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## **COCKPIT SAFETY INSPECTION**

(CM2 Duty)

This procedure must be performed before airplane systems are powered.

Completion ensures there will be no danger to the airplane and/or personnel when powering the systems.

### **BATT Switch ..... ON/LOCK**

If neither external nor APU power is on, move battery switch to ON and rotate in the locked position. Rotate the meter selector to BATT VOLT and check battery voltage is 25 volts or higher.

Verify the DC TRANSFER BUS OFF light is off.

*CAUTION: If battery voltage is less than 25 volts, move battery switch to OFF and call maintenance. Battery must be replaced.*

*NOTE: Cockpit standby lights come on when the battery bus is powered, and normal AC power is off.*

### **Windshield WIPER Selector ..... OFF**

Verify selectors are in OFF and check condition of windshield wipers.

### **Landing Gear Lever ..... DOWN&IN**

### **AUX HYD PUMP Switch ..... OFF**

### **FLAP/SLAT Lever ..... UP/RET**

If flaps and/or slats are extended, coordinate their retraction with ground personnel.

*NOTE: During stop over, with the lever in UP/RET position and hydraulic systems depressurized, flaps and/or slats may partially extend by gravity. Full flap/slat retraction may require both hydraulic systems to be pressurized.*


### **SPEEDBRAKE Lever ..... RET&DISARM**

### **Circuit Breakers ..... CHECK**

Check that all the circuit breakers are set.

*CAUTION: Do not reset any tripped fuel pump circuit breakers.*

*One reset of any other tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again do not attempt another reset. Indiscriminate pulling or resetting of circuit breakers for systems or components may cause unanticipated results because of systems interrelationships.*

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# **PRELIMINARY COCKPIT PREPARATION** (CM2 Duty)

**APU (If required) ..... START**

Perform the APU fire protection system test, if not already performed, as described in CM2 Cockpit Preparation.

Move the start pump switch to ON (or, if electrical power is available, the right aft fuel tank pump switch to ON) and check the R INLET FUEL PRES LO annunciation extinguishes.

Verify APU LEFT and RIGHT Bus switches in OFF, APU FIRE CONTROL switch in NORM, APU AIR switch in OFF and APU DOORS switch in AUTO. Move and hold APU MASTER switch to START, then release. Observe APU OIL PRESS LOW annunciation and APU STARTER ON light come on.

Observe RPM and EGT increase.

At about 35% RPM verify the APU STARTER ON light goes off.

If APU STARTER ON light does not go off at about 35% RPM, shutdown immediately the APU by moving the APU FIRE CONTROL switch to OFF & AGENT ARM. After APU shutdown, return switch to NORM and call maintenance.

Verify APU OIL PRESS LOW annunciation extinguishes at or prior to 95% RPM.

If APU OIL PRESS LOW annunciation does not extinguish by 95 % RPM, shutdown immediately the APU by moving the APU FIRE CONTROL switch to OFF & AGENT ARM. After APU shutdown, return switch to NORM and call maintenance.

Verify APU stabilizes in normal operating range.

*NOTE: Normal EGT idle value are within 200°C to 400°C in no load idle condition.*

Check the APU PWR AVAIL LIGHT is on.

If APU PWR AVAIL light does not come on, reset the APU generator (one time only).

Rotate the meter selector to APU position and check voltage and frequency indications are normal (115 ± 3 V; 400 ± 10 Hz).

Move, one at a time, the APU LEFT and RIGHT Bus switches to ON and verify the corresponding power in use (blue) light comes on.


Check the following lights/annunciations are off: L/R AC BUS OFF, AC & DC EMER BUS OFF and DC BUS OFF.

Check the APU AC load within limits.

When AC electrical power is available, move the right aft fuel pump switch to ON and the start pump switch to OFF.

**External Power (If APU not in use) ..... ESTABLISH**

Check the EXT PWR AVAIL LIGHT is on.

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Rotate the meter selector to EXT position and check voltage and frequency indications are normal (115 ± 3 V; 400 ± 4 Hz).

Move the EXT LEFT and RIGHT Bus switches to ON and verify the corresponding power in use (blue) light comes on.

Check the following lights/annunciators are off: L/R AC BUS OFF, AC & DC EMER BUS OFF lights, DC BUS OFF.

**Air Conditioning System ..... AS REQUIRED**

With the APU operating and electrical power in use, move the APU air switch to ON and check that pneumatic pressure is available.

*NOTE: Normally idle APU EGT rises momentarily when the APU air switch is moved to ON. Then, if all pneumatic powered systems are off, EGT returns to the original idle value.*

*CAUTION: If EGT remains high (the most probable cause is pneumatic duct leak), move APU air switch, and APU master switch to OFF and call maintenance.*

Open the pneumatic x-feed valves and verify the cabin pressure control lever is in auto (up) and the cabin outflow valve position indicator is in full aft DECR (VALVE OPEN) position.

*CAUTION: Do not attempt to slow down outflow valve motion acting on the wheel.*

*NOTES: There is a 60 second time delay after the APU is started before the load control valve will open.*

*If the cabin temp is 24 °C or higher, move APU air switch to AIR COND COLDER.*

*If APU is the pneumatic air source and cabin temperature requirements can be maintained with reduced bleed flow, move APU Normal/Economy switch to ECON position.*

Move (one at a time) both air condition supply switches to AUTO.

Observe associated supply air pressure indicator in the normal range.

*NOTE: Due to high electrical starting loads of the heat exchanger cooling fans, the air conditioning systems should be turned on one at a time.*


Rotate the cabin temperature selectors to the twelve o'clock AUTO position. The temperature control valve will be driven automatically to the position required to achieve the selected temperature (approximately 22 °C).

**Passenger Address ..... CHECK**

**Emergency Lights ..... TEST/OFF**

Place the emergency lights switch to ON and verify that the EMER LIGHT NOT ARMED annunciation is displayed.

Announce through handset: "PA & EMERGENCY LIGHTS TEST".

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To avoid excessive batteries discharge, leave the emergency lights ON for the minimum time required to perform the test. The emergency lights batteries power the emergency lights also when the airplane electrical system is powered by APU generators or external power.

Move the emergency lights switch to ARM (EMER LIGHT NOT ARMED annunciation off).

**Station Lighting ..... SET**

Adjust instrumental panel, digital readouts and general cockpit illumination as desired.

**Annunciator/Digital Lights ..... TEST**

Push and hold annun/digital lights test button and verify illumination of all display/characters, all cue switch/lights, both scroll arrow switch/lights on CA and all lights on WAAP (including blank positions), verify also illumination of MASTER WARNING and MASTER CAUTION lights, of all annunciators and segmented filament readouts on glareshield (all 8's and star bursts except first digit on NAV panels which is 1's), C/M-1's, C/M-2's, center, upper and overhead instrument panels, and pedestal.

EFIS/EASD verify also:

**SDP** All 7 segment LED displays indicating 8's. Illumination of all marking filaments.

Illumination of all filaments of slat advisory lights and illumination of HYD QTY amber light. Flap vertical bar LED indices scanning from 0 to 40 then back to zero.

**EDP** All 7 segment LED displays indicating 8's. Illumination of all LED constituting the pictorial base of the eight circular instruments.

Illumination of all REVERSE THRUST and REVERSE UNLOCK annunciators and illumination of FUEL USED backlight.


**LED** pointers (but with five bars) moving clockwise from minimum to maximum of the scale. An annunciator or LED segment that does not illuminate or any fault indication require maintenance action.

**CABIN PRESS Control Lever ..... CHECK & AUTO**

Move the cabin pressure control lever to the manual (down) position. Depress and rotate the cabin pressure control wheel until outflow valves are partially closed then move the cabin pressure lever to auto (up) position. Check that the outflow valve position indicator travels to the full aft DECR (VALVE OPEN) position.

**Aileron & Rudder Trims ..... FREE & ZERO**

Rotate aileron trim and rudder trim knob left then right for few units and check for friction loads; then to avoid aileron and/or rudder mistrim condition: assure the airplane is clear and turn on the auxiliary hydraulic pump, place the aileron and rudder trim indicators to zero. During subsequent Exterior Inspection verify that the surfaces are aligned.

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## EXTERIOR INSPECTION

### (CM2/PM Duty)

The Exterior Inspection is normally a CM2 duty. The Captain can decide otherwise for workload sharing.

The exterior inspection must be performed prior to each flight.

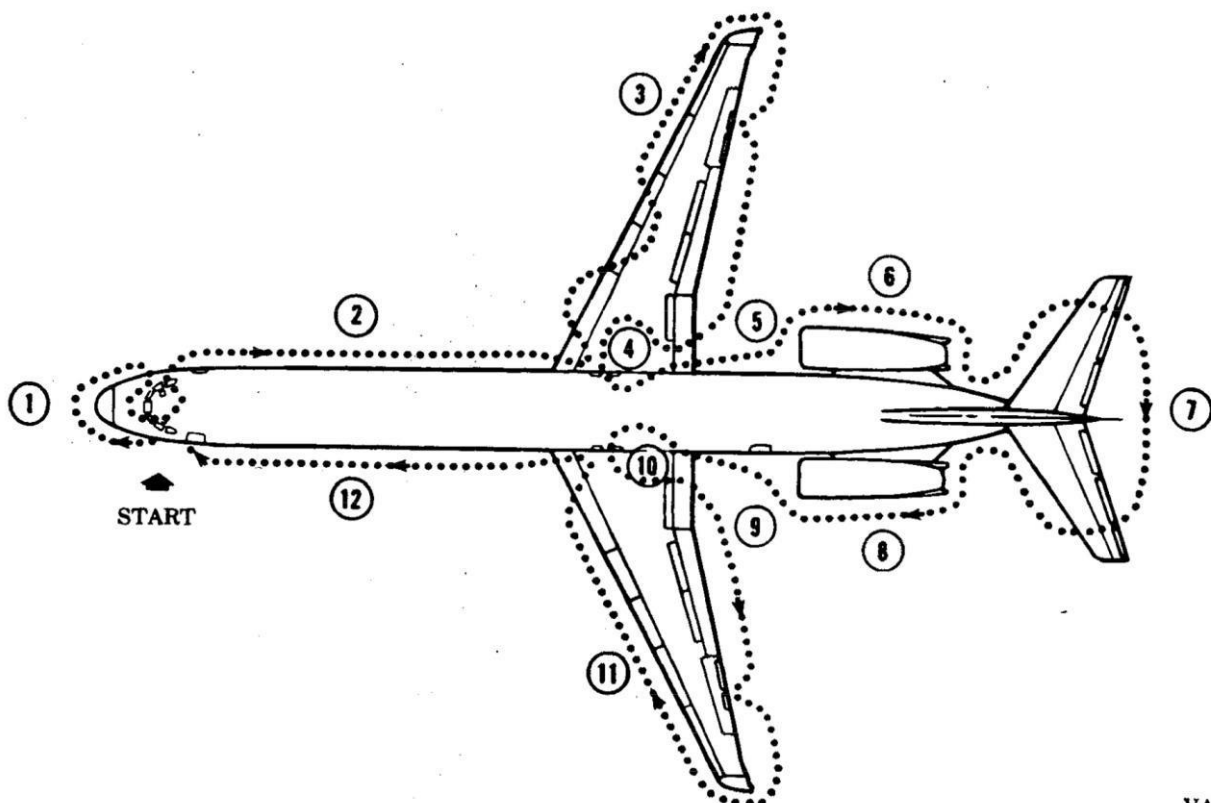
The exterior inspection is primarily a visual check to ensure that the overall condition of the airplane and visible components and equipment are safe for the coming flight phases.

