

B747 - 400 Normal Procedures / Limits Overview

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Cockpit Safety Check	
Battery	ON
Standby Power	AUTO
Gear	DOWN & GREEN
Flaps Selector & Indicator	AGREE
GPWS	ON
WXR Radar	OFF
Hydraulic Demand Pumps	OFF
Fuel Control Switches	CUTOFF
Fuel Jettison	OFF
Alternate Gear Selector	OFF
Alternate Flap Selector	OFF
NAV Lights	ON
Emergency Exit Lights	ARMED
Windshield Wiper Switches	OFF
Logbook	CHECKED
External Power (APU Power)	ESTABLISHED

Before Start	
Internal / External Preparation	COMPLETED
Cabin Signs	ON
Clock	CHECKED, UTC
EECS	NORMAL
IRS	ALIGNED
Battery Status	CHECKED
APU	ON
Fire Switches	IN
SQUIB Test	PASSED
Autostart Switch	ON
FMC	SET
Navigation Aids	SET
Weight & Balance Data	CHECKED
Altimeter	QNH
Flight Instruments	CHECKED
Fuel Quantity	VERIFIED
Oil Quantity	CHECKED
Oxygen	CHECKED
Hydraulic Quantity	CHECKED
Mobile Phone	OFF
Briefing	COMPLETED
Doors	IN FLIGHT
Cabin Report	RECEIVED
ACARS	INITIALIZED
----- CLEARED FOR START -----	
Beacon	ON
Packs	OFF
Fuel Panel	SET
Hydraulic Clearance	RECEIVED
Hydraulic Demand Pumps	#1-#3 AUTO, #4 AUX
Duct Pressure	VERIFIED
Parking Brake	SET
Brake Pressure	CHECKED
Thrust Levers	CLOSED
Ramp Agent Report	RECEIVED
Recall / Status	CHECKED

After Start	
APU	OFF (ON)
Hydraulic Demand Pump #4	AUTO
Aft Cargo Heat	ON
Packs	SET
Anti Ice	AUTO
Outflow Valves	OPEN
MCP	SET
Transponder	SET
TCAS	TA/RA (ABV)
Takeoff Thrust Setting	VERIFIED
Recall / Status	CHECKED
Wave Off	RECEIVED

Before Take Off	
Cabin Report	RECEIVED
Wheels & Brakes	NO WARNING
Ref. Speeds / Airspeed Bugs	CONFIRMED
Trim	0, 0, T/O
Autobrakes	RTO
Flaps	SET, 20° (10°)
Flight Controls	OPR
Recall / Status	CHECKED
----- ENTERING THE RUNWAY -----	
Cabin Crew	ALERTED
RWY Offset	VERIFIED
Strobes	ON
Landing Lights	ON
Autothrottles	ARMED
Event Timer	STARTED

After Take Off	
Gear	UP & OFF
Flaps	UP
Climb Thrust Mode	CHECKED
Nacelle Anti Ice	AUTO
Packs	ON
APU	OFF
----- TRANSITION ALTITUDE -----	
Altimeter	QNE

Descent / Approach [GA]	
Recall / Status	CHECKED
Landing Altitude	VERIFIED
Landing Weight	CHECKED
Ref. Speeds / Airspeed Bugs	SET
FMC	SET
Navigation Aids	SET
Aircraft Autoland Status	VERIFIED (IF REQ.)
Autobrakes	SET (OFF)
Minima	SET
Cabin Signs	ON
Briefing	COMPLETED
----- TRANSITION LEVEL -----	
Altimeter	QNH

Landing	
Cabin Report	RECEIVED
RWY Offset	VERIFIED
Frequencies & Courses	VERIFIED
G/A Thrust	ARMED
Autobrakes Setting	VERIFIED
Speedbrakes	ARMED
Flaps	SET, 25° (30°)
Gear	DOWN & GREEN

After Landing	
Autothrottles	OFF
WXR Radar	OFF
Transponder	STANDBY
Speedbrakes	DETENT
Flaps	UP
Trim	0, 0, 6.3
APU	ON (OFF)
Strobes	OFF
Landing Lights	OFF
Wheels & Brakes	NO WARNING
Engines 2 & 3	OFF (ON)
----- APPROACHING THE STAND -----	
'Doors to Manual'	ANNOUNCED

