecting NAV when intercepting final approach course.

Option 2

DIR INTC key Push

Create a waypoint to proceed FROM and enter in 1L.

For example:

When intercepting the 180° radial to XXX, enter XXX/180/99, ensuring that this created waypoint will be behind the intercept point.

Observe desired waypoint in 1L.

Select 1L prompt.

Clear F-PLN DISCONTINUITY.

Clear T-P.

Confirm active waypoint on ND.

Select NAV.

Note: Wait until wings level (the heading select dashed line disappears on the ND MAP display) before arming the NAV function. This will ensure the airplane stays on the ATC assigned heading until intercept and not the FMS computed intercept heading.

Note: If the intercept heading provided by ATC is greater than 45° from the F-PLN intercept course and the aircraft is greater than 10 NM from the course, the aircraft will turn to a 45° intercept heading once the aircraft is within the 10 NM capture zone.

Entering a Waypoint Not in the Database:

F-PLN key Push

Along track displacement (Place/Distance):

Type the waypoint identifier (XXX), slash (/), and distance for a new waypoint to be placed after an existing waypoint (XXX/10).

Add a minus (-) prior to the distance for a new waypoint to be placed prior to an existing waypoint (XXX/-10).

Enter on top of existing waypoint (XXX) and confirm route modification on ND.

Create new waypoint:

Place/Bearing/Distance (PBD):

Type the waypoint identifier (XXX), slash (/), bearing (123), slash (/), and distance (XXX/123/10).

Enter into desired location and confirm route modification on ND.

Latitude/Longitude:

Type the latitude, slash (/), and the longitude (NXXXXX.X/EXXXXX.X).

Enter into desired location and confirm route modification on ND.

Runway:

Type the ICAO identifier and the runway identifier (KATL08R).

Lateral revision waypoint:

Select LAT REV page for waypoint to be modified.

Type the desired waypoint identifier.

Enter into NEXT WPT.

Confirm route modification on ND.

REF key Push

Select DEFINED WAYPOINT page.

Select NEW WAYPOINT page.

Type any combination of letters and numbers up to seven and select IDENT.

Type either the LAT/LONG or PLACE/BEARING/DISTANCE and select appropriate line.

For a pilot defined runway, type RW and the runway identifier (RW08L).

Enter the LAT/LONG or PLACE/BEARING/DISTANCE and ELEV, LENGTH, and CRS.

Holding

Note: Three minutes prior to the holding waypoint, the airplane will slow to FMS computed holding speed.

To enter holding:

F-PLN key Push

Select LAT REV page for desired waypoint.

Note: To hold present position, select LAT REV page for the waypoint under FROM (1L).

Select HOLD page and enter desired parameters for INB CRS, TURN, and TIME/DIST.

Note: There is no pilot entry for EFC. RTE RSV can be modified.

Select INSERT prompt.

To exit holding:

F-PLN key Push

Select EXIT AT FIX prompt.

Note: If cleared by ATC to exit holding by proceeding direct to a downtrack waypoint, confirm the correct waypoint is entered in the DIR TO boxes on the DIR INTC page.

The CLR key may also be used to clear the holding pattern. This will clear the hold and the holding waypoint.

Destination Change or Divert

Note: Select REF key and CLOSEST AIRPORTS page to determine airports nearby or enter an ICAO identifier in 5L.

The DIR INTC key and DIR TO page can be used to establish the initial ATC routing.

F-PLN key or SEC F-PLN Push

Select LAT REV page for any waypoint (including FROM or PPOS) and enter the ICAO identifier in NEW DEST.

Enter new routing.

Refer to SP.11, Route Initialization, for further guidance.

Push INIT key and enter new CRZ LEVELS, if required.

Entry of Approach for an Immediate Return

Note: This procedure may be used for an immediate return to your departure airport or following a go-around.

F-PLN key Push

Select LAT REV page from any waypoint.

Note: If there are no waypoints, push the DIR INTC key and enter a waypoint, then LAT REV from the entered waypoint.

Note: For an immediate return, enter NEW DEST and select a LAT REV page.

Select STAR page.

Clear the STD STAR, if required.

Confirm or enter the ATC assigned STD APPR.

Select INSERT prompt.

Enter the TRANS, if required.

Navigation Accuracy Check

REF key Push

Select POS REF page.

Confirm ACTUAL value is less than RNP value.

NAVAID Inhibit

REF key Push

Select NAVAID page.

Enter NAVAID identifier in DESELECT.

GNS Inhibit

REF key Push

POS REF page - Select

Select GNS NAV INHIBIT prompt

Approach Not in FMS Database/Hard Tuning

Note: In order to allow auto tuning, hard tuned NAVAIDs must be cleared manually.

NAV RAD key Push

Note: PRESELECT (6L or 6R) may be used to preset NAVAIDS (either frequencies or four letter identifiers) and courses for later use. Data entered into PRESELECT must be line selected to the scratchpad before entering in 1L, 1R or 4L.

ILS or localizer approach:

CAUTION: APPR/LAND will not arm if you fail to enter a CRS with the ILS frequency or four letter identifier.

Enter ILS frequency or four letter identifier/CRS in 4L. Select APPR/LAND or LOC ONLY, as required.

Select APPR on ECP.

Note: In order to use DME as a reference only, enter the localizer frequency or four letter identifier in 4L.

LDA with GS:

Enter ILS frequency/CRS in 4L. Select APPR/LAND.

Select APPR on ECP.

Note: Do not use the four letter identifier because the glideslope will not capture.

VOR approach:

Enter VOR/CRS in 1L or 1R.

Select VOR on ECP if required.

Arrival Change

Note: SEC F-PLN can also be used for an arrival change. See SEC F-PLN section.

F-PLN key Push

Select LAT REV page for desired waypoint.

Select STAR page.

Select STD STARS, TRANS, and STD APPR.

Select INSERT prompt.

Select approach TRANS prompt, if desired.

Crossing Radials

FIX key Push

Enter identifier in FIX.

Enter radial in DNTKFX.

Note: The point where the entered radial crosses the FMS lateral path or the ABEAM generated point can be used to create a PBD waypoint.

ETO

PROG key Push

Observe ETO for TO or NEXT waypoint.

Select PAGE key and enter FIX for other waypoints on F-PLN pages.

RTA

PROG key Push

Select PAGE forward key.

Enter FIX and RTA.

Note: Plus (+) may be used for an “at or after” time and minus (-) for an “at or before” time.

Arrival Time Change Using Cost Index

Note: Cost Index changes are immediate and will affect all phases of flight. Speed edits will only affect that specific phase of flight.

INIT key Push

Enter CI.

Parallel Offset

F-PLN key Push

Select LAT REV page for the FROM point in 1L.

Enter desired distance and L or R in OFFSET.

Note: The parallel offset is cancelled when the active leg is changed with a lateral revision, the offset data is cleared, or the next leg is not applicable for an offset.

Procedure Turn

F-PLN key Push

Select LAT REV page for the desired waypoint.

Select PROCEDURE TURN page.

Enter OUTB CRS, INB DIST, and INB CRS.

For example:

VOR final approach course 090, remain within 10NM, and maneuver north of the final approach course.

Enter 315 for OUTB CRS, 5 for INB DIST, and 090 for INB CRS.

Select INSERT prompt.

SEC F-PLN

Note: SEC F-PLN can be used for planning changes and predictive purposes. Uses include reroutes, restricted critical terrain routes, arrival changes, diversion planning, etc.

SEC F-PLN key Push

Note: Refer to SP.11, Route Initialization, for entry information.

COPY ACTIVE.

This page copies the F-PLN. Sequencing will be identical to the active leg until a revision is made to the active flight plan. Sequencing will then cease and the rest of the route will remain.

ACTIVATE SEC prompt.