Even though not noted individually, the airplane and its visible components must be checked for obvious damage and leakages (i.e., hydraulic, fuel, oil, water).


The skin's general condition must be checked on fuselage, wings, nacelles, pylons and empennages.

In the above-mentioned areas, all access panels not actually involved in maintenance operations must be checked closed and fastened.

Start at left side strake, proceed in the direction indicated and terminate at the forward entry door.



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## COCKPIT PREPARATION

Cockpit preparation will be performed according to CM1 and CM2 task sharing concept for systems test and check, and to PF / PM concept for navigation instruments and FMS set.

### CM1 COCKPIT PREPARATION

**Parking Brake ..... SET**

Check that hydraulic brake pressure is above 1000 psi to ensure parking brake operation. Push and hold the brake pedals, pull on the brake control knob then release the brake pedals. Observe PARKING BRAKE ON annunciation displayed and brake pressure normal.

----- GLARESHIELD -----

**WING LDG LTS & NOSE LTS Switches ..... RET/OFF**

**FGCP/FGS ..... CHECK/SET**

**FD Switch**

Move FD switch to FD; observe FMA's display HDG HLD and ALT HLD and the flight director roll and pitch command bars come into view and are centered.

*NOTE: If the FMA's remain blank, verify the instrument panel lights digital knobs are on. If the FMA's are still blank, momentarily push the autopilot release button and wait approximately 10 seconds for the flight guidance computer to reset. After 10 seconds, if the FMA's are still blank, call maintenance.*

**AUTO LAND Mode Button**

At first flight of the day or whenever weather conditions (CAT III A/IIIB) on destination require use of the autoland, the availability test should be completed:


**VHF NAV Radios ..... SET**

Set both VHF NAV radios to an ILS frequency (preferably non-local).

**AUTOLAND Mode Button ..... PUSH**

Observe the following sequence of events:

- NO AUTOLAND flashes and relevant FMA displays AUTO LND PRE FLT TEST;
- CM1's ILS pointers show 1 dot up/left and AHRS 3 BASIC MODE light and AHRS 3 INOP annunciator comes on;
- CM2's ILS pointers show 1 dot up/left, AHRS 2 BASIC MODE light comes on and compass 2 cards go to 015°;
- CM1's ILS pointers show 1 dot down/right, the AHRS 1 BASIC MODE light comes on and compass 1 cards go to 015°;
- CM2's ILS pointers go to 1 dot down/right;

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- CM1's and then CM2's radio altimeter displays go to test value of 40 feet;
- The NO AUTOLAND legend lights goes off and FMA returns to pre-test display;
- The AHRS 3 BASIC MODE light and AHRS 3 INOP annunciation goes off;
- The AHRS 2 BASIC MODE and AHRS 1 BASIC MODE lights go off and compass cards return to airplane heading.

### AUTOPILOT Switch

At the first flight of the day, move the autopilot switch to ON then push the AP release button and verify switch drops to OFF and AP warning lights flash. Push the button a second time and verify reset of AP warning lights after three additional flashes. Verify the autopilot switch is OFF.

### ---- CM1 INSTRUMENT PANEL ----

#### Flight and Navigation Instruments ..... TEST/CHECK

All flight and navigation instruments on the CM1 instrument panel and the standby horizon on the center instrument panel should be checked for integrity and normal operation.

#### MACH/IAS Indicator

Observe MACH/IAS indicator for normal indication.

*NOTE: Normal static indications at sea level: airspeed pointer approximately 0, VMO pointer approximately 340 knots, the MACH readout 0.150 and no flags.*

#### EFIS ..... TEST

##### NOTES:


- Self-testing begins when TEST button is depressed and held; it terminates 3 seconds after release.
- Incomplete PFD/ND presentation may be caused by incorrect power-up sequence.

##### 1) Pre-test:

- On the Control and Dimming Panel, rotate PFD/ND knobs out of detent and adjust brightness.
- Observe that PFD/ND display normal symbology. (ARC/ROSE)
- Set DH to 100 feet.
- Set related VHF NAV to unused (non-local) ILS frequency.

##### 2) Push and hold Control and Dimming Panel TEST button and observe the following:

- PFD radio altimeter symbology indicates 40 plus/minus 5 ft, then symbology disappears and R/A FAIL message is displayed; DH tone will also sound.
- PFD marker beacon lights sequence to "O" (blue), "M" (yellow) and "I" (white).
- PFD ATT FAIL, F/D FAIL and F/S FAIL messages are displayed, and associated symbology disappears.
- ND HDG FAIL message is displayed and all heading symbology disappears.

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- PFD glideslope symbology indicates glideslope up and localizer symbology indicates localizer left then symbology disappears and G/S FAIL and LOC FAIL messages are displayed.
- ND glideslope symbology indicates glideslope up and localizer symbology indicates localizer left, then symbology disappears, and G/S FAIL and LOC FAIL messages are displayed.

3) Release Control and Dimming Panel TEST button and observe the following:

- PFD/ND symbology returns, and all failure messages disappear (if normal valid inputs are present).
- Check normal symbology and no failure messages displayed on PFD/ND.

### Altimeter

Check OFF warning flag is out of view.

### Standby Horizon

Observe flag is out of view. Pull knob to cage indicator if necessary. Cross-check indications with ADI.

*NOTE: If a 3° or more error in pitch or roll is apparent, call maintenance.*

### Compass System

Observe the HDG FAIL message on HSI and relevant VOR RMI are out of view. Cross-check compass cards. Make comparison with standby magnetic compass and make allowance for correction card.

*NOTE: Compass card check has to be delayed if it is suspected that presence of metallic masses is disturbing the flux valve operation.*

### Vertical Speed Indicator

Observe VSI FAIL annunciation is not in view and pointer indicates approximately zero.

### Standby Altimeter/Airspeed Indicator

Observe indications are normal.


**Clock ..... CHECK/SET**

Check and set the clock. Rotate the ET control knob to RESET position to zero the elapsed time, then release to HLD position. When ready to start the elapsed time, rotate the ET selector to RUN.

**STATIC AIR Selector ..... NORM**

**Crew Oxygen and Mask ..... TEST/CHECK**



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- Check supply toggle is in the ON position.
- Check diluter control in 100% OXYGEN position.
- Check Regulated Oxygen Pressure remains in the normal range throughout the test.
- Set BOOM/MASK switch on jack panel to MASK.
- Select interphone on audio panel and adjust the volume as required.

Move the TEST MASK/NORMAL/EMERGENCY toggle to TEST MASK temporarily and observe:

- FLOW blinker operating.
- oxygen flow can be heard through the interphone. (mask mic test)

Return the toggle switch to NORMAL.

Set BOOM/MASK switch on jack panel to BOOM.

#### ----- PEDESTAL -----

#### **Primary Stabilizer Trim ..... TEST**

Check that the stabilizer trim switch is in NORM (guarded) position.

Check trim movement by longitudinal trim handles:


- Operate both longitudinal trim handles in same direction (full stop NOSE UP then full stop NOSE DOWN) and check for corresponding indicator movement and audible signal.
- Release handles to neutral.

#### **Alternate Stabilizer Trim ..... TEST**

Check by alt long trim levers.

*NOTE: To obtain maximum service life, do not maintain lever position longer than necessary to check response. If there is no response, release the levers and determine cause. Should any lever or control stick or hesitate in returning to neutral it should be corrected before flight.*

Operate both alternate longitudinal trim levers and check for corresponding indicator movement and audible signal. Observe that the alternate trim stops moving when the alternate trim levers are released.

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## **CM2 COCKPIT PREPARATION**

### ----- OVERHEAD PANEL -----

**Ground Service Power** ..... **OFF**

*NOTE: If ground service power switches are not moved to OFF prior to engine start, control switching interaction in the power system electronics may result in AC cross-tie lockout.*

**MAINTENANCE INTERPHONE Switch** ..... **OFF**

*NOTE: The OFF position avoids a possible interruption of interphone communications between the cockpit and the cabin attendant's stations in case of failure of any external jack socket.*

**Flight Recorder/AIDS TEST** ..... **SET**

- Move the flight recorder switch to GND TEST. Observe the FLT RECORDER OFF annunciation on the EOAP goes off.

*NOTE: Flight data entry panel lights may come on momentarily and then go off when the flight recorder switch is placed in GND TEST. If any light remains on, a failure is indicated in the system. Call maintenance.*

- Wait at least 16 seconds prior to insert data.
- Enter day, month, flight number and respective leg (do not use 0) with the slide switches.
- Press/hold the INSERT button for at least 5 seconds.
- After at least 16 seconds are elapsed, return the flight recorder switch to NORM. The FLT RECORDER OFF annunciation on the EOAP will come on.

*NOTE: The selection of the second group of documentary data (TOW, MAC) is carried out before engine start.*

**Cargo Smoke Detection and Fire Suppression System (SDFSS)** ..... **TEST**

Press and hold the Test Switch on the SDFSS Panel.

- Verify the following lights on the SDFSS Panel illuminate: BTL1 LOW (white), BTL2 LOW (white), BTL1 CHK (green), BTL2 CHK (green), FAULT (amber), FWD VALVE (green), MID VALVE (green), AFT VALVE (green), FWD FIRE (red), MID FIRE (red), AFT FIRE (red);
- Verify the EOAP "CARGO FIRE" and the Master Warning Lights illuminate;
- Verify the aural warning sounds.


Release the Test Switch and verify that all Annunciation Lights extinguish and the aural warning stops.

**Fire Detector LOOPS Switches** ..... **BOTH**

**Instrument Transfer Selectors** ..... **NORMAL**

Verify that the CADC, FD CMD, AHRS, EFIS, FMS and RADIO NAV transfer selectors are in normal center position and all FD and CADC annunciators are off.

**WAGS** ..... **TEST**

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Set the WNDSHR TEST switch momentary on test. Windshear system perform eight-seconds self-test if airplane on ground and airspeed less than 30 knots.

## Electrical System ..... CHECK

Check CSD temperature indications (outlet and rise) normal.

*NOTE: A negative rise indication (possible after prolonged airplane stops) is not to be considered as a symptom of system malfunction.*

Check CSD disconnect switches are in NORM and guarded. Momentarily move left and right generator switches to RESET and then to ON. Check that AC bus cross-tie switch is in AUTO and DC bus cross-tie switch is in OPEN.

## Emergency Electrical Power ..... TEST/OFF

*NOTE: The emergency electrical power check may be accomplished any time the battery switch is in ON and the right AC bus or ground service bus is energized.*

Rotate the emergency power switch to ON and check that the EMER PWR IN USE light comes on indicating proper operation of the emergency power circuitry.

Check the AC and DC EMER BUS OFF lights remain off.

Check that the following instruments remain powered: CM1's PFD, CM1's ND, and CM2's RMI.

Rotate the meter selector to BATT VOLT and check voltage 25 volts or higher.

Rotate the meter selector to BATT AMP and verify 10 to 50 amps on the right side of the scale.


Rotate the emergency power switch to OFF (EMER PWR IN USE light off).

Check the AMPS meter pointer steady (40 A max) to the left side of the scale (to confirm the proper operation of the battery charger).

### NOTES:

- During battery charging, when the battery state of charge is low, the approximate battery ampere reading will be a steady (non- -pulsing) 40 amps which will decrease as the battery becomes fully charged. Verification that batteries are not discharging, and that battery voltage is within normal limits is accomplished as follows:
- Place Meter Selector to BATT AMP position and verify batteries are not discharging as indicated by a needle centered or to the left. A needle displaced to the right indicates the battery is discharging.
- Place Meter Selector to BATT VOLT position and verify the battery voltage is within normal limits (29±4VDC).
- Verify the BATTERY CHARGER Annunciator is not displayed.
- If the battery amperage indicates in a steady mode to the left, it may be the battery has not had sufficient time to charge. The crew may continue through engine start and taxi. However, all requirements of the emergency electrical power check must be met before completing the Before Takeoff Checklist.
- The battery switch must be in ON to enable the battery charger to operate.
- The meter selector should be in BATT AMP except when checking other selected sources.  
The BATT AMP position allows continuous monitor of battery and battery charger condition.