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Shutdown	
External Power	SET AS REQUIRED
APU	SET AS REQUIRED
Hydraulic Demand Pumps	OFF
Fuel Control Switches	CUTOFF
Fuel Pumps	OFF
Aft Cargo Heat	OFF
Anti Ice	OFF
Beacon	OFF
Parking Brake	OFF

Secure	
IRS	OFF
Packs	OFF
External Power	OFF
APU	OFF
----- 1 MINUTE AFTER APU SHUTDOWN -----	
Emergency Exit Lights	OFF
Standby Power	OFF
Battery	OFF

Limits							
Maximum EGT							
	Time Limit	EICAS Color Marking		EGT			
Ground Start	40 sec	Red Bar		870 °C			
T/O and G/A	5 min	Red Bar		960 °C			
Max. Continuous	None	Amber Bar		925 °C			
Standard Flight	None	White / Green		750 °C			
Engine Oil							
Oil Pressure Minimum (Idle)						10 psi	
Oil Pressure Minimum (Other Than Idle)						20 psi	
Minimum Oil Quantity Before Start						8 Quarts	
Maximum Continuous Oil Temperature						160 °C	
Maximum Temporary Oil Temperature (15 min)						175 °C	
Maximum RPM							
Maximum N1 RPM						117.5 %	
Maximum N2 RPM						112.5 %	
Starter Engagement							
Starter Engagement Activity <= 5 min						Until Return to 0% N2	
Starter Engagement Activity => 5 min						Starter Engagement Time	
Maximum Continuous Starter Engagement Limit						15 min without Cooling	
Maximum Starter Re-Engagement RPM						20% N2	
Hydraulics							
Minimum Hydraulic Quantity at Dispatch Time						72 %	
Cabin Differential Pressure							
Take Off and Landing		Max Differential - Operating			Max Differential - During Climb		
0.11 psi		9.4 psi			9.4 psi		
Design Maneuvering Speeds V _A (kt KIAS)							
Sea Level	10000 ft	20000 ft	29000 ft	30000 ft	34000 ft	36000 ft	40000 ft
300	315	330	336 / .860	-	-	-	-
Flap Extension Speeds V _{FE} (kt KIAS)							
Flaps 1	Flaps 5	Flaps 10	Flaps 20	Flaps 25	Flaps 30		
280	260	240	230	205	180		
Landing Gear Limit Speeds (kt KIAS / Mach)							
V _{LO} - Retraction		V _{LO} - Extension		V _{LE} - Extended		V _{TL} - Tire Limit	
270 / .820		270 / .820		320 / .820		204 kt GS	
Maximum Operating Limit Speeds V _{MO} / M _{MO} (kt KIAS / Mach)							
≤ 20000 ft		25000 ft		30000 ft		35000 ft	
365		365 / .880		340 / .900		309 / .900	
						40000 ft	
						269 / .900	
Maximum Turbulent Air Penetration Speeds (kt KIAS / Mach)							
≤ 15000 ft						250	
> 15000 ft						290 / .780	
Structural Weights							
Maximum Taxi		877000 lb			397800 kg		
Maximum Take Off		875000 lb			396893 kg		
Maximum In Flight Landing		650000 lb			294835 kg		
Maximum Landing		630000 lb			285763 kg		
Maximum Zero Fuel		535000 lb			242671 kg		
ILS Approaches							
Approach	CAT I	CAT II	CAT III a	CAT III a	CAT III b		
Landing	Manual / Auto	Manual / Auto	Auto	Auto	Auto		
Rollout	Manual / Auto	Manual / Auto	Auto	Auto	Auto		
F/D req.	No	Yes	Manual / Auto	Manual / Auto	Auto		
Min. A/P req.	0	2	Yes	Yes	Yes		
RVR required	(see chart)	≥ 350 m	2	3	3		
DH / AH	≥ 200 ft	≥ 100 ft RA	≥ 200 m	≥ 200 m	0 m (125 m)		
			≥ 50 ft RA	DH ≥ 23 ft RA (3 ENG)	AH ≥ 23 ft RA (3 ENG)		
				DH ≥ 17 ft RA (4 ENG)	AH ≥ 17 ft RA (4 ENG)		