This page activates the SEC F-PLN and the previously active flight plan becomes the secondary. If NAV is engaged, the first leg of SEC F-PLN must be identical to the active leg for the ACTIVATE SEC prompt to be displayed. If the prompt is not displayed, disengage the NAV mode.

Vertical Navigation

Speed/Altitude Constraints

F-PLN key Push

Enter desired SPD/ALT next to desired waypoint or select VERT REV page for desired waypoint (right side prompts) and enter desired speed and/or altitude constraints.

The FMS may not know if the restriction is for a climb or descent and the CLB and DES prompt may be displayed and one must be selected to enter the restriction.

A pilot cannot enter an “at or above” altitude restriction and an “at or below” altitude restriction (block altitude) for the same waypoint.

Note: Note: The VERT REV page will also display EFOB for the selected waypoint.

Changing Climb/Cruise/Descent Speed Schedule

PERF key Push

PATH ERROR monitor.

Enter desired speed in EDIT and select prompt.

Descent prior to FMS computed top of descent point (T/D):

Select a lower altitude in the altitude select window.

Adjust the descent rate by using the V/S wheel, then select PROF. This will lock in the vertical descent rate until intercepting the idle path (I/P).

To reenter the cruise phase of flight, push the INIT key and enter CRZ LEVEL. A new descent profile and T/D will be displayed.

Descent after FMS computed top of descent point (T/D):

If more than 300 feet above the descent path the FMS speed will increase to regain the idle path. (Speed up to .02M not to exceed MMO .02 or 20KTS not to exceed VMO – 10KTS.)

Note: The speed increase will occur in FMS ECON or POLICY speed and not EDIT speed.

If on path and speed is FMS speed + 10KTS, the ADD DRAG message is displayed. As speed slows to target speed – 5KTS, the RMV DRAG message is displayed.

If speed constraint cannot be met, the SPD ERROR AT message is displayed. Once reaching the altitude limit + 500 feet, the airplane will level, and SPEED LIMIT EXCEEDED message is displayed until the airplane has slowed to target speed -3KTS.

If altitude constraint cannot be met, the ALTITUDE ERROR AT message is displayed.

The FMS computed ECON or POLICY speed can be overridden by an EDIT entry or by entering a speed in the IAS/MACH speed display window and then immediately pushing the FMS SPD button.

If an altitude lower than 10,000 feet is selected in the altitude display window, the FMS speed will be maintained until approximately 2000 feet above 10,000 feet. The FMS will then slow the airplane to 245KIAS and continue the descent.

CAUTION: In PROF mode and speed select, the airplane will maintain the FMS computed path and not slow at 10,000 feet.

Miscellaneous

FMS Position Update

REF key Push

Select POS REF page.

Use a waypoint, NAVAID, LAT/LONG, or PBD and enter in 1L.

When over selected point, select UPDATE prompt.

Duplicate Waypoints

After entering waypoint, DUPLICATE NAMES page will be displayed.

Select correct waypoint.

Timer

Note: Selection of FMS timer is only available in flight.

TO/APPR key Push

Enter TIMER MMSS.

Enter time in minutes and seconds and select 4R.

Select DOWN on TIMER (captain or first officer's light panel) and
PUSH to start. Tone will sound when timer is at zero.

Depicting a Radial or Course

Option 1

FIX key Push

Enter waypoint in 1L.

Enter radial or course in DNTKFX.

Select MAP on EIS and view radial or course on ND.

Option 2

NAV RAD key Push

Enter identifier and radial or course in 1L or 1R.

Select MAP on EIS and view radial and course on ND.

FMS Manual Entry Procedures

Note: The following procedure is only for FMS manual entries and assumes Data Uplink is inoperative or unavailable. All other procedures remain the same.

Preflight Procedure - PF

FMS Set

F-PLAN key - Push

LAT REV from departure airport - Select

SID page - Select

Enter SID, RWY, and TRANS, if required

INSERT prompt - Select

LAT REV from last F-PLN waypoint - Select

Enter flight plan route.

LAT REV from last flight plan waypoint - Select

Enter STAR, TRANS, and APPR, if required and available.

INSERT prompt - Select

Enter TRANS, if required

CLR F-PLN DISCONTINUITY, if required

NAV RAD key - Push

Confirm autotune of NAVAIDs or enter NAVAID information, as required.

PERF key - Push

Enter climb speed restrictions, if required.

Enter descent winds on PERF page 3, DESCENT FORECAST page.

INIT key - Push

Enter 0 for ALTN ROUTE, FLT NO (e.g. DAL0123), CRZ LEVEL, TEMP/WIND, and CL.

WEIGHT INIT page - Select

Enter TAXI, RTE RSV, 0 for FINAL, and BLOCK.

Enter ZFW. (Use UFOB after fueling complete. Verify with FSR or EFSR.)

TO/APPR key - Push

Enter 0/0 for SLOPE/WIND and current OAT (e.g 15°C)

Enter CLB THRUST, ACCEL, and EO ACCEL.

THRUST LIMITS page - Select

Select CLB1

SEC F-PLN key - Push

Select COPY ACTIVE or enter SEC F-PLN, if desired.

FIX key - Push

Enter fix information, if desired.

PROG key - Push

Compare DTG with flight plan.

F-PLN key - Push

Select ECP PLAN mode.

Step through FMS and compare to flight plan.

Taxi Procedure

Captain	First Officer
Referencing the WDR data:	
	• F-PLN page 1 • Verify FMS selected runway and WDR runway/takeoff position agree.
	• INIT key - Push • PAGE key - Push • Enter ZFW, TOCG, and ZFWCG. • Compare WDR TOWT with TOGW. • TO/APPR key - Push • Enter FLEX if required, FLAP, V1, VR, and V2.

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Supplementary Procedures

Fuel

Chapter SP

Section 12

Fuel System Test

Full functional check required on first flight of the day.

FUEL system Test

Push SDCP FUEL cue.

FUEL PUMP switches – ON

Turn on all fuel tank pump switches for tanks containing fuel including the start pump.

Verify all fuel pump symbols turn green and ENG START PUMP ON alert message displayed on EAD.

FUEL X-FEED lever – ON

Verify crossfeed valve symbol turns green and FUEL XFEED ON alert message displayed on EAD.

FUEL X-FEED lever – OFF

Verify crossfeed valve symbol turns white and FUEL XFEED ON alert message extinguishes on EAD.

FUEL PUMP switches – OFF

Crossfeed Operation

Use this procedure to correct main tank fuel imbalance. This condition may be due to a fuel leak, an uneven engine fuel burn condition, or APU fuel consumption.

Note: A LAT FUEL UNBAL alert may be displayed when main tank quantities differ by more than 1400 pounds.

If a fuel leak is suspected, refer to QRH, chapter 12, Fuel Leak.

SDCP FUEL cue Push

CTR AFT and CTR FWD PUMP switches OFF

FUEL X-FEED lever ON

Verify crossfeed valve symbol turns green and FUEL X-FEED ON alert message displayed on EAD.

AFT PUMP and FWD PUMP switches
(tank with lesser quantity) OFF

Observe the main tank fuel quantities to confirm that the imbalance between tanks is being corrected.

Note: Tank with greater quantity should decrease consistent with engine (and APU if applicable) consumption. Tank with lesser quantity should not decrease.

When main tanks are at desired level and prior to approach and landing:

All AFT PUMP and FWD PUMP switches ON

CTR AFT and
CTR FWD PUMP switches ON (if tank contains fuel)

FUEL X-FEED lever OFF

Verify crossfeed valve symbol turns white and FUEL XFEED ON alert message not displayed on EAD.

Supplementary Procedures

Hydraulic

Chapter SP

Section 13

Hydraulic System Test

Full functional check required on first flight of the day.