## APU Panel ..... CHECK

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Verify that APU controls, EGT and RPM indicators are in accordance with normal operation. If APU is not operating observe that fire agent switches, air switch, and master switch are in OFF, doors switch is in AUTO, and fire control switch is in NORM.

**ENG IGN Selector ..... OFF**

**Fuel System ..... TEST/AS REQUIRED**

Verify that fuel crossfeed lever is in OFF, all fuel tanks pumps switches are in OFF, and L/R INLET FUEL PRES LO annunciations are displayed.

Move start pump switch to ON, observe R INLET FUEL PRES LO annunciation goes off, then move start pump switch to OFF and observe annunciation comes on.

Check pumps one at a time, noting applicable L or R INLET FUEL PRES LO annunciation is not displayed when each pump is operated and that annunciation in other system remains displayed. While checking one of the main tank boost pumps, move FUEL X FEED lever to ON and NOTE: INLET FUEL PRES LO annunciation in opposite system is not displayed. Move FUEL X FEED lever to OFF and note annunciation in opposite system is displayed.

Verify both center fuel boost pump switches are in OFF, then move the center FWD fuel boost pump switch to ON. Observe CENTER FUEL PRESS LO annunciation and MASTER CAUTION lights illuminate after approximately 22 seconds. Move center FWD fuel boost pump switch to OFF and observe CENTER FUEL PRESS LO annunciation and MASTER CAUTION lights extinguish. Repeat procedure for center AFT fuel boost pump.

**NOTES:**

- When checking center tank boost pumps, observe L and R INLET FUEL PRES LO annunciations are not displayed.
- L and R INLET FUEL PRES LO annunciations may take approximately 2 minutes to come on when engines are not running.

If APU is operating, leave the right aft fuel tank pump switch in ON.

**Emergency Lights ..... ARM**

Move emergency light switch to ARM and check that the EMER LIGHT NOT ARMED light goes off.


**Cabin Signs ..... ON/ON**

Move the no smoking and the seat belts light switches to ON.

**Pitot and Static Heaters ..... TEST/OFF**

Rotate meter sel and heat selector out of OFF and observe current flow for each position (except RAT PROBE, which is inoperative during ground operations) and PITOT/STALL HEATER OFF annunciation goes off.

*NOTE: The heater current indication will vary between components, any reading on the current meter indicates that components are operable.*

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Rotate the meter sel and heat selector to OFF in order to prevent operation of heaters when the airplane is parked.

Observe the PITOT/STALL HEATER OFF annunciation displayed.

**AIRFOIL and ENG Anti-Ice Switches ..... OFF**

Verify the airfoil and eng anti-ice switches are OFF and associated lights are off.

*NOTE: Both engine anti-ice switches should be in OFF to prevent unnecessary engine bleed air extraction during engine starting.*

**WINDSHIELD ANTI-FOG Switch ..... OFF**

**WINDSHIELD ANTI-ICE Switch ..... ON**

Move the windshield anti-ice switch to ON. If the airplane has been exposed to extremely cold temperatures, it may take up to 30 minutes to warm up thoroughly and reach the required impact resistance.

**ENG SYNC Selector ..... OFF**

Verify eng sync selector is in OFF and the ENG SYNC ON light is off.

**GND PROX WARN Switch ..... NORM**

**Anti-Skid System ..... TEST/ARM**

Verify the anti-skid switch is in ARM and the ANTI-SKID annunciations are not displayed. Move and hold the switch to TEST and observe all ANTI-SKID annunciations come on. Release the switch and observe all annunciations go off.

**Stall Warning System ..... TEST**

Move and hold stall test switch to SYS 1 and observe stick shakers on both control columns operate, both intermittent STALL warning lights and both stick pusher PUSH TO INHIBIT lights on the glareshield come on and the intermittent audible stall recognition signal and vocal warning sound. Move the stall test switch to SYS 2 and observe the same indications. Move the stall test switch to OFF.


**YAW DAMP Switch ..... ON**

Verify the yaw damper switch is in ON and observe the YAW DAMP OFF annunciation is not displayed.

**Overspeed Warning System ..... TEST**

Hold the maximum speed warning test switch to SYS 1 and observe the audio clacker sounds followed by the word "Overspeed". Release switch to OFF and observe the warnings are silent. Hold the maximum speed warning test switch to SYS 2 and observe the same indications.

**MACH TRIM COMP Switch..... NORM**

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Verify the mach trim compensator switch is in NORM and observe the MACH TRIM INOP annunciation is not displayed.

**Logo Lights ..... AS REQUIRED**

**ICE FOD Switch ..... TEST**

Hold ICE FOD switch in TEST position and observe all four ICE FOD alert system light/annunciations (L ICE FOD DET, R ICE FOD DET, L ICE FOD SYS INOP, and R ICE FOD SYS INOP) are illuminated. Release switch and observe all four lights/annunciations extinguish.

**CKPT & CABIN TEMP Selectors ..... TEST/SET**

Rotate both cockpit and cabin temperature selectors to MANUAL HOT and verify that temperature control valve position indicators move toward hot position. Rotate both temperature selectors to MANUAL COLD and verify that temperature control valve position indicators move toward cold position.

Rotate both temperature selectors to AUTO.

Rotate indicator temperature selector to CABIN SPLY to check cabin supply temperature. Return to CABIN for periodic check of cabin temperature. Adjust cockpit and cabin temperature selectors to desired position. Observe response to the setting on temperature control valve position indicators.

**RADIO RACK Switch ..... FAN**

Verify the radio rack switch is in FAN and the RADIO FAN OFF annunciation is not displayed.

**Cabin Pressure Controller (Acft With STBY ON and TRANSFR LOCKOUT Lts) ..... SET**


Verify system selector switch is in PRIMARY and STDBY ON and TRANSFR LOCKOUT lights are off. Push to test FLOW light and verify its illumination; on some airplanes verify also the illumination of both STDBY ON and TRANSFR LOCKOUT blue lights.

*NOTES: The primary and standby system are powered by separate electrical buses. Due to electrical transients during engine start, and when performing the electrical system check, the STDBY ON and the TRANSFR LOCKOUT lights may come on. Light(s) illumination may also occur during rapid movement of thrust or reverse levers due to transient excessive cabin rate of change. If STDBY ON and TRANSFR LOCKOUT lights are on, move the system selector switch to STDBY then back to PRIMARY and push to reset the TRANSFR LOCKOUT switch-light. If TRANSFR LOCKOUT light comes back on, or remains on, only single system automatic operation is available for dispatch. The same procedure may be necessary to reset the system when only the TRANSFR LOCKOUT light is on.*

Rotate the landing altitude selector knob to set destination field altitude. Rotate landing baro selector knob to set destination barometric pressure. For normal operation, set rate limit control knob beyond the index mark toward increase (mark of the knob in correspondences of the arrow-head).

*NOTE: If destination barometric setting is not known, it can be set prior to landing.*

**AIR COND SHUTOFF Switch ..... AUTO**

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**RAM AIR Switch ..... AS REQUIRED**

**----- GLARESHIELD -----**

**Pos/Strobe, Anti-Collision, Flood, Wing/Nacelle Lights ..... SET**

Verify position/strobe light switch as required, anti-collision light switch in OFF, flood lights switch, and wing/nacelle light switch are set as required.

**FGCP/FGS ..... CHECK/SET**

**SPD / MACH Readout**

*NOTE: Initial readout after electrical power application on ground is a reference value of 100 knots (or mach 780).*

Push the SPD/MACH select knob to first detent and set 250 knots. Push the speed/mach select knob full in and set desired cruise mach. Push speed/mach select knob full in again and release so speed readout will be primary in readout.

**AUTO THROT**

Switch Verify the autothrottle switch is in OFF.

**Bank Angle Limit**

Rotate bank angle limit selector to 15°.

**Altitude Alert**

Altitude alert should be tested on first flight of the day using DFGS 1 and C/M-1's altimeter on odd flights and DFGS 2 and C/M-2's altimeter on even flights:

- Move the DFGS selector to required position.
- Adjust the baro set on appropriate altimeter to QNH barometric pressure.
- Set the altitude preselect readout to 1000 feet plus field elevation.


*NOTE: If the preselect readout was previously set to 1000 feet plus field elevation. the set knob must be rotated away from and back to 1000 feet plus field elevation altitude to arm the mode.*

- Simulate airplane approaching 1000 feet plus field elevation by rotating the altimeter baro set knob clockwise.
- When the height approaches 250 feet plus field elevation the amber alert lights will come on steady and the aural tone will sound.
- Continue to rotate the baro set knob clockwise.
- When the height approaches 750 feet plus field elevation the amber alert lights will go off.
- Rotate the baro set knob counter-clockwise to simulate the airplane deviating below 1000 feet plus field elevation.
- When the height is again approximately 750 feet, plus field elevation the aural tone and voice "Altitude" will sound and the amber altitude alert lights will come on flashing.
- Cancel altitude alert advisories by changing the alt preselect readout.

**FD Switch**

Move FD switch to FD: observe FMA's display HDG HLD and ALT HLD and the flight director command bars come in to view and are centered.



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*NOTE: If the FMA's remain blank, verify the instrument panel lights digital knobs are on. If the FMA's are still blank, momentarily push the autopilot release button and wait approximately 10 seconds for the flight guidance computer to reset. After 10 seconds, if the FMA's are still blank, call maintenance.*

**AUTOLAND Mode Button** (if not already performed by CM1) At first flight of the day or whenever weather conditions on destination require use of the autoland, the availability test should be completed. Refer to Ch. 7 Cond Proc. AUTO LAND AVAILABILITY TEST.

#### ---- CENTER INSTRUMENT PANEL ----

#### **ENG FIRE Shutoff Handles ..... IN**

Verify both engine fire shutoff handles are in their full forward position to assure that all the connected control valves are in fully open position and that all the connected electrical switches are in normal position.

#### **Fire Protection System (If not tested previously) ..... TEST**

Verify eng & APU loops selector in BOTH and MASTER WARNING lights are off. Push loops (A, B) test buttons simultaneously. Observe the fire bell and vocal warning sounds and red lights in each engine fire shutoff handle, all LOOP lights, FIRE DETECTOR LOOP light, APU FIRE light, and MASTER WARNING lights come on. Release both test buttons and observe all lights go off.

#### NOTES:

- *The following are the fire bell and vocal warnings associated with the test of the engine fire warning system: fire bell sounds followed by a vocal warning of either "fire left engine" or "fire right engine", then fire bell sounds again followed by vocal warning of either "fire right engine" or "fire left engine". Sequence is repeated 2 more times, then ceases. Lights will remain on until loops test buttons are released. Bell and vocal warning may be silenced by pushing the fire bell off button.*
- *One cycle of the bell and vocal warnings is required for valid test.*
- *If one light is inoperative in any dual loop system and/or some warning did not activate, move the APU or engine loops selector switch to the loops light (in the malfunctioning system) that comes on during the test. Push the affected loops A or B test button. If test is satisfactory, release the button and observe all lights go off and aural warning stops. The system is operable as a single loop system. If test is unsatisfactory, call maintenance.*

#### **REVERSE THRUST Lights ..... OFF**


Check all REVERSE THRUST lights are off.