WARNING: Do not establish hydraulic power which will result in flap, slat, or spoiler movement unless the wing/flap area has been cleared of personnel and equipment. Use an outside observer.

If possible, pressurize the hydraulic system for the first flight of the day exterior inspection. Coordinate with ground crew or another flight deck crewmember to obtain clearance to turn on the TRANS and AUX HYDRAULICS pumps.

If no outside observer is available, the TRANS and AUX HYDRAULIC pumps may be turned on if:

- FLAP/SLAT handle agrees with flap position on the SD CONFIG page, and
- there is no GEAR DOOR OPEN alert on the SD CONFIG page, and
- there is no FLAP DISAG alert or SLAT DISAG alert.

HYDRAULICS panel Test

Push SDCP HYD cue.

AUX pump switch – ON

Verify auxiliary hydraulic pump symbol turns green and pressure normal.

TRANS pump switch – ON

Verify hydraulic power transfer unit symbols turn green and pressure normal.

TRANS and AUX pump switches – OFF

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Supplementary Procedures

Landing Gear

Chapter SP

Section 14

Gear Warning Test

Full functional check required on first flight of the day.

Gear warning Test

Push SDCP CONFIG cue.

Verify LEFT, NOSE, and RIGHT gear lights are illuminated green and CONFIG secondary gear indicators are green.

Pull landing gear lever out of detent and verify LEFT, NOSE, and RIGHT gear lights illuminate red and CONFIG secondary gear indicator lights are red.

Release landing gear lever and verify LEFT, NOSE, and RIGHT gear lights illuminate green and CONFIG secondary gear indicators are green.

Operating Over a Raised Arresting Cable

Avoid landing prior to or on an arresting cable.

On departure, begin takeoff roll just past the cable (if raised).

At the pilot's discretion, complete a back taxi, or taxi to the approach end on the parallel taxiway, onto the runway, then slowly past the cable to takeoff position.

Note: Operate over a raised cable only at a slow taxi speed. Avoid "donuts" used to elevate the cable.

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Supplementary Procedures

Warning Systems

Chapter SP

Section 15

EGPWS Test

Full functional check required on first flight of the day.

Enhanced Ground Proximity Warning Test

Push WX/TERR switch on the captain's and first officer's ECP to display TERRAIN on ND.

Push SDCP STATUS cue.

Hold GPWS TEST switch to TEST position momentarily.

Verify BELOW G/S switch lights on the captain's and first officer's forward panel illuminate momentarily.

Verify GRND PROX illuminates red and amber in the captain's and first officer's PFD alert window.

Verify aural alerts sound:

“GLIDESLOPE”

“WHOOOP-WHOOP, PULL-UP”

"TERRAIN, TERRAIN, PULL-UP"

Verify TERRAIN TEST and terrain test pattern on ND.

Verify STATUS page alert messages:

- TERRAIN FAIL
- GPWS FAULT

Note: When the test switch is held until the aural alerts begin, all GPWS aural alerts are tested.

Radar Test

Radar and PWS Test

Push WX/TERR switch on the captain’s and first officer’s ECP to display WXR OFF on ND.

WX RADAR GAIN switch AUTO.

WX RADAR antenna TILT selector as required.

Rotate WX RADAR mode selector to TEST.

Verify WINDSHEAR AHEAD flashes amber then red on the captain’s and first officer’s PFD.

Verify aural alerts sound:

“MONITOR RADAR DISPLAY”

“GO AROUND, WINDSHEAR AHEAD”

“WINDSHEAR AHEAD, WINDSHEAR AHEAD”

Verify test pattern on the captain’s and first officer’s ND.

Rotate WX RADAR mode selector to OFF.

Transponder/TCAS Test

Full functional check required on first flight of the day.

Transponder and TCAS Test

Select TCAS or MAP on captain's and first officer's ECP.

Rotate mode selector momentarily to TEST and release.

Verify RA recommended vertical speed on the captain’s and first officer’s PFD.

Verify threat symbols and tags on the captain’s and first officer’s ND.

Verify aural alerts sound:

“TCAS SYSTEM OK”

Weather Radar Operation

CAUTION: WX RADAR switch must be ON prior to takeoff for the predictive windshear system to operate.

The recommended tilt and range settings are guidelines for good radar operation. The flight crew is not limited to these settings. Operational needs often dictate flexibility in tilt and range selections.

Before Takeoff

Confirm RADAR operation with a confidence check.

Set tilt 15° UP, WX mode, and short range.

Slowly lower tilt until weather or ground returns are displayed.

If no returns can be detected, suspect an inoperative radar.

WARNING: Do not operate weather radar in a hangar or within 50 feet of any personnel or a fuel spill.

To evaluate terminal area weather before takeoff:

Set tilt at 15° UP, RANGE at 40 nm or less.

The radar height of weather targets displayed is at least (Tilt x Distance x 100). Weather targets displayed at:

10 nm	are at least 15,000 feet AGL
15 nm	are at least 22,500 feet AGL
20 nm	are at least 30,000 feet AGL

Slowly lower tilt from 15° UP to 5° UP while evaluating weather returns in the area.

Takeoff

During takeoff, tilt is initially set at 5° UP, with range at shortest appropriate for terminal area conditions.

During initial climb (below 10,000 feet AGL) set the tilt between 2° to 7° UP, with 5° tilt being a good compromise. (Maintain the radar display clear of ground returns while allowing weather returns to be displayed).

Climb

As climb continues above 10,000 feet AGL, lower tilt as necessary to maintain ground returns at the outer edge of the display.

A range selection of 80 nm or less is optimal during climb, unless a longer range setting is needed for deviation planning.

Cruise

To establish enroute park:

Set RANGE at 80 nm or less.

Adjust tilt to produce ground returns at the outer edge of radar display.

This tilt setting guards against over scanning nearby weather areas and provides continuous confirmation that the radar is working.

Weather targets will separate from ground returns and move toward the bottom of the display.

Range settings above 100 nm should be selected occasionally for long-range planning.

Set tilt to produce a scattering of ground returns beyond 100 nm.

Storms detected at long range will increase in displayed intensity as they are approached. Plan early deviations accordingly.

Note: Nearby weather areas may not be detected due to over scanning.

When returning to a shorter range, lower tilt to enroute park position.

At cruise altitudes above 30,000 feet:

Use sufficient down tilt to direct the beam into unfrozen areas of nearby storms.

Recommended Over Water Settings:

Altitude (feet)	40 NM	80 NM	160 NM
40,000	-7°	-3°	-2°
35,000	-6°	-2°	-1°
30,000	-4°	-1°	0°
25,000	-3°	-1°	0°
20,000	-2°	0°	+1°

Descent

On descent from cruise altitude, raise tilt as necessary to maintain ground returns at the outer edge of the display.

Low Altitude Park

Generally used at altitudes below 10,000 feet AGL.

To observe weather:

Set tilt 2° to 5° UP, range at shortest appropriate distance.

Note: If ground returns flood display, raise tilt until ground returns are removed, and weather can be displayed.

Approach

Approach Park

On final approach:

Set tilt at 10° UP, range at 20 nm.

At 10° UP tilt the radar height of weather returns displayed will be above aircraft altitude by at least (Tilt x Distance x 100). Weather areas will be developed above aircraft altitude by at least:

10 nm	10,000 ft.
15 nm	15,000 ft.
20 nm	20,000 ft

Strong returns at mid to upper levels indicates hazardous convective activity.

In a thunderstorm environment, occasionally lower tilt to produce ground returns and detect radar shadows, then return tilt to approach park.

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Supplementary Procedures

Adverse Weather

Chapter SP

Section 16

Introduction

Airplane operation in adverse weather conditions may require additional considerations due to the effects of extreme temperatures, precipitation, turbulence, and windshear. Procedures in this section supplement normal procedures and should be observed when applicable.