*NOTE: All REVERSE THRUST lights should be off. Reverse thrust levers must be fully down. However, if the systems have been depressurized by the maintenance crew, the REVERSER ACCUM LOW lights may be on and hydraulic pressure must be provided to recharge the accumulators.*

*CAUTION: If REVERSE THRUST lights are on, the reversers could be extended. Therefore, it is necessary to obtain ground clearance before pressurizing hydraulic system.*

#### **Engine Indicators ..... CHECK**



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Check EPR, N1, EGT, and N2 indicators for normal static indications.

**FUEL USED Readouts ..... RESET**

Pushing momentarily FUEL USED RESET button on EDP, the present FUEL USED values will be displayed for approximately 2 seconds, then the displays revert to all zeros (reset) and finally the displays revert back to normal FUEL FLOW readouts. In addition, push momentarily FUEL FLOW/USED button and verify that FUEL USED function operates normally.

**Engine Oil Indicators ..... CHECK**

Check the oil pressure and oil temperature indicators for normal indications.

Check oil quantity indicators show at least 12 quarts.

*NOTE:*

- *Between 12 and 16 quarts is normal indicators for a full tank.*
- *If engines have been shut down by more than 30 minutes, refer to ATL for oil quantity readings.*

**TRC ..... TEST**

Pushing button causes a 12 PLUS to be displayed in RAT readout and a 2.04 value to be displayed in EPR LIM readout. All lights including the NO MODE light should be off. When button is released the NO MODE light will come on and all mode lights will be off.

**FUEL QTY Indicator ..... TEST**

*NOTE: If refueling is in progress test must be delayed until refueling is completed.*

Push the test button and observe L main, R main, and CTR tank readouts change to 1500 ± 25 kgs, the total fuel readout indicates approx. 4500 kgs, and the gross wt readout displays whatever the zero-fuel weight is plus 4500 kgs. Release the button and observe the readouts return to the pre-test values. If a blank appears in any tank readout, rotate the test button to opposite channel (A or B) and retest the system.


*NOTE: The fuel quantity system can be operated on either channel.*

Observe and record, as required, fuel quantity values. Compare individual fuel totals with the total fuel. Check that fuel distribution is symmetrical within allowable limits. Ascertain that fuel loaded corresponds to the fuel required and recorded on the Technical Log Book.

*NOTE: It is not recommended that a takeoff be initiated with less than 1100 kgs indicated fuel in each main tank.*

**GEAR DOOR OPEN Light ..... OFF**

**Gear Lights and Aural Warning ..... TEST**

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Observe the gear, green lights are on. Pull out on the landing gear lever (while in DOWN position).

Observe green lights go off, red lights come on a steady horn sounds for one second followed by the word "landing gear". Release the gear lever into the DOWN detent verify the aural warning stops, the red lights go off, and green lights come on.

*NOTE: If the aural warning does not sound during the test, continue holding out and down on the landing gear lever while advancing the throttles to the takeoff position and returning them to idle stop. The aural warning should sound when the throttles are returned to idle stop.*

#### ----- CM2 INSTRUMENT PANEL -----

**TAS/SAT ..... CHECK**

Observe the flags are out of view. Observe that the SAT and RAT readouts are approximately equal.

**Flight and Navigation Instruments ..... TEST/CHECK**

Check the CM2's Instrument Panel flight and navigation instruments for integrity and normal operation.

#### **Mach/IAS Indicators**

Observe MACH/IAS indicator for normal indications.

Verify that airspeed command bug is positioned at 250 knots.

*NOTE: Normal static indications at sea level airspeed pointer approximately 0, VMO pointer approximately 340 knots, the MACH readout 0. 150, and no flags.*

**EFIS ..... TEST**

#### **NOTES:**


- Self-testing begins when TEST button is depressed and held; it terminates 3 seconds after release.
- Incomplete PFD/ND presentation may be caused by incorrect power-up sequence.

#### 1) Pre-test:

- On the Control and Dimming Panel, rotate PFD/ND knobs out of detent and adjust brightness.
- Observe that PFD/ND display normal symbology. (ARC/ROSE)
- Set DH to 100 feet.
- Set related VHF NAV to unused (non-local) ILS frequency.

#### 2) Push and hold Control and Dimming Panel TEST button and observe the following:

- PFD radio altimeter symbology indicates 40 plus/minus 5 ft, then symbology disappears, and R/A FAIL message is displayed; DH tone will also sound.

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- PFD marker beacon lights sequence to "O" (blue), "M" (yellow) and "I" (white).
  - PFD ATT FAIL, F/D FAIL and F/S FAIL messages are displayed, and associated symbology disappears.
  - ND HDG FAIL message is displayed and all heading symbology disappears.
  - PFD glideslope symbology indicates glideslope up and localizer symbology indicates localizer left then symbology disappears and G/S FAIL and LOC FAIL messages are displayed.
  - ND glideslope symbology indicates glideslope up and localizer symbology indicates localizer left, then symbology disappears, and G/S FAIL and LOC FAIL messages are displayed.
- 3) Release Control and Dimming Panel TEST button and observe the following:
- PFD/ND symbology returns, and all failure messages disappear (if normal valid inputs are present).

Check normal symbology and no failure messages displayed on PFD/ND.

#### Altimeter

Check OFF warning flag is out of view.

#### GPWS

Ensure that ND's are in ARC or MAP mode and both WX knobs on EFIS dimming panels are off. Ensure that TERRAIN DISPLAY is not selected (TERRAIN DISPLAY switch/light not illuminated on both pilots' panels). Initiate the GND PROX self-test by momentarily pressing GPWS switch/light.

#### Compass Systems

Observe the HDG FAIL message warning flags on ND and on relevant VOR RMI are out of view. Cross-check compass cards. Make comparison with standby magnetic compass and make allowance for correction card. NOTE: Compass card cross check has to be delayed if it is suspected that presence of metallic masses is disturbing the flux valve operation.

#### Vertical Speed

Indicator Observe VSI FAIL annunciation is not in view and pointer is indicating approximately zero.

**Clock ..... CHECK/SET**


Check and set the clock. Rotate the GMT control knob to FS or SS to set GMT if required. Rotate the ET control knob to RESET position to zero the elapsed time, then release to HLD position. When ready to start the elapsed time, rotate the ET control knob to RUN.

*NOTE: If ET readout is in chro function operate the chr or clock button to reset ET display.*

**EFIS/EASD verify also:**

**SDP ..... CHECK**

Check SDP for normal indications.

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If hydraulic pressure on the relevant side is less than 500 psi (for at least 5 minutes) the relevant side OIL PRESS, OIL TEMP annunciators are inoperative. (The HYD QTY annunciator is operative for unpressurized condition).

## Hydraulic System ..... TEST

Check levels of hydraulic fluid reservoirs and check that the L & R HYD PRESS LOW annunciators are displayed.

Momentarily move the auxiliary hydraulic pump switch to OVRD and verify that the right hydraulic system pressure increases; move the switch to ON and check the pressure between 2800 and 3200 psi and the R HYD PRESS LOW annunciation goes off.

Check that the R REVERSE ACCUM LOW annunciation is not displayed.

### NOTES:

- The auxiliary hydraulic pump switch is moved to OVRD for checking the bypass thermal protective circuit operation.
- In case of R HYD PRESS LOW annunciation displayed, with right hydraulic system pressurized, the malfunction is probably caused by right spoiler shutoff and system depressurization valve in spoiler off position.

Move the transfer, pump switch to ON and check that the left hydraulic system pressure indicates above 2000 psi.

Check that L HYD PRESS LOW and L REVERSE ACCUM LOW annunciators are not displayed.

### NOTES:

- Hydraulic pressure may fluctuate when operating the transfer pump.
- In case of L HYD PRESS LOW annunciation displayed, with left hydraulic system pressurized, the malfunction is probably caused by left spoiler shutoff and system depressurization valve in spoiler off position.

Check flaps indicating up and slat light off.

Move the rud hyd cont lever to MAN and observe RUDDER CONTROL MAN annunciation displayed. Return lever to PWR and verify annunciation is not displayed.

Check again the hydraulic fluid reservoir levels to ascertain that no fluid has been lost during test.


When the pressure is up and the accumulators are pressurized, the fluid quantity will drop, but amber hydraulic quantity low light should remain off.

Move the auxiliary hydraulic pump and the transfer pump switches to OFF in order to check correct operation of the engine hydraulic pumps during engine start.

## Hydraulic System ..... SET

Set the engine pump switches to HI

## BRAKE TEMP Indicator ..... TEST/ALL

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Observe the OVHT light is off. Verify the brake temperature selector is in ALL. Push the brake temperature test button and observe temperature indication between 425° and 475°C and the OVHT light comes on. Release the button and observe the temperature indication returns to the pre-test value and the OVHT light goes off.

*NOTE: Due to low rate of heat propagation from brakes to bulb temperature sensors, it is possible that brake temperature indication continues to increase even after 20 minutes from brakes operation.*

**STATIC AIR Selector ..... NORM**

**Crew Oxygen and Mask ..... TEST/CHECK**

- Check supply toggle is in the ON position.
- Check diluter control in 100% OXYGEN position.
- Check Regulated Oxygen Pressure remains in the normal range throughout the test.
- Set BOOM/MASK switch on jack panel to MASK.
- Select interphone on audio panel and adjust the volume as required.

Move the TEST MASK/NORMAL/EMERGENCY toggle to TEST MASK temporarily and observe:

- FLOW blinker operating.
- oxygen flow can be heard through the interphone. (mask mic test)

Return the toggle switch to NORMAL.

Set BOOM/MASK switch on jack panel to BOOM.

#### ----- PEDESTAL -----

**Primary Stabilizer Trim ..... TEST**

Check by CM2 longitudinal trim wheel switches

Operate trim switches UP and DOWN and check for corresponding indicator movement and audible signal.

During this check, test the autopilot disconnect feature by trim switches.

During this check, it is not required to reach the stabilizer full stop positions.

**Radar ..... TEST/OFF**


Operational status of weather radar system may be verified before each flight by performing the following procedure:

Press PWR, press TEST and observe the test pattern is complete and the appropriate colors are present.

Push PWR button to remove power from system.

**RUD HYD CONT Lever ..... PWR**

Verify the rud hyd cont lever is in PWR and the RUDDER CONTROL MANUAL Light is off.

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**Takeoff Warning / Thrust Levers ..... TEST/IDLE**

Slowly advance both thrust levers toward the takeoff position. Listen to the intermittent warning horn sound and check the vocal warning calls the items which are out of takeoff position.  
Retard thrust levers to idle and check the horn and voice stop.

**FUEL Shutoff Levers ..... OFF**

Verify that fuel shutoff levers are in OFF and that the release buttons are fully extended to prevent premature fuel flow and the possibility of hot starts.

**FUEL X-FEED Lever ..... OFF**

Verify fuel crossfeed levers is in OFF.

*CAUTION: Due to pump output pressure difference, fuel flow split between left and right tank with crossfeed open, may lead to a fuel unbalance condition.*


**Flap T.O. Selector ..... STOW**

**ATC/TCAS ..... SET/TEST**

Select TEST and verify TCAS indications and aural test.  
Select the A/N/B mode to ABOVE and select desired range. Select ATC Transfer Switch on PF side.

**ADF ..... TEST**

Test the ADF systems. Move the audio panel ADF switches to on position. Verify the ADF control panel BFO switch is in OFF and the ADF/ANT switch is in ANT. Rotate the volume control to mid range. Push the TEST Button (or move the TEST/NORM/TONE Sw to TEST position on digital ADF). Listen for test tone. Observe the appropriate ADF pointer on the HSI moves to 225° (135° on digital ADF) and repeat the test on the other ADF. After test is completed, move the ADF/ANT Sw to ADF.