Cold Weather Operation

Considerations associated with cold weather operation are primarily concerned with low temperatures and with ice, snow, slush, and standing water on the airplane, ramps, taxiways, and runways.

Icing conditions can exist when OAT (on the ground) is 6°C or below or TAT/RAT is 10°C or below (in flight) and any one of the following exist:

- visible moisture (clouds, fog with visibility of one statute mile (1600m) or less, rain, snow, sleet, ice crystals, etc.) is present, or
- 3°C or less temperature/dew point spread, or
- ice, snow, slush or standing water is present on the ramps, taxiways, or runways.

Preflight Procedure

Although removal of surface snow, ice or frost is normally an ACS function, the flight crew should carefully inspect areas where surface snow, ice or frost could change or affect normal system operations.

Exterior Inspection

Do the normal Exterior Inspection with the following additional steps:

Surfaces Check

Ensure all leading edge devices, all control surfaces, tab surfaces, and the upper wing are free of snow, ice, and frost. The upper wing surfaces should be confirmed free of frozen contamination by inspection from the best vantage points.

Note: After inspection, monitor environmental conditions and ensure control surfaces remain free of contamination.

Note: Takeoff with light coatings of frost, up to 1/8 inch (3mm) in thickness on lower wing surfaces due to cold fuel is allowable.

Thin hoarfrost is acceptable on the upper surface of the fuselage provided all vents and ports are clear. Thin hoarfrost is a uniform white deposit of fine crystalline texture, which usually occurs on exposed surfaces on a cold and cloudless night, and which is thin enough to distinguish surface features underneath, such as paint lines, markings or lettering.

Pitot probes and static ports Check

Check all pitot probes and static ports free of ice and snow. Water rundown after snow removal may refreeze immediately forward of static ports and cause an ice buildup which disturbs airflow over the static ports resulting in erroneous static readings even when static ports themselves are clear.

Air conditioning inlets and exits Check

Verify the air inlets and exits, including the outflow valve, are free of snow and ice.

CAUTION: During or following an environmental icing event, ice or snow can accumulate inside the intake which cannot be seen from the ground or from inside the cabin. If this potential exists, have the intake inspected by the appropriate ground personnel prior to engine start.

Engine inlets Check

Verify the inlet cowling is free of snow and ice.

Fuel tank vents Check

Verify all traces of ice and frost are removed.

Landing gear doors Check

Landing gear doors should be free of snow or ice.

APU air inlets Check

The APU inlet door and cooling air inlet must be free of snow or ice prior to APU start.

Engine Start Procedure

Note: When anticipating taxiing on a slippery or contaminated surface, consider starting both engines.

Do the normal Engine Start procedure with the following modifications:

- Additional warm-up time may be needed to allow oil temperature to reach the normal range.
- Display units may require additional warm-up time before displayed engine indications accurately show changing values.
- Display units may appear less bright than normal.

Engine Anti-ice Operation - On the Ground

Engine anti-ice must be selected ON immediately after engine start and remain on during all ground operations when icing conditions exist or are anticipated.

WARNING: Do not rely on airframe visual icing cues before activating engine anti-ice. Use the temperature and visible moisture criteria because late activation of engine anti-ice may allow excessive ingestion of ice and result in engine damage or failure.

When engine anti-ice is needed:

L and R ENG anti-ice switches ON

Confirm ENG A-ICE ON alert message on the EAD.

When engine anti-ice is no longer required:

L and R ENG anti-ice switches OFF

Confirm ENG A-ICE ON alert message is not displayed.

Taxi Procedure

Do the normal Taxi procedure with the following modifications:

CAUTION: Avoid taxiing in deep snow or slush since steering will be more difficult. Brakes, landing gear and flaps may also freeze after takeoff if contaminated with snow or slush.

CAUTION: Taxi at a reduced speed. Use smaller nose wheel steering and rudder inputs and apply minimum thrust evenly and smoothly. Taxiing on slippery taxiways or runways at excessive speed or with high crosswinds may start a skid.

CAUTION: Be aware of any slipping due to asymmetric thrust or poor braking action. If necessary, stop the aircraft and clear one engine at a time.

During icing conditions do an engine run up, as needed, to minimize ice build-up. Use the following procedure:

- Check that the area behind the airplane is clear.
- Run the engines up to a minimum of 40% N1 for approximately 10 seconds at intervals no greater than 60 minutes and at least one time prior to takeoff.

Before Takeoff Procedure

Refer to the Takeoff Runway Contaminant Decision Tree in this section. For performance corrections, refer to the WDR.

If contamination is present:

APU As required

The APU may be used as a back-up source of electrical power until completion of the After Takeoff checklist when any of the following conditions exist:

- moderate or heavy rain;
- standing water, snow, or slush on the runway.

Takeoff Procedure

Refer to the Takeoff Runway Contaminant Decision Tree in this section, if applicable.

Do the normal Takeoff Procedure with the following modifications:

During icing conditions, the takeoff must be preceded by a standing takeoff.

A standing takeoff is accomplished by holding the brakes while in position on the assigned runway until the engines are stabilized at or above 50% N1 before the start of the takeoff roll.

If the aircraft starts to move due to poor braking conditions, release the brakes and continue the takeoff.

As speed increases during takeoff roll, reduce forward pressure on control column to reduce spray from the nosewheel.

Climb, Cruise, and Descent Procedures

Engine Anti-Ice Operation – In Flight

Engine anti-ice must be ON during all flight operations when icing conditions exist or are anticipated.

When operating in areas of possible icing, activate engine anti-ice before entering icing conditions.

WARNING: Do not rely on airframe visual icing cues before activating engine anti-ice. Use the temperature and visible moisture criteria because late activation of engine anti-ice may allow excessive ingestion of ice and result in engine damage or failure.

When engine anti-ice is needed:

L and R ENG anti-ice switches ON

Turn one ENG anti-ice switch to ON.

Allow engine to stabilize, then move other ENG anti-ice switch to ON.

Confirm ENG A-ICE ON alert message on the EAD.

When engine anti-ice is no longer required:

L and R ENG anti-ice switches OFF

Confirm ENG A-ICE ON alert message is not displayed.

Fan Ice Removal

CAUTION: Avoid prolonged operation in moderate to severe icing conditions.

Increased engine vibration during low thrust operation in icing conditions may be due to fan blade icing.

Severe icing can usually be avoided by a change in altitude and/or airspeed.

Refer to QRH, section 3, High Engine Vibrations/Ice Shedding.

Wing Anti-Ice Operation – In Flight

Ice accumulation on the flight deck window frames, windshield center post, side windows, or windshield wiper arm may be used as an indication of structural icing conditions and the need to turn on wing anti-ice.

When wing anti-ice is needed:

AIR FOIL WING and TAIL anti-ice switches ON

Confirm A-ICE ALL ON alert message displayed.

Note: BLD AIR TEMP LO alerts may be displayed with engines at low power. Increasing power enough that alerts are no longer displayed will provide adequate ice protection.

When wing anti-ice is no longer needed:

AIR FOIL WING and TAIL anti-ice switches OFF

Confirm A-ICE ALL ON alert message extinguished.

Cruise and Descent Procedures

Cold Temperature Altitude Corrections

Extremely low temperatures create significant altimeter errors and greater potential for reduced terrain clearance. When the temperature is colder than ISA, true altitude will be lower than indicated altitude.

To ensure adequate obstacle clearance in conditions of extreme cold weather (-10°C or lower, or as specified in the Delta Special Page), refer to Airway Manual, Weather, Altimeter Corrections.

Prepare for Descent:

FMS PERF key Push

PAGE forward key – Push

Select DESCENT FORECAST page.

ANTI-ICE push.