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## PM COCKPIT PREPARATION

**Takeoff information ..... RECEIVE**

Obtain through ACARS/ATIS or ATC all relevant departure information.

**TAKEOFF DATA ..... COMPUTE**

Compute takeoff data according to information received using estimated TOW rounded to the next 1000 kilograms.

**TRC/ART ..... SET AS REQUIRED**

Determine engine thrust computer mode to be used.

### **T.O.FLX**

Rotate assumed temperature selectors until the desired temperature is set in the readout, then move the ART switch to OFF.

#### **NOTES:**

- *Operations at takeoff flex thrust are not allowed with use of ART.*
- *Takeoff flex thrust should not be used on runways contaminated by water, ice, slush, snow or whenever airfoil ice protection is required.*

Push takeoff flex mode button and observe EPR limit readout shows the EPR allowable for takeoff. Observe EPR maximum limit indexes on respective EPR indicators are driven to the same setting as in the EPR limit readout.

#### **NOTES:**


- *If the engine anti-ice switches are on and the outside air temperature is 10°C or more, the TRC NO MODE annunciator light will come on when the takeoff flex mode button is pushed.*
- *When the TRC NO MODE annunciator light comes on, the takeoff flex mode button will go off and a flag will cover the EPR limit readout.*
- *If the EPR maximum limit index(es) (bugs) has not driven to the EPR limit, set the EPR limit manually on the EPR indicator(s) by pulling the EPR bug set knob (which exposes an upper readout on the EPR indicator). Rotate set knob to set desired EPR limit in the upper read out and observe maximum limit index(es) indicate the same as the readout.*

### **Normal T.O.**

Rotate assumed temperature selectors until 00 is set in the readout. Set ART switch in AUTO (guarded) and observe the ART INOP light is off, then push T.O. mode button and observe EPR limit read out shows the EPR allowable for takeoff. Observe EPR maximum limit indexes on respective EPR indicators are driven to the same setting as in the EPR limit readout.

#### **NOTES:**

- *If ART INOP light is on, move DFGS 1-2 selector to the other position and check that the light goes off. If the ART INOP light does not go off, consider ART system inoperative.*
- *If the engine anti-ice switches are on and the outside air temperature is 10°C or more, the TRC NO MODE annunciator light will come on when the T.O. mode button is pushed.*
- *When the TRC NO MODE annunciator light comes on, the T.O. mode button will go off and a flag will cover the EPR limit readout.*
- *If the EPR maximum limit index(es) (bugs) has not driven to the EPR limit, set the EPR limit manually on the EPR indicator(s) by pulling the EPR bug set knob (which exposes an upper readout on the EPR*

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*indicator). Rotate set knob to set desired EPR limit in the upper readout and observe maximum limit index(es) indicate the same as the readout.*

- *If ART is inoperative, move the ART switch to OFF.*

## **PF COCKPIT PREPARATION**

**RADIO AIDS ..... SET**

Set desired VHF NAV1/2 frequencies and courses and ADF frequencies according expected SID.

**SPEED Readout ..... SET**

Check speed readout is showing 250 knots. If a different value is requested, enter new value, and verify that airspeed command bug is positioned on correct speed.

**HDG Readout ..... SET**

Rotate the heading select knob until the runway magnetic heading or first turn after takeoff is set in readout.


**DFGS ..... SET**

Set selector in correct position for the flight. Set 1 for CM1 PF or 2 for CM2 PF

**ALT Readout ..... SET**

Rotate the altitude select knob to the expected initial climb clearance. Verify ARM (or xxx flight level) is displayed in FMA.



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## **PF FMS DATA ENTRY**

**FMS POWER UP ..... PERFORM**

**FMS Initialization ..... PERFORM**

**MENU ..... DEPRESS**

**AFMC1(2) ..... SELECT**

**IDENT PAGE ..... VERIFY**

Check MODEL and ENGINES, NAV DATA ACTIVE period of validity.

*NOTE: Anytime the SBY/ACTIVE NAV DATABASE are interchanged, all the previously entered data will be cancelled.*

**POS INIT > ..... SELECT**

In POS INIT page insert the ICAO designator departing airport and verify coordinates

**SET POSITION (if required) ..... ENTER**

**ROUTE > ..... SELECT**

**COMPANY ROUTE/DEP & DEST ..... ENTER**

Enter in the scratchpad the co-route identifier or enter the ICAO identifier for departure and destination airport, then insert route by AIRWAYS ID and TO WPT method.

**DEP ARR ..... DEPRESS**

Push the <DEP prompt in RTE 1 to show the available Rwys & SIDS/TRANS for departure Airport. Select the appropriate RWY & SID/TRANS;

Push the Destination Airport ARR> prompt in RTE 1 to show the available Rwys & STAR/TRANS. Select the appropriate RWY & STAR/TRANS;


**INIT REF ..... DEPRESS**

PERF INIT page is displayed. Insert relevant and available data.

**TAKEOFF > .....SELECT**

If ZFW/TOW, takeoff speeds information available, insert takeoff speeds.

*NOTE: FMS has the capability of storing a second route, defined as RTE 2, that remains as stand-by unless its activation is performed. Only one route can be active at a given time.*

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*If applicable, RTE 2 could be set for an immediate return to departure airport or a diversion to alternate airport for takeoff or departure from a different SID/RWY.*

## **FINAL COCKPIT PREPARATION**

(CM1/CM2 Duty)

**AHRS Alignment ..... CONFIRM**

The flight crew must assure the AHRS are properly aligned.

**T.O. DATA FORM and TRC/ART selection ..... CROSSCHECK**

**V Bugs ..... SET/CROSSCHECK**

Set airspeed reference bugs to V1, V2, flap retract, and slat retract. Verify spd/mach readout and associated airspeed command bugs are set on requested speed (usually 250 knots).

**Altimeters ..... SET & CROSS-CHECK**

Set QNH on the pressure readout and cross check the indications, verifying that the indicated altitude is plus or minus 30 ft from the field elevation and that the 60 foot spread between the altimeters is not exceeded. CM1 set QNH on standby altimeter. Set altimeter Amber bug to one engine out acceleration altitude.

**PREFLIGHT BRIEFING ..... PERFORM**

**ND mode and range ..... AS RQRD**

- **MODE:** It is recommended to display MAP on one ND and ARC or ROSE on the other ND in order to cross-check FMS position with navigation radio data.
- **RANGE:** It is recommended to set the minimum range to display the first way point or better check position update at takeoff, or to set it as required for weather radar.

**Radio Aids ..... X--CHECK**


Verify VOR frequencies, selected courses and RMI bearing pointers. Verify DME indications on HSI. Verify ADF control panels set as required. Verify VHF COMM frequencies selected as desired: move the transfer switch as appropriate and observe green light coming on above selected frequency. Verify position of audio panel controls and push the desired transmit button, adjust volume as required.

**FGCP ..... X-CHECK**

Verify selections are in accordance with expected departure route

**Start-Up Clearance ..... REQUEST**

**Cockpit Crew Checklist..... COMPLETE**

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## **BEFORE START**

**Load Sheet / Takeoff Data ..... X-CHECK PN/PM**

**ZFW ..... SET PF**

Push and rotate ZFW selector until airplane zero fuel weight is set in the gross weight readout. Release the button and x- -check gross weight indications in loadsheet.

**FMS final data entry ..... PERFORM PF**

**INIT REF ..... DEPRESS PF**

or

**PERF INIT> ..... SELECT PF**

Page PERF INIT appears: insert ZFW and x-check GROSS WEIGHT with loadsheet reported one.

**<INDEX ..... SELECT PF**

**<TAKEOFF ..... SELECT PF**

**FMS final x-check ..... PERFORM PF/PM**

Both CM verify in TAKE-OFF REF page PRE-FLIGHT COMPLETE appear.

**MCDU TAKEOFF CONFIGURATION ..... SET PF/PM**

It is recommended to display CLIMB on PF side for vertical revision, and DIRECT TO on PM side for lateral revision.

**FLAP T.O. Selector (If Required) ..... SET 2**

Rotate the flap takeoff selector until required degree of flaps indicated in the relevant readout.


*NOTE: Flap settings between 13 degrees and 15 degrees have been designated DO NOT USE and will not be selected for takeoff.*

**Takeoff Condition Longitudinal Trim Readouts ..... SET 1**

Rotate the C.G. thumbwheel until computed C.G. appears in C.G. readout. Rotate the flap thumbwheel until the computed takeoff flap setting is in the flap readout. Verify computed long trim setting shown on corresponding readout.

**Stabilizer Trim ..... SET 1**

Set the horizontal stabilizer to the reading that appears in takeoff condition/long trim readout.

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**AIDS ..... SET DATA 2**

Select T.O.W. and C.G. values in relevant readout, select 000 on remaining readouts.

**Parking Brake ..... SET 1**

**APU AIR Switch ..... AS REQUIRED 2**

If APU air pressure is used to start engines, move APU air switch to ON. If APU air is also used for air conditioning, leave APU air switch in existing position. If GPU air pressure is used, contact ground personnel.

**APU NORM/ECON Switch ..... NORM 2**

*NOTE: If pneumatic supply is APU, NORM/ECON switch must be in NORM to assure adequate air flow is available for normal engine start.*

**AIR COND SUPPLY Switches ..... OFF 2**

The switches must be off to provide maximum pneumatic supply capabilities for engine starting.

**Fuel System ..... SET 2**

Move all left and right fuel tanks pumps switches to ON.

**Anti-Collision Lights ..... ON 2**

**PNEU X-FEED VALVE Levers ..... OPEN 1**

**Thrust Levers ..... IDLE 1**

Verify both reverse levers are full forward and thrust levers are in IDLE to avoid inadvertent high thrust and/or high EGT after engine start.

**Pneumatic Pressure ..... CHECK 1**

Observe pneumatic pressure indicator shows normal pressure (minimum 36 psi at SL).


**NOTES:**

- Consider a decrease of 1 psi every 1000 feet PA.
- If pneumatic pressure is below minimum, be aware that starting problems such as hot start, hung start, etc., may take place.

**ENG IGN Selector ..... SYS A or SYS B 1**

Select SYS A for CM1 PF or SYS B for CM2 PF.


**Before Start Checklist ..... COMPLETE 2**

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### **ENGINE START**

CONDITION	CM1	CM2
Ready to start	Informs engine start sequence and proceeds with ground crew communication procedure.	
Eng START Sw ON	Announces "ENGINE N° ....." Moves and holds ENG START Switch to ON	
	Observe that START VALVE OPEN annunciation displays and that pneumatic pressure drops.	
N2 indication	Observe N2 RPM, hydraulic pressure and oil pressure increasing.	
	Observe N1 RPM increase	
Maximum Motoring (20% N2 RPM MINIMUM)		Calls "MAXIMUM MOTORING"
	Position FUEL Shutoff Lever to On	Start timing
Fuel Flow indicates		Calls "FUEL FLOW"
	Monitor Fuel Flow	
EGT rises		Calls "EGT"
	Monitors EGT rising	Monitors EGT rising and checks time elapsed from FUEL Shutoff Lever on.
40% N2 RPM		Calls "40%"
	Releases ENG START Sw	
	Observe START VALVE OPEN annunciation goes out and all engine annunciations are off.	
Eng indications stabilized at ground idle	Check EGT, N1, N2 FF and oil pressure have stabilized on normal ground idle values.	
		Stops timing

(Continued)

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## ENGINE START (cont'd)

*CAUTION: Check door and stairway lights are off before attempting Towing or Pushback operations.*

### Engine (Starting Order 2 -1) ..... **START 1**

#### NOTES:

- Before starting the engine, to avoid a hang / hot start, check residual EGT is below 100°C. Engine motoring shortens cool down time considerably.
- If APU air is used, allow APU parameters stabilization before starting engine number one. Too rapid engine start sequence may cause an increase of APU EGT with APU load thermostat operation and consequent bleed air reduction with associated insufficient start torque.  
This condition will probably cause a hot start.

### Engine Start ..... **MONITOR 2**

After CM2 has announced "Before Start Checklist completed", the CM1 inform on engine starting sequence and proceed with Ground Communication procedure. CM1 announce "Engine number . . . .", move and hold the related engine start switch to ON.

*NOTE: If the engine start switch is inadvertently released, allow engine N 2 compressor to stop and request ground personnel confirmation before attempting another start.*

Observe that START VALVE OPEN annunciation displays and that pneumatic pressure drops.

*NOTE: If pneumatic pressure does not decrease due to start valve failed closed, release the ENG START switch.*

CM1 and CM2 observe N2 RPM, hydraulic pressure and oil pressure increasing.

*NOTE: If START VALVE OPEN annunciation displays but no N2 RPM increase is observed within a few seconds, monitor hydraulic pressure, oil pressure and N 1 RPM increasing and assume a faulty N 2 indicator. Move fuel shutoff lever to ON at 5% N 1 RPM and release engine start switch at 12% to 20% N 1 RPM.*

## **ABNORMAL START CASES**


### **IF No oil pressure rises during start,**

CM1: Abort start.

CM1 and CM2 observe N1 RPM increase before N2 RPM indication has reached 20%.

### **IF No N1 RPM indication by 20 % N2 RPM,**

CM1: Abort start and call maintenance to ascertain free movement of N1 shaft.

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At maximum motoring N2 RPM, CM2 call "Maximum Motoring", CM1 move fuel shutoff lever to ON and keep hand on lever until all engine indications are stabilized. CM2 start timing and as soon as fuel flow indicates, call "Fuel Flow".

*NOTE: Moving fuel shutoff lever to ON when N2 reaches maximum motoring RPM (maximum motoring is defined as no N2 RPM changed for 5 seconds) and N1 RPM indicates positive rotation, will improve the probability of a good start. Minimum N2 RPM for moving fuel shutoff lever to ON is 20%. If N2 RPM indicator is inoperative, move fuel shutoff lever to ON at 5% N1.*

CM1 and CM2 observe that fuel flow is normal.

**NOTES:**

- Initial fuel flow for normal start is approximately 360 kg/h.
- In case of significantly higher (455 kg/h or more) or lower (330 kg/h or less) initial fuel flow, starting problems may be expected.

**IF Initial fuel flow is 500 kg/h or more, or display flashing,**

CM1: Abort start.

CM2 call "EGT" and verify that EGT rises within 20 seconds from fuel shutoff lever in ON. CM1 and CM2 monitor EGT rising, and continued to monitor EGT until N2 is stabilized: 50-61%.

**IF EGT does not rise within 20 seconds from fuel shutoff lever in ON,**

CM1: Abort start.

*CAUTION: Do not rotate the engine ignition selector to other positions (A, B or OVRD) until engine rotation has ceased and fuel shutoff lever is in OFF. One reset of tripped circuit breaker may be attempted after a cooling period of approximately 2 minutes. If the circuit breaker trips again, do not attempt another reset.*

**NOTES:**


- An abnormal high rate of EGT increase (or EGT display flashing) is indicative of hot start.
- The ground starting EGT limit is 475° C.

**IF EGT indications rapidly reaches 50°C below the corresponding start limit and continues to rise, or EGT display flashing (~450° C),**

CM1: Monitor the EGT display and abort start if necessary to prevent exceeding EGT limits. Record EGT peak. If EGT indications has exceeded start limits Maintenance action is required prior to next start.

*NOTE: When fires are encountered on the ground they are most likely to be tailpipe or internal fires which occur during engine start or engine shutdown. Normally the ground crew notices the fires first. However, high EGT may be another indication of internal fire.*

*CAUTION: Tailpipe fires are not displayed in the cockpit. The first notification of a tailpipe fire may be from an external source. Discharging the engine fire*

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*extinguishing agent will not extinguish the fire. If the fire cannot be extinguished by motoring, or if motoring is not possible, the use of ground fire fighting equipment may be required.*

#### **IF Tailpipe fire or torching,**

If cockpit start indications are normal, continue start procedure. Monitor EGT and fuel flow indicators to idle. Continue to operate engine at idle. If fire goes out, continue flight preparation and report start incident for maintenance investigation. If fire continues or cockpit indications are abnormal, CM1: abort start. To blow-out the engine re-engage starter at any N2 RPM below 20% and keep it engaged until fire goes out.

At 40% N2 RPM, CM2 call "40%" and CM1 release the engine start switch.

*NOTE: If N2 RPM indicator is inoperative release start switch at 12-20% N1.*

CM1 and CM2 observe START VALVE OPEN annunciation extinguished and all other engine annunciations are extinguished.

#### **IF Premature release of engine start switch with fuel shutoff lever ON,**

CM1: Abort start.

CM1 and CM2 monitor engine stabilization at idle. CM2 stop and reset timing.

*NOTE: Sub-idle vibration felt during start-up phases, that go out at the idle stabilized speed of the engine, should be considered normal provided the same are not associated to an abnormal engine behavior.*

CM1 and CM2 verify that engine parameters stabilize at the following approximate idle values: EGT 300-480°C, N1 22-30%, N2 50-61%, F/F 270-500 k/h, Oil Pressure 40-55 PSI.

*NOTE: Idle EGT (bleeds on) will normally not exceed 480° C. If exceeded, an abnormal condition may be indicated.*

#### **IF Engine does not accelerate to idle and all other parameters are normal,**

CM1: Move hydraulic pump switch and generator switch to OFF and advance the thrust lever.

#### **IF Engine response and indications are normal,**


CM1: Reinstate hydraulic and electrical load and recheck response.

#### **IF Within 2 minutes from engine light-up, the parameters are not stabilized at idle,**

CM1: Abort start.

Start remaining engine using the same procedure.



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## AFTER START

**Electrical System ..... CHECK/TEST 1**

*CAUTION: If AC CROSSTIE LOCKOUT annunciation is on:*

- Verify no other electrical system annunciations are on.
- Move the AC CROSSTIE LOCKOUT RESET Sw to RESET.

*If AC CROSSTIE LOCKOUT annunciation remains on or comes back on after reset, attempt another reset.*

*If AC CROSSTIE LOCKOUT annunciation remains on or if any other electrical annunciations come on after second reset attempt, maintenance will be required prior to dispatch.*

Check right and left generator voltage and frequency (115 plus/minus 3V; 400 plus/minus 4Hz).

Check the CSD OIL PRESS LOW annunciations are off.

Move the APU bus (or external power) switches to OFF.

*NOTE: The following check should be accomplished prior to first flight of the day. All electrical buses must be powered by the engine-driven generators. If external or APU electrical power is connected, the external power and APU left and right bus power switches must be off. AC bus crosstie switch must be in AUTO.*

Move left generator switch to OFF.

- Observe left AC load meter indicates zero and right AC load meter, indicates approximately double. Observe L GEN OFF annunciation is on, and all bus off annunciations remain off.

Move left generator switch to ON.

- Observe left AC load meter indication increases, and right AC load meter indication decreases, both showing some load. All electrical system, warning and caution messages should be off.


Move right generator switch to OFF.

- Observe right AC load meter indicates zero and left AC load meter indicates approximately double. Observe R GEN OFF annunciation is on, and all bus off annunciations remain off.

Move right generator switch to ON.

- Observe right AC load meter indication increases and left AC load meter indication decreases, both showing some load. All electrical system warning and caution messages should be off.

**Galley Power ..... ON 1**

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**ENG IGN Selector ..... OFF 1**

**Pitot and Static Heaters ..... ON (CAPT) 1**

The meter select and heat selector should be left in CAPT because this is the only heated pitot when emergency electrical power, only is available.

**AIR FOIL Anti-Ice Switches ..... AS REQUIRED 1**

Air foil anti-ice should be on whenever icing conditions exist or are expected.

Air foil anti-ice should be on prior to start of takeoff roll when:

- icing conditions exist in the immediate vicinity of the departure airport, or
- icing conditions are expected, along both the departure and the one engine out route, at or below one engine out acceleration altitude.

Icing conditions can exist when ram air temperature is below 6 degrees C and there is visible moisture in the air. In addition, to the temperatures below 6 degrees C, be alert for ice buildup on the windshield wipers or edges of the windshields.

The higher the temperature, the higher the cloud liquid water content and the more severe will be the icing conditions. At temperatures below -20 degrees C, icing conditions encountered should be less severe. However, heavy icing has on occasion been reported at temperatures as low as -60 degrees C.

When airfoil ice protection is required:

**PNEU X-FEED VALVE Levers..... OPEN**

**AIR FOIL Ice Protect Sw(s) ..... ON**

Move one switch at a time to ON in order to prevent cabin surge due to pneumatic pressure increasing.


**WING ANTI-ICE ON Lt ..... ON**

**PNEU PRESS Indicator ..... ABOVE YELLOW ARC**

*NOTE: If airfoil ice protect switch was moved to ON when on the ground the system will operate after nose gear lift-off.*

**Ice Protect Annunciations ..... OFF**

*NOTES: L and R PROT TEMP LOW and AIRFOIL ICE PRES ABNML Annunciations may come on but will go off within 1 minute. This is a normal indication. However, the L and R PROT TEMP LOW ann may also come on with engines at low power. In order to provide adequate ice protection, power should be increased enough to extinguish the annun (s). Either or both L & R ICE PROT TEMP HIGH Ann may come on for a short period of time at takeoff rotation when airfoil ice protection system has been turned on prior to takeoff. The ANTI-ICE SUPPLY HIGH ann. may come on momentarily at takeoff rotation when airfoil ice protection system has been turned on prior to takeoff.*

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## TAIL DE-ICE SYSTEM OPERATION

Operate tail de-ice each 20 minutes of operation of the wing anti-ice system:

TAIL Ice Protection Sw ..... ON & RELEASE

TAIL DE-ICE ON Lt ..... ON

*NOTE: In addition to the requirement to operate the tail de-ice every 20 minutes during icing conditions, a tail de-ice cycle should be initiated prior to the approach, approximately 1 minute prior to extension of flaps or gear.*

WING ANTI-ICE ON Lt ..... OFF

After 2.5 min period:

TAIL DE-ICE ON Lt ..... OFF

WING ANTI-ICE ON Lt ..... ON

When icing conditions no longer exist:

AIR FOIL Ice protect Sw ..... OFF

PNEU X-FEED VALVE Levers ..... CLOSE

ENG Anti-Ice Switches ..... AS REQUIRED 1

*NOTES: Engine anti-ice should be on whenever icing conditions exist or are expected. Airfoil anti-ice should also be used if conditions warrant.*


ENG IGN Selector ..... SYS A OR SYS B

ENG Anti-ice Sws ..... ON

Move the engine anti-ice switches to ON one at a time. Observe that the L/R ENG VALVE ann comes on and goes off, and that the L/R ENG ANTI-ICE ON light comes on steady. Observe engine parameters stabilize, then move the other engine anti-ice switch to ON.