This provides for a more accurate descent profile.

Note: Operate engines to maintain a minimum of 22 psi pneumatic pressure for ice protection systems.

Approach and Landing Procedures

Refer to the Guidelines for Contaminated Runways procedure in this section, if applicable.

Do the normal Approach and Landing procedures with the following modifications:

If the runway is contaminated:

APU As required

The APU may be used as a backup source of electrical power when any of the following conditions exist:

- moderate or heavy rain,
- standing water, snow, or slush on the runway.

After Landing Procedure

Do the normal After Landing procedure with the following modifications:

After prolonged operation in icing conditions with the flaps extended, or when an accumulation of airframe ice is observed, or when landing on a runway contaminated with ice, snow, or slush:

Do not retract the flaps until the flap areas have been checked to be free of contaminants.

Refer to Taxi Procedure in this section for engine anti-ice, engine run up, and taxi guidance.

Secure Procedure

Do the normal Secure procedure with the following modifications whenever the temperature falls below 0°C (32°F) or the aircraft may be de/anti-iced during overnight parking:

Parking brake As required

If the ramp is contaminated with ice or snow, the parking brake should remain set.

CABIN PRESSURIZATION panel Set

SYSTEM SELECT/MANUAL switch light - MANUAL

Push SDCP AIR cue and observe CABIN PRES MAN alert.

MANUAL CL/DESC switch - DESC

Hold the switch to DESC until the pointer is positioned to CL.

The above procedure positions the outflow valve partially open to inhibit intake of snow, ice, or deicing fluid and to prevent the aircraft from pressurizing when pre-conditioned air is supplied to the aircraft.

Note: Additional cold weather securing procedures are required to be accomplished by maintenance and/or ACS personnel. Stations have the responsibility for draining the water system.

Guidelines for Takeoff on Contaminated Runways or Landing with Braking Action Less than Good

When there is contamination on the runway or the braking action is less than good, captains must evaluate crew, aircraft, and environmental conditions in determining the safety of operating their flight.

Procedure Guidance

General

- Consider crew capability.
- Consider current Maintenance Carry Overs (MCOs) - reversers, anti-skid, etc.
- Consider type and amount of contaminant.
- Consider source and age of reported braking action.
- Consider usable runways and taxiways (NOTAMS, ATIS, etc.).

Taxi

- Be aware that ramps and taxiways may be very slippery.
- Be cautious of jet blast effect on ground personnel and equipment.
- Taxi onto and off runways at an extremely slow speed. Nose wheel slippage may occur causing the aircraft to continue straight ahead and possibly off the paved surface.

Crosswind Guidance

- On slippery runways, crosswind guidelines are a function of runway surface condition, airplane loading, and proper pilot technique.
- The following crosswind guidelines are applicable for takeoff and landing:

Braking Action	Runway Condition	ICAO	MU	RCR	Takeoff and Landing Crosswind Component	Tailwind
---	Dry	6	≥ 40	≥ 19	38	10*
Good	Damp Frost (<1/8")	5				
Good/ Medium	Wet	4				
Medium/ Fair	Dry Snow**	3	35-30	13-18	20	5
Medium/ Poor	Wet Snow/ Standing Water/ Slush	2	29-26	-	10	0
Poor	Ice - No Melting**	1	25-21	6-12		
Nil	Do Not Operate					

* Unless the aircraft and airport are authorized for 15 knots.

** Takeoff on untreated ice or snow should only be attempted when no melting is present.

* Unless the aircraft and airport are authorized for 15 knots.

** Takeoff on untreated ice or snow should only be attempted when no melting is present.

Note: Crosswind guidelines are not considered limitations. Refer to Limitations, for crosswind limits.

Note: Reduce crosswind guidelines by 5 knots on wet or contaminated runways whenever asymmetric reverse thrust is used.

Note: When multiple reports are present (e.g. "Braking Action Fair to Good") use the lower crosswind value.

Takeoff

- Refer to the Takeoff Runway Contaminant Decision Tree, this section.
- Do not takeoff with braking action report of NIL by any air carrier aircraft or airport operator.
- A rolling takeoff is strongly advised when the crosswind exceeds 20 knots.
- Do not takeoff with a standing water, slush, or wet snow in excess of 1/2 inch (1.2 cm) depth.
- Do not takeoff in dry snow in excess of 4 inches (10 cm) depth.

Landing

- If FCTM, Quick Reference Landing Length chart does not apply, determine braking action. If braking action is less than good, accomplish an ACARS Landing Performance Request or refer to the ODM, Quick Reference Tab, Operational Landing Distance table.
- Do not land with braking action report of NIL by any air carrier aircraft or airport operator in the landing or rollout portion of the runway.
- Do not land with standing water, slush, or wet snow in excess of 1 inch (2.5 cm) depth.
- Do not land in dry snow in excess of 4 inches (10 cm) depth.
- Land as early in the touchdown zone as possible.
- Use reverse thrust judiciously.
- Do not assume the last 2,000 feet of the runway will have braking action as good as the touchdown zone.
- Be aware of possible white-out effects from reverse thrust usage in dry snow.
- Use maximum landing flap configuration when landing on a contaminated runway.
- Avoid excessive approach speed.
- Use maximum allowable symmetrical reverse thrust.
- If side slipping off the runway, select reverse idle and release brakes to return to centerline.
- Aircraft will tend to drift off the runway nose first with forward thrust and tail first with reverse thrust.
- Avoid abrupt steering inputs.

Category Definitions

- **DRY** - A runway is dry, or can be considered dry, based upon the considerations discussed in the Takeoff Runway Contaminant Decision Tree.
- **Slippery** - Under slippery conditions it is assumed that only the aircraft's braking capability is degraded; the aircraft's ability to accelerate is assumed to be unaffected.
 - **W (WET)** - A runway which is wet and on which the captain considers the aircraft's braking capability to be degraded, or a runway covered with packed snow.
 - **I (ICY)** - A runway whose surface is covered by ice.
- **Cluttered** - Under cluttered conditions it is assumed that there is sufficient depth of contaminant that both the aircraft's acceleration and braking capability are degraded.
 - **QCTR** (1/4 inch clutter) - A runway whose surface is covered by an equivalent standing water depth of between 0.14 and 0.25 inches.
 - **HCTR** (1/2 inch clutter) - A runway whose surface is covered by an equivalent standing water depth of between 0.26 and 0.50 inches. Refer to the Takeoff Runway Contaminant Decision Tree, this section, for dry snow equivalent depths.

AWABS Determinations

Airport Customer Service (ACS) maintains a template in AWABS which describes conditions on each runway. ACS will enter the runway contaminant type and depth when more than 25% of the runway is affected. AWABS interprets this information according to rules established by Flight Operations to automatically select the contaminant type.