### NOTES:

- On ground, both engine anti-ice switches may be moved to ON simultaneously.
- During ground operation, if a L or R ENG VALVE ann remains on, call maintenance.
- In flight, if a L or R ENG VALVE ann is on, one or more engine anti-ice valves has malfunctioned.  
*Depart the icing area as soon as possible. Maintain engine operation at desired thrust level.  
Minimize thrust lever movement until clear of icing area.*
- ATS, if being used, may disconnect if engine anti-ice switches are moved to OFF while wing anti ice or tail de-ice is on (TRC NO MODE light will be on).
- While operating in EPR LIM mode with ATS engaged, icing of the engine pressure ratio probes may cause throttles to retard. The EPR indication will be the same the limit shown in the TRP. If the engines are icing at different rates, the ATS may disconnect. If the thrust levers retard, degradation of climb performance may occur. If allowed to continue in indicate airspeed or mach mode, a descent will be initiated. If in vertical speed mode, airspeed will decrease.

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- The other engine parameters, especially N1, can help with the decision about erroneous indicated EPR.

When engines are stabilized:

ENG IGN Selector ..... OFF

*NOTE: If engine parameters fluctuate maintain the eng ign selector on SYS A or B alternatively.*

When engine anti-ice is no longer required:

ENG Anti-ice Sws ..... OFF

Move the engine anti-ice switches to OFF. Observe that L/R ENG VALVE ann come on and go off, and that L/R ENG ANTI-ICE ON lights go off.

*NOTE: If the outside air temperature is 10° C or more, moving the engine anti-ice switches to ON will cause the TRC NO MODE annunciator light to come on. The light in the TRC mode button previously selected for takeoff (either T.O. or takeoff flex) will go off and a flag will cover the EPR limit readout.*

*CAUTION: Anytime engine anti-ice is required, periodic engine run-up, to as high a thrust setting as practical, (70% N1 for a minimum of 15 seconds is desired or alternately 60% N1 for a minimum of 40 seconds) should be performed to minimize the possibility of ice build-up during extended ground idle operation. It is suggested that such run-ups need not be made more frequently than at 10 minute intervals. If engine anti-ice is still required, subsequent airplane takeoff should be preceded by a static run-up to as high a thrust level as practical with observation of EPR and EGT to assure normal engine operation.*

**NOTES:**


- Engine anti-ice should be on whenever icing conditions exist or are expected.
- Engine anti-ice should be used during ground operation if the outside air temperature is less than 6° C and visible moisture is present or, as icing hazard can exist during a cool damp day even in bright sunshine, when the dewpoint and outside air temperature (RAT or SAT) are within 3° C of each other.
- Engine anti-ice should be used during flight when the ram air temperature is less than 6° C and visible moisture is present or if ice buildup occurs on the windshield wipers or edges of the windshields.
- The higher the temperature, the higher the cloud liquid water content and the more severe will be the icing conditions. At temperatures below -20° C, icing conditions encountered should be less severe. However, heavy icing has on occasion been reported at temperatures as low as -60° C.
- When encountering engine inlet icing conditions and before the engine anti-icing system is turned on, the engine ignition selector should be rotated to SYS A or SYS B.

**AIR COND SUPPLY Switches ..... AUTO 1**

Fan start is evidenced by a momentary increase of the AC load meter indication. If the heat exchangers cooling fan does not start, the related air conditioning system will be inoperative on ground. Normal operations will automatically be resumed in flight. If the ambient temperature is high, it may be desirable to taxi with the APU supplying one air conditioning system. As a matter of fact, when the APU is supplying only bleed air (APU generator not in use), it can deliver appreciably more air than the idling engine.

**APU AIR Switch ..... OFF 1**

**APU MASTER Switch ..... OFF 1**

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If APU is not required, CM1 moves the APU master switch to OFF and verify that APU doors switch is in AUTO to assure APU doors closing.

*NOTE: The APU will shut down 60 seconds after the APU master switch is moved to OFF. CM1 observe APU RPM and EGT indications decrease.*

*NOTE: If the APU is used for air conditioning during taxi, it has to be turned off before takeoff.*

## **Hydraulic System ..... CHECK & SET 2**

Check that both engine hydraulic pumps supply between 2800 and 3200 psi, quantities are approximately the same as during hydraulic test and the HYD PRESS LOW and HYD TEMP HIGH annunciations are not displayed. Move the AUX HYD and TRANS PUMP switches to ON.

### **NOTES:**

- *If engine start performed during pushback or towing, verify operation of RIGHT ENG HYD pump by momentarily turning OFF the AUX HYD and TRANS Pumps.*
- *With the AUX HYD and TRANS Pumps ON, an additional source of hydraulic pressure is provided in the event of an engine failure during takeoff.*

## **ATC/TCAS ..... SET/XPNDR 1/2**

SET/CHK ATC Transponder code and set the Mode Select Knob in XPDR position.

## **PNEU X-FEED VALVE Levers ..... AS REQUIRED 2**

If APU is used for air conditioning or air foil ice protection use is anticipated, leave pneumatic crossfeed valves open.

### **NOTES:**

- Due to normal allowable leakage, an indication of pressure in the center pneumatic duct with the crossfeed valves closed may exist.
- If pneumatic pressure indication persists after takeoff, the following check should be performed to determine if crossfeed valve leakage is acceptable:
  - Verify pneumatic crossfeed valves are closed.
  - Turn ON the ice protection system.
  - Check that pneumatic pressure quickly drops to less than 5 psi.
  - L and R ICE PROTECT TEMP LOW and AIR FOIL ICE PRES ABNML annunciations will be displayed.
  - Turn OFF the ice protection system if no longer required.


## **Windows ..... CLOSE 1/2**

## **DOOR LOCK Sw ..... DENY 1/2**

## **Door Annunciations ..... CHECK OFF 1/2**

All door annunciations must not be displayed before takeoff.

## **SPOILERS ..... ARMED 1**

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**AIDS ..... CHECK/PUSH 2**

Check data properly set then push the insert button for at least 5 seconds.

**Ground Crew Clearance ..... RECEIVE 1**

Ground crew will indicate, by hand signal, to CM1 that airplane is clear to be moved. CM1 acknowledge the signal.

**After Start Checklist ..... COMPLETE 2**

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## **TAXIING**

Completion of this procedure ensures that the airplane is safe for takeoff and is properly configured.

**Taxi Clearance** ..... **RECEIVE 2**

**FLAP/SLAT Lever** ..... **SET FOR TAKEOFF 2**

Before leaving the parking position: Move the flap/slat lever to O/EXT to enable the auto slat self-test; the SLAT AUTO light will come on momentarily to indicate slats have momentarily moved to fully extended position. AUTO SLAT FAIL annunciation will come on if system failure is detected.

Move the flap/slat lever to selected takeoff detent. Observe SLATS T/O light is on, SLATS DISAG, SLATS AUTO, SLATS LAND lights are off and flap position bars and takeoff CONDTN/FLAP readout agree with selected flap setting.

**Exterior Lights** ..... **AS REQUIRED 1/2**

For night operations, move the wing landing lights switches to EXT OFF and nose lights switch to DIM or BRT as desired, and verify position/strobe light switch is in BOTH position.

Set the external flood lights as desired.

**Windshield WIPER Selector** ..... **AS REQUIRED 2**

**Parking Brake** ..... **RELEASE 1**

Gently advance the thrust levers and simultaneously depress brake pedals to release parking brake; the knob will return to its original position and the PARKING BRAKES ON ann. will go off. Start taxi, check brake operation and brake pressure.


### NOTES:

- If very heavy or uphill, 40% to 50% N1 RPM momentarily is maximum required to initiate motion.
- Roll forward before turning.

**Speed and Directional Control** ..... **MAINTAIN 1**

CM1 maintain safe taxi speed, using idle power, and control direction of airplane by nosewheel steering or rudder pedal steering. Nosewheel steering is sensitive, therefore ease pressure into and out of turn and lead with rudder pedal steering. In addition, overshoot centerline during turns because gear is considerable aft. If braking is required to maintain safe speed, apply sufficient pressure to slow the airplane then release the brakes. Ridding of brakes will result in overheating and excessive wear. Intermittent use allows cooling. The following steps must be performed after leaving parking areas and before entering the active runway for takeoff:

- At start of taxi, allow the airplane to move forward prior to initiating any maximum nosewheel turning angle.
- To preclude engine FOD do not use high taxi speed.

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- A contributing factor to tire failure during taxiing and takeoff is excessive heat buildup, caused by long taxi distances and/or high taxi speeds: Do not normally exceed 20 kt during taxiing and go even slower with high gross weight or if taxi distance is long.

## Flight Instruments ..... CHECK 1/2

Using standard instrument panel scan, observe flight instruments normal and no flags. Observe that compass cards agree and indicate correct heading.

## FMS ..... CHECK PF/PM

## Flight Controls ..... TEST 1/2

CM2 announce and complete the check with the control wheel for aileron and column (full aft then forward) for the elevator, through full range of travel.

Observe SPOILER DEPLOYED annunciation on when control wheel is moved and the ELEVATOR POWER ON light on when the control column is in full forward position.

## Takeoff Data ..... REVIEW 1/2

## V Bugs ..... CHECK 1/2

Verify airspeed reference bugs are set to V1, V2, flap retract and slat retract. Verify speed/mach readout and associated command bugs are set to 250 knots.

## TRC/ART ..... SET AS REQUIRED 1/2

Verify TRC and ART are set according to selected takeoff thrust level.

T.O. FLEX → assumed temp → ART OFF


TO NORMAL → Temp 00 → ART AUTO.

If takeoff flex is used, verify that correct assumed temperature is in ATS FMA. If normal takeoff is used, verify that READY light is on.

### NOTES:

- If normal T.O. is used and ART READY light is off, check engines below 49% N1 RPM, move the DFGS 1-2 selector to the alternate system and verify READY light comes on. Consider ART inoperative if ART INOP annunciation occurs.
- Once ART is armed (both engines above 64% N1 RPM), any system failure or selection of the alternate DFGS will result in ART actuation indicated by ART light on and reserve thrust limit displayed on EEDP.
- If takeoff flex is used, ART switch must be in OFF (ART INOP ann. will be on with slats extended).
- If a significant temperature inversion is known to exist use Normal Takeoff Thrust. If both engines are operating normally at time encountering an unknown temperature inversion: No action is



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*required. If one engine has failed at time of encountering an unknown temperature inversion: Push GA button on TRP and adjust power manually to go-around EPR to compensate power loss.*

**Aileron, Rudder and Stabilizer Trim ..... ZERO, ZERO, CHECK 2**

Verify that the aileron and rudder trims are at zero and stabilizer is set to the reading that appears in the takeoff condition/long trim readout.

**Fuel Heat ..... AS REQUIRED 2**

If indicated fuel temperature is 0°C or below, L and R fuel heat switches should be placed (momentary) at ON position, thus giving one cycle (one-minute duration) of fuel heating. CM2 observe FUEL HEAT ON lights coming on followed by fuel temperature and oil temperature increase and going off after one minute.

**NOTE:**

- *Both fuel heat switches and FUEL HEAT ON lights should be off before takeoff.*
- *With engines at idle, the fuel temperature rise is low. If fuel temperature does not increase sufficiently, set 1.20 EPR and repeat heating cycle.*

**CAUTION:**

*No fuel temperature increase may indicate a malfunction in the first stage of the engine fuel pump. Maintenance action is required before takeoff.*

**ATC Clearance ..... RECEIVE 1/2**


**FGS ..... SET 1/2**

**Takeoff Briefing ..... COMPLETE PF/PM**

PF and PM will complete takeoff briefing if not previously made.

**Cabin Report ..... OBTAIN 1**

**Taxiing Checklist ..... COMPLETE 2**

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## **BEFORE TAKEOFF**

This procedure must be performed just before entering the active runway for takeoff. Starting from this phase of flight for work load sharing.