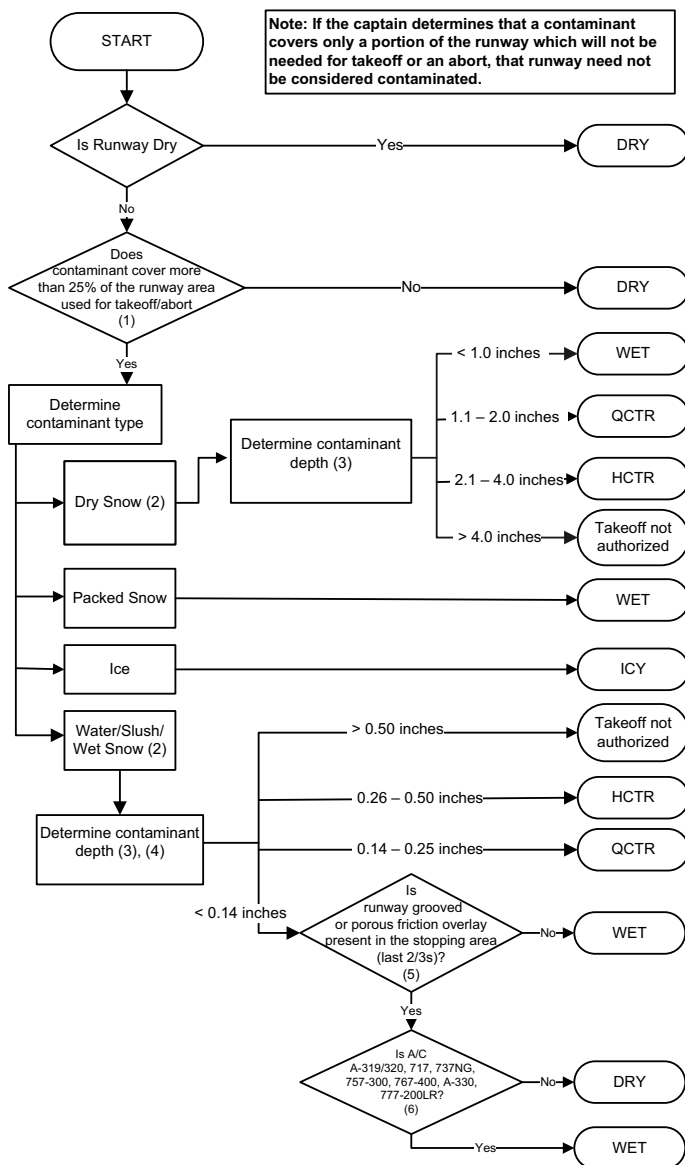
Note: For the A319, A320, 717, B737NG, B757-300, B767-400, A330 and 777-200LR, W (WET) is automatically selected by AWABS when the runway is reported wet. For other aircraft types, the captain must notify the gate agent or Operations if he wants Load Control Center (LCC) to load plan for W (WET) numbers.

AWABS limits the takeoff weight, as appropriate, based upon the selected contaminant type.

If the captain determines that a contaminant covers only a portion of the runway which will not be needed for takeoff or an abort, that runway need not be considered contaminated. The captain's determination affects his flight only and should be communicated to the dispatcher so AWABS can be updated appropriately, via LCC.

Takeoff Runway Contaminant Decision Tree

Use the following decision tree to determine runway condition for takeoff.



Takeoff Runway Contaminant Decision Tree Notes		
1		If the captain determines that a contaminant covers only a portion of the runway which will not be needed for takeoff or an abort, that runway need not be considered contaminated. Note: There are circumstances that permit the Airport Authority to clear only the center 100 feet of the runway. In those circumstances, only the contaminant coverage within the cleared area is used to establish the percentage coverage.
2	Snow	AWABS determines if snow is dry or wet on the basis of temperature. Snow is considered: • Wet when the temperature is 30° F (-1.1°C) or above • Dry when the temperature is below 30° F (-1.1°C) Note: A good operational test is: If a well compacted snowball can be made, the snow is wet; if the snowball falls apart, then the snow is dry.
3		A runway can be covered at varying depths over its length/width. When contaminant depths vary along the runway, a weighted average may be required. The contaminant depth along the runway where the aircraft will be at higher speeds should be weighed more heavily than at other points.
4		A weighted average depth: • Less than or equal to 1/4 inch equates to QCTR, • Over 1/4 inch and up to 1/2 inch equates to HCTR Note: When the average depth exceeds 1/2 inch, takeoff will not be attempted.
5		Grooved runways and runways with special porous overlays are designed to drain water from the runway surface in order to reduce the possibility of hydroplaning and increase the effective friction coefficient. Properly maintained runways with grooves or porous pavement have been shown to provide braking action approximately equivalent to a dry runway.
6		A319, A320, A330, B717, B737NG, B757-300, B767-400, and B777-200LR aircraft cannot consider a wet runway dry even if it is grooved or has a porous friction course overlay.

Contaminant Millimeters to Inches Conversion

Use the following table for foreign stations that report runway clutter depth in millimeters (mm).

mm	0	6.35	12.7	25.4	50.8	101.6	152.4
Inches	0	1/4	1/2	1	2	4	6

Ground De-Icing/Anti-Icing Procedure

Pre-Gate Departure Communication

The captain can expect to talk to several different people during the deicing process; however, only two call signs are used.

- “Iceman” is a person who communicates with the captain via the VHF radio from a position within operations, the control center, or the deice pad tower. This person will refer to the aircraft’s “Ship Number” in all communications.
- “Deicer/Coordinator” is the person who will be in direct control of the actual deicing operation on the aircraft. He/she will be plugged into the aircraft interphone system or on VHF radio and must be in direct communication with the captain at all times. This person will not know the flight number and will refer to the aircraft’s “Ship Number” in all communications.

The following communication procedures will be used:

PRE-GATE DEPARTURE COMMUNICATION	
CAPTAIN:	“This is ship # _____, we will require deicing.”
ICEMAN:	“Ship # _____, your aircraft will be deiced with the engine(s) running. OR “Ship # _____, your aircraft will be deiced _____ (at the gate, off the gate, or at the remote) with the engines shut down.”
CAPTAIN:	“Roger, ship # _____.”

Use the appropriate procedure for deicing at the gate or at the remote site with engines running or shut down.

Note: Advise deicer/coordinator if the APU will be running during de/anti-icing.

Note: Ensure engine inlets have been inspected and are clear prior to engine start.

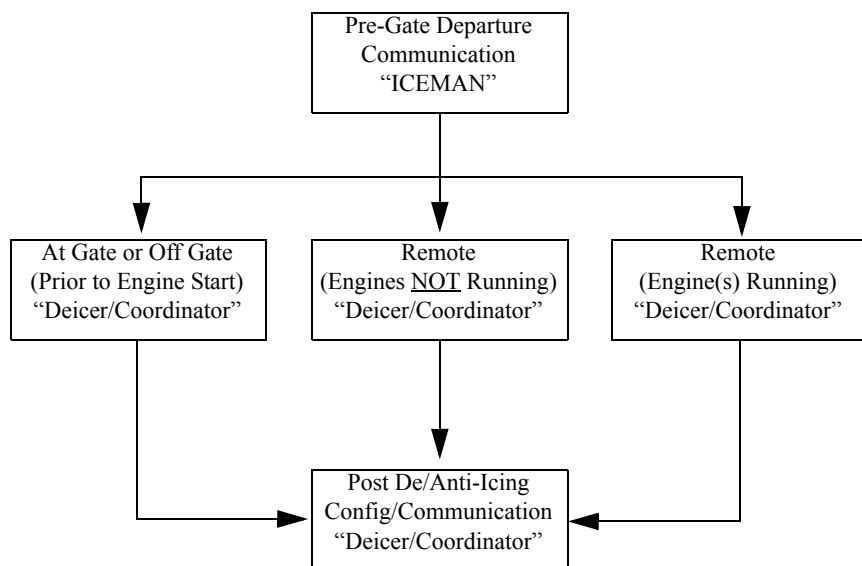
Aircraft Configuration and Communication

Prior to departure from the gate, when conditions warrant, the captain will contact “Iceman” and follow the Pre-Gate Departure Communication. The Iceman will describe one of three de/anti-icing scenarios:

- At Gate or Off Gate (Prior to Engine Start)
- Remote (Engines Not Running)
- Remote (Engine(s) Running)

Follow the communication and configurations described in the appropriate procedure. Once complete, follow the Post De/Anti-Icing configuration and communication.

Note: If the APU is inoperative, advise Iceman.



At Gate or Off Gate (Prior to Engine Start)

Make a PA to the passengers regarding the deicing process.

Approximately one minute prior to deicing:

PRE-DEICING COMMUNICATION	
DEICER/COORD:	"Ship # ____, brakes set?"
CAPTAIN:	"Roger, ship # ____, brakes set."
DEICER/COORD:	"Ship # ____, Type II / IV with (fluid brand name) will be used for anti-icing (if anti-icing required)."
CAPTAIN:	"Roger, ship # ____"
DEICER/COORD:	"Ship # ____, ready for deicing?"
CAPTAIN:	"Stand by." (Follow procedure below).

OR

PRE-DEICING COMMUNICATION USING FORCED AIR	
DEICER/COORD:	"Ship # ____, brakes set?"
CAPTAIN:	"Roger, ship # ____, brakes set."
DEICER/COORD:	"Ship # ____, the final process used will be forced air with Type I fluid (or forced air only) with no holdover time."
CAPTAIN:	"Roger, ship # ____" OR "Negative, ship # ____, holdover time required."
DEICER/COORD:	"Ship # ____, ready for deicing?" OR "Ship # ____, Type II/IV with (fluid brand name) will be used for anti-icing (if anti-icing required). Ready for deicing?"
CAPTAIN:	"Stand by." (Follow procedure below).

Prior to Deicing/Anti-Icing:

Aircraft Configuration for deicing/anti-icing.

CAUTION: Snow/slush/ice ingestion in the APU inlet duct while the APU is running can cause serious damage. Coordinate with ground personnel to ensure that APU inlet area is clear before starting APU. Ingestion of de-icing fluid causes objectionable fumes and odors to enter the airplane.

- APU or external power As required
- TRANS and AUX pumps ON
- FLAP/SLAT handle ____
- Extend the flaps/slats to the anticipated takeoff position.
- L and R PACK switches OFF
- APU AIR switch OFF

WARNING: Once the deicing operation begins, any aircraft movement or changes in configuration must be coordinated with the ground crew.

CAPTAIN:	“Ship # ____, aircraft ready for deicing.”

POST DE/ANTI-ICING COMMUNICATION	
DEICER/COORD:	“Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete.” OR “Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete. The final process used was forced air with Type I fluid (or forced air only) with no holdover time.”
CAPTAIN:	“Roger, ship # ___.”
DEICER/COORD:	“Ship # ___ Type I fluid application started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Ship # ___ Type II/IV fluid application with (fluid brand name) started ___ minutes ago.” OR (Non-US locations): “Ship # ___ Type II/IV fluid application (fluid brand name) started ___ minutes ago using a fluid mixture of ___ (% concentrate).”
CAPTAIN:	“Roger, ship # ___ Type I started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Roger, ship # ___ Type II/IV (fluid brand name) started ___ minutes ago.” OR (Non-US locations): “Roger, ship # ___ Type II/IV (fluid brand name) started ___ minutes ago using a fluid mixture of ___ (% concentrate).”
DEICER/COORD:	“Ship # ___, clear to start engines (when applicable). Do not move the aircraft under power until you have been given the all clear salute.”
CAPTAIN:	“Roger, ship # ___.”

Post Deicing/Anti-Icing:

WARNING: An All Clear salute is required to verify de/anti-icing procedures are complete.

Aircraft configuration post deicing/anti-icing:

WING ICE DETECT switch RESET

Hold switch to RESET for 1 second and verify no WING ICE
DETECTED alert message on EAD.

Complete the Pushback procedure, if not already accomplished.

APU As required

Note: It is recommended that the APU not be used for air conditioning packs until after the airplane arrives at its destination.

Note: Wait approximately 1 minute after deicing is complete to restore bleed air for pack operation to ensure deicing fluid has been cleared from the engines and APU.

Engine(s) Start

Start the engine(s) using the normal Start procedure.

Accomplish the After Start procedure.

Accomplish the Taxi procedure.

Remote (Engines Not Running)

If remote deicing with engines not running is anticipated, the APU should be left operating. If the APU or a portion of the APU is inoperative, confirm that electric and/or air carts are available at the remote location before departing the gate.

CAUTION: Snow, slush, or ice ingestion in the APU inlet duct while the APU is running can cause serious damage. Coordinate with ground personnel to ensure that APU inlet area is clear before starting APU. Ingestion of deicing fluid causes objectionable fumes and odors to enter the airplane.

Approaching the icepad:

- Contact “Iceman”.
- Start the APU if it is not already operating.
- Make a PA to the passengers regarding the deicing process.

Just prior to entering the deicing area:

- Verify slats and flaps are in the intended takeoff position.

When the aircraft is in position for deicing:

PRE-DEICING COMMUNICATION	
DEICER/COORD:	“Ship # ____, brakes set?”
CAPTAIN:	“Roger, ship # ____ brakes set.”
DEICER/COORD	“Ship # ____ Type II / IV with (fluid brand name) will be used for anti-icing (if anti-icing required).”
CAPTAIN	“Roger, ship # ____.”
DEICER/COORD:	“Ship # ____ ready for deicing?”
CAPTAIN:	“Stand by.” (Follow procedure below).

OR

PRE-DEICING COMMUNICATION USING FORCED AIR	
DEICER/COORD:	“Ship # ____ brakes set?”
CAPTAIN:	“Roger, ship # ____ brakes set.”
DEICER/COORD:	“Ship # ____, the final process used will be forced air with Type I fluid (or forced air only) with no holdover time.”
CAPTAIN:	“Roger, ship # ____.” OR “Negative, ship # ____, holdover time required.”
DEICER/COORD:	Ship # ____, ready for deicing?” OR “Ship # ____, Type II/IV with (fluid brand name) will be used for anti-icing (if anti-icing required). Ready for deicing?”
CAPTAIN:	“Stand-by.” (Follow procedure below).

Prior to Deicing/Anti-Icing:

Aircraft configuration for deicing/anti-icing.

APU or external power As required

L and R PACK switches OFF

APU AIR switch OFF

Engines Shutdown

WARNING: Once the deicing operation begins, any aircraft movement or changes in configuration must be coordinated with the ground crew.

CAPTAIN:	“Ship # ____ aircraft ready for deicing.”

POST DE/ANTI-ICING COMMUNICATION	
DEICER/COORD:	“Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete.” OR “Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete. The final process used was forced air with Type I fluid (or forced air only) with no holdover time.”
CAPTAIN:	“Roger, ship # ___.”
DEICER/COORD:	“Ship # ___ Type I fluid application started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Ship # ___ Type II/IV fluid application with (fluid brand name) started ___ minutes ago.” OR (Non-US locations): “Ship # ___ Type II/IV fluid application (fluid brand name) started ___ minutes ago using a fluid mixture of ___ (% concentrate).”
CAPTAIN:	“Roger, ship # ___ Type I started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Roger, ship # ___ Type II/IV (fluid brand name) started ___ minutes ago.” OR “Roger, ship # ___ Type II/IV (fluid brand name) started ___ minutes ago.”
DEICER/COORD:	“Ship # ___, clear to start engines (when applicable). Do not move the aircraft under power until you have been given the all clear salute.”
CAPTAIN:	“Roger, ship # ___”

Post Deicing/Anti-Icing:

WARNING: Do not move aircraft until ATC taxi clearance and the All Clear Salute have been received.

Aircraft configuration post deicing/anti-icing:

WING ICE DETECT switch RESET

Hold switch to RESET for 1 second and verify no WING ICE
DETECTED alert message on EAD.

APU As required

Note: It is recommended that the APU not be used for air conditioning
packs until after the airplane arrives at its destination.

Note: Wait approximately 1 minute after de-icing is complete to
restore bleed air for pack operation to ensure de-icing fluid has
been cleared from the engines and APU.

Engine(s) Start

Start the engine using the normal Start procedure.

Accomplish the After Start procedure.

When clear of the deicing area:

Accomplish the Taxi procedure.

Remote (Engine(s) Running)

CAUTION: Engines running deicing is not allowed during freezing drizzle, light freezing rain, sleet, or rime ice. Also, engines running deicing is not allowed during rain or high humidity with a cold soaked wing. The engines are susceptible to ice ingestion when ice or slush is removed from the wings or fuselage.

Note: Deicing with the engines running is authorized only at stations identified in the Delta Special Pages.

Approaching the icepad:

- Contact “Iceman”
- Make a PA to the passengers regarding the deicing process.

Just prior to entering the deicing area:

- Verify flaps are in the intended takeoff position.

When the aircraft is in position for deicing:

PRE-DEICING COMMUNICATION	
DEICER/COORD:	“Ship # ____, brakes set, engines at idle?”
CAPTAIN:	“Roger, ship # ____, brakes set, engines at idle.”
DEICER/COORD:	“Ship # ____, Type II / IV with (fluid brand name) will be used for anti-icing (if anti-icing required).”
CAPTAIN:	“Roger, ship # ____”
DEICER/COORD:	“Ship # ____, ready for deicing?”
CAPTAIN:	“Stand by.” (Follow procedure below.)

OR

PRE-DEICING COMMUNICATION USING FORCED AIR	
DEICER/COORD:	“Ship # ____, brakes set, engines at idle?”
CAPTAIN:	“Roger, ship # ____, brakes set, engines at idle.”
DEICER/COORD:	“Ship # ____, the final process used will be forced air with Type I fluid (or forced air only) with no holdover time.”
CAPTAIN:	“Roger, ship # ____.” OR “Negative, ship # ____, holdover time required.”
DEICER/COORD:	“Ship # ____, ready for deicing?” OR “Ship # ____, Type II/IV with (fluid brand name) will be used for anti-icing (if anti-icing required). Ready for deicing?”
CAPTAIN:	“Stand by.” (Follow procedure below).

Prior to Deicing/Anti-Icing:

Aircraft configuration for deicing/anti-icing.

CAUTION: Operate the APU during deicing only if necessary. If the APU is running, ingestion of deicing fluid causes objectionable fumes and odors to enter the airplane. Ingestion of snow, slush, ice, or de/anti-icing fluid can also cause damage to the APU.

APU or external power As required

L and R PACK switches OFF

APU AIR switch OFF

WARNING: Once the deicing operation begins, any aircraft movement or changes in configuration must be coordinated with the ground crew.

CAPTAIN:	“Ship # ____ aircraft ready for deicing.”

POST DE/ANTI-ICING COMMUNICATION	
DEICER/COORD:	“Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete.” OR “Ship # ___ de/anti-icing, tactile inspection, and aircraft inspection complete. The final process used was forced air with Type I fluid (or forced air only) with no holdover time.”
CAPTAIN:	“Roger, ship # ___”
DEICER/COORD:	“Ship # ___ Type I fluid application started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Ship # ___ Type II/IV fluid application with (fluid brand name) started ___ minutes ago.” OR (Non-US locations) “Ship # ___ Type II/IV fluid application (fluid brand name) started ___ minutes ago using a fluid mixture of ___ (% concentrate).”
CAPTAIN:	“Roger, ship # ___ Type I started ___ minutes ago. The freeze point is ___ °C. No Type II or IV was used.” OR “Roger, ship# ___ Type II/IV (fluid brand name) started ___ minutes ago.” OR (Non-US locations) “Roger, ship # ___ Type II/IV (fluid brand name) started ___ minutes ago using a fluid mixture of ___ (% concentrate).”
DEICER/COORD:	“Ship # ___ clear to start engines (when applicable). Do not move the aircraft under power until you have been given the all clear salute.”
CAPTAIN:	“Roger, ship # ___”

Post Deicing/Anti-Icing:

WARNING: Do not move aircraft until ATC taxi clearance and the All Clear Salute have been received.

Taxi may be commenced prior to restoring bleed air and pack operation.

Aircraft configuration post deicing/anti-icing:

WING ICE DETECT switch..... RESET

Hold switch to RESET for 1 second and verify no WING ICE
DETECTED alert message on EAD.

APU As required

Note: It is recommended that the APU not be used for air conditioning
packs until after the airplane arrives at its destination.

Note: Wait approximately 1 minute after de-icing is complete to
restore pack operation to ensure de-icing fluid has been cleared
from the engines and APU.

Engine Start, if required
Start the engine using the normal start procedure.

Accomplish the After Start procedure.

When clear of the deicing area:

Accomplish the Taxi procedure.

Hot Weather Operation

During ground operation, the following considerations will help keep the airplane as cool as possible:

- If a ground source of conditioned air is available, the supply should be plugged in immediately after engine shutdown and should not be removed until just prior to engine start.
- If a ground source of conditioned air is not available, both packs should be used (when possible) for maximum cooling.
- All doors, including cargo doors and windows, should be closed as much as possible.
- Electronic components which contribute to a high temperature level in the flight deck should be turned off while not needed.
- All flight deck air outlets should be opened.
- All passenger cabin gasper outlets should be opened and all window shades on the sun-exposed side of the passenger cabin should be closed.

During takeoff performance evaluation consider the following:

- High temperatures inflict performance penalties which must be taken into account on the ground before takeoff.
- Alternate takeoff procedures (Packs Off Takeoff, etc.).

Turbulence

During flight in light to moderate turbulence, the autopilot and/or autothrottle may remain engaged unless airspeed, altitude or attitude deviations require use of manual control. Avoid making large pitch, roll, thrust or trim changes.

The turbulent air penetration speed provides ample protection from stall and high speed buffet, while also providing protection from exceeding the structural limit. Refer to the Limitations section for the turbulent air penetration speed. Below 10,000 feet, a speed between 240 and 250 knots provides adequate buffet margin.

SEAT BELTS switch ON

Advise passengers to fasten seat belts prior to entering areas of reported or anticipated turbulence. Instruct flight attendants to check that all passengers' seat belts are fastened.

Severe Turbulence

Severe turbulence should be avoided if at all possible. If severe turbulence cannot be avoided, an increased buffet margin is recommended. This can be obtained by descending approximately 4,000 feet below optimum altitude. The autothrottle should be off in severe turbulence.

Refer to QRH, chapter 3, Severe Turbulence/Heavy Rain Ingestion.

Note: If an approach must be made into an area of severe turbulence, delay flap extension as long as possible. The airplane can withstand higher gust loads in the clean configuration. Diversion to another airfield is the best policy if severe turbulence persists in the area.

Volcanic Ash Encounter

Ground Operations

Aircraft should not operate into or out of airports where there is falling ash and/or ash-covered runways/taxiways. If an airport's operational surfaces are contaminated with ash, the taxiways and runways to be used must be swept prior to use, and if possible, sprayed with water to minimize aircraft contamination from any remaining ash.

Restrict ground use of the APU to engine starts. Use ground starting air and electrical power, if available.

Do not use windshield wipers for dust removal. Coordinate with maintenance to hose off ash deposits with water and wipe residue away with a soft cloth.

Avoid the use of air conditioning packs on the ground as long as recirculation fans will maintain adequate cabin comfort. If air conditioning is required, operate at full cold setting. Use preconditioned air at the terminal from a filtered ground cart, if available. If possible, keep engine bleeds off.

Avoid static operations of engines above idle power.

To prevent contamination of air conditioning system, consider a takeoff with packs off.

Use rolling takeoff procedures to minimize engine dust ingestion.

During landing, limit reverse thrust to avoid impairing visibility and minimize ingesting dust into the engines. Exercise caution as braking may be less effective than normal due to contamination on the runway.

In Flight

CAUTION: If volcanic ash is encountered in flight, refer to QRH, chapter 0, Volcanic Ash.

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