**Line-Up and Takeoff Clearance ..... RECEIVE 2**

**ATC/TCAS ..... TA/RA 2**

Set the Mode Select Knob in TA/RA position and TCAS A/N/B Button in ABV (Above) Mode with the desired range.

**Fuel Balance ..... CHECK 1/2**

Check that fuel balance is within limits and qty is as required.

**Brake Temperatures ..... CHECK 2**

Observe brake temperature indications, and the OVHT light is off.

*CAUTION: Do not takeoff if any brake temperature exceeds 205°C.*

**Takeoff Immanency ..... ANNOUNCE 1/2**

**EGPWS TERR Sw ..... ON PM**

PM selects TERR Sw ON and the Navigation Display in ARC mode as per Normal Procedures. Adjust brightness of display as required for clarity of information using the WX knob on EFIS dimming panel.

**Radar ..... AS REQUIRED 1/2**

On the WXR RDR Control Panel, push RADAR PWR button, select WX or WX+T mode. Set tilt as required to monitor area just ahead and below intended path.


**ENG IGN Selector ..... BOTH 1**

**EOAP ..... CHECK 1/2**

RUDDER TRAVEL UNRESTRICTED light must be on. All other lights/annunciations should be normal for conditions.

*NOTE: The ART INOP annunciation will be on if the ART switch is OFF*

**Before Takeoff Checklist ..... COMPLETE 2**

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## **TAKEOFF**

*NOTE: If engines have been shut down for more than two hours, it is recommended that they be warmed up at idle (or at a thrust setting normally used for taxi operation) for five minutes before advancing the thrust levers to takeoff thrust.*

**Landing and Exterior Lights ..... AS REQUIRED 1**

**Thrust Levers ..... 1.4 EPR 1/2**

PF advance thrust levers to 1.4 EPR or 80% N2 (throttles approximately vertical) and check that the EPR's are approximately matched and other engine parameters normal.

*NOTE: When both engines are operating above 64% N1 and the ART READY light is on, selecting the alternate position on the DFGS selector will activate the ART system on both engines.*

**Autothrottle ..... ENGAGE 1/2**

PF move autothrottle switch to AUTO THROT position.

*NOTE: At 60 knots, the autothrottle system clamp (CLMP) mode will engage removing power from the autothrottle system servo.*

**Thrust Levers ..... SET T.O. THRUST/CHECK MIN N1 1/2**

*NOTES: Within 60 KTS, PM checks N1 to be above minimum charts value for actual OAT and takeoff EPR as per tables reported in Final Cockpit Preparation.*

*If a manual takeoff is desired, leave autothrottle switch in OFF position. PF advance thrust levers in a rapid but smooth manner to takeoff EPR. PM adjust throttles as necessary to set takeoff EPR's with final readjustment of static takeoff thrust by 60 knots.*

**Clocks ..... START 1/2**

PF rotates the ET control knob to RUN.


**Airplane Directional Control ..... MAINTAIN 1/2**

PF hold control wheel to ensure crosswind aileron correction and maintain forward pressure on control column.

### NOTES:

- During crosswind takeoff, the upwind wing will have a tendency to rise soon after brake release and the nose turn into the wind. Therefore, control wheel deflection must be applied into the wind to maintain wings level. This deflection will not affect the takeoff performance.

- Directional control is maintained by use of rudder pedal steering, with the rudder becoming aerodynamically effective at approximately 50 knots. As the speed increases, the aileron deflection requirement will decrease but it will never diminish to zero throughout the ground roll. The primary objective is to KEEP THE WINGS LEVEL AND THE AIRPLANE GOING STRAIGHT DOWN THE RUNWAY.

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## EEDP/ESDP ..... MONITOR 1/2

PM monitor all engine parameters for normal indications. Announce "Takeoff thrust set" within 60 knots and "Clamp" after FMA check at 60 knots. PM also check WHEEL NOT TURNING light is off.

### NOTES:

- After EPR setting within 60 knots, the EPR indications may vary slightly during the takeoff and acceleration phases due to ram effect, temperature and altitude changes. No action should be taken to correct these variations except to prevent exceeding engine limits.
- The illumination of the WHEEL NOT TURNING light indicates a wheel problem and an attempted abort at high speeds could result in a blown tire, if it had not already occurred. This could compromise the stopping ability.
- If WHEEL NOT TURNING light comes on prior to V1-20 KIAS reject takeoff, return to ramp and have maintenance determine the cause.

## Airspeed Indicators (80 knots) ..... CROSS-CHECK 1/2

At 80 knots, PM calls "80 knots". PF cross-check reading with his airspeed indicator/airspeed stdby indicator and calls "CHECKED".

*CAUTION: Rejection of a takeoff at speeds above V1-20 KIAS shall be confined to circumstances where an engine failure or fire condition develops or where the aircraft condition clearly renders it unflyable.*

## V Speeds ..... ANNOUNCE 1/2

PM announce V1 speed and rotate order as they are achieved during takeoff roll.

## Airplane Rotation ..... ACHIEVE 1/2

At V1 PF must have both hands on the control wheel. PF rotate the airplane at VR using smooth continuous rotation without hesitation which will require approximately 5 seconds to reach takeoff attitude (20° max). At lift-off the airplane will have 8° of pitch.

### NOTES:

- Abrupt control applications particularly when using VRMIN speeds and low takeoff flap settings, must be avoided during lift-off in order to preclude striking the tail. Both early and late rotation will increase takeoff distance.

PM monitor rotation and when a positive rate of climb is established announce, "Positive climb".


## Landing Gear ..... RETRACT 1/2

PF ensure that a positive rate of climb is established and call, "Gear up".

PM acknowledge "Gear up" then pull and lift landing gear lever to UP. PM observe gear lights are off and report. "Gear up, lights out".

### NOTES:

- Gear retraction cycle time is 8.5 seconds.

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- After takeoff in slush or wet snow and when clear of obstacles, extending and retracting the landing gear may reduce ice accumulation and the possibility of gear door freeze-up.

**Landing Lights ..... RETRACT 1**

CM1 moves wing landing and nose light switches to RET and OFF respectively.

**Autopilot ..... ON PF/PM**

When desired, engage the autopilot by ordering "Autopilot ON". Observe AP 1 or AP 2 light on.

**FGS ..... AS RQD PF/PM**

When above 400ft AAL, select HDG SEL or NAV as appropriate. Before engaging NAV mode, assure that the "to waypoint" displayed on the ND is sequenced to the desired one.

**FMS ..... SET PF/PM**

Until passing 10000ft AAL, PM will perform all changes and entries into the FMS upon PF request.

**At Thrust Reduction Altitude**

**Climb EPR ..... SET 1/2**

At Thrust Reduction Altitude PF commands "Climb thrust". PM push CL mode button on thrust rating panel and observes light is on, autothrottle CLMP mode disengages, and autothrottle FMA's display EPR/CL.

PM verify thrust settings and report, "Climb thrust set".

**At Acceleration Altitude**

**FGS ..... VNAV/IAS SET PF**

At acceleration altitude select VNAV or IAS mode and accelerate to desired climb speed.

**Flaps/Slats ..... RETRACT 1/2**


At or above flap/speed schedule PF calls, "Flaps zero".

PM ensure conditions for flap retraction are met then acknowledge, "Flaps zero", and move flap/slat lever to O/EXT detent. PM observes flap position moving symmetrically toward zero and when up reports, "Flaps up".

At or above slat/speed schedule PF call, "Slats retracted". PM ensure conditions for slat retraction are met then acknowledge, "Slats retracted", and move flap/slat lever to UP/RET.

When SLATS DISAG and SLATS T/O lights go off, PM report, "Lights out".

**FLAP T.O. Selector ..... STOW 2**


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Rotate the flap T.O. selector to STOW position.

*NOTE: Blockage of the flap/slat lever in 0/EXT position may occur if the flap T.O. selector is moved to STOW before selection of the UP/RET configuration.*

**ART Switch (if T.O. Flex Used) ..... AUTO 2**

If T.O. flex is used, return the ART switch to AUTO (guarded) position.

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### **AFTER TAKEOFF**

This procedure must be performed at the end of takeoff phase after slat retraction. Completion ensures that airplane is properly configured for the coming phase of flight.

**FMS ..... AS REQUIRED PF/PM**

**ENG IGN Selector ..... AS REQUIRED PM**

If engine ignition is not required, CM1 rotates engine ignition selector to OFF, otherwise select SYS A or SYS B alternatively every 10 minutes.

*NOTE: Ignition should be used to provide flameout protection when encountering inlet icing, severe turbulence, heavy rain or other unusual operating conditions.*

**Fuel System ..... AS REQUIRED PM**

If fuel in center tank is present, set both center tank pumps ON.

When the center tank fuel quantity indicator shows empty, CM1 moves both center fuel tank pump switches to OFF. Maintain ON all left and right fuel tanks pumps switches.

**Hydraulic System ..... CHECK/SET PM**

PM move left and right engine hydraulic pump switches to LOW and check that hydraulic system still operates at about 3000 psi, then move transfer pump and auxiliary hydraulic pump switches to OFF and check that hydraulic system pressure decreases to 1500 psi.

*NOTE: It may take a few minutes for the systems pressure to decrease to 1500 psi especially if there are no demands on hydraulic power.*

**Brake Temperatures ..... CHECK 2**

Observe the brake temperature indicator and OVHT light.


**Spoilers ..... FLIGHT MODE 1**

CM1 verify that the red ARM placard of the speed brake lever is not exposed.

**Altimeters (CM1/CM2/Stand-by) ..... 1013/1013/1013 1/2**

At transition altitude, PM call, "Transition altitude", CM1 and CM2 set altimeters to 1013 millibars and cross-check indications. CM1 set also the stand-by altimeter to 1013 millibar.

**After Takeoff Checklist ..... COMPLETE PM**

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## **CLIMB**

**EOAP ..... CHECK 2**

Observe EOAP annunciations indications are normal. After airspeed exceeds approximately 180 KIAS, observe the RUDDER TRAVEL UNRESTRICTED light is off.

*NOTE: If RUDDER TRAVEL UNRESTRICTED light remains on, refer to Abn. Proc.  
RUDDER TRAVEL UNRESTRICTED LIGHT ON ABOVE 180 KIAS.*

**Radar ..... AS REQUIRED 1/2**

If radar is required, select the ARC mode and the desired RANGE on Mode Select Panel. Then, on the WXR RDR Control Panel, turn radar on; select WX or WX + T mode and set tilt to monitor area just ahead and below intended path. Adjust (if necessary) the WX Brightness on Control and Dimming Panel.

**EGPWS ..... AS REQUIRED PM**

De-selects the EGPWS system when terrain/obstacle are no longer a factor. Use Weather Radar as required.

NOTE: If the system generates a caution or a warning, while the TERR Sw is off, the terrain data is automatically displayed on the Nds selected in ARC or MAP mode.


**Cabin Signs ..... AS REQUIRED 1**

When appropriate, switch the seat belts sign off by setting seat belts switch to the AUTO position. The AUTO position will permit the intervention of seat belt signs in case of decompression.

**Automatic Altitude Capture ..... MONITOR 1/2**

When operating in RVSM airspace the aircraft should not overshoot the cleared flight levels by more than 150 feet.



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## CRUISE

**Cruise EPR Limit ..... SET PM**

PM select cruise EPR limit on the thrust rating panel.

**FMS ..... AS RQD PF/PM**

**TCAS A/N/B button ..... B (BELOW) 1/2**

PM set Range Selector and TCAS A/N/B Button in B (Below) mode.  
 Monitor traffic below in order to plan contingencies in case of a rapid descent.

**Engine/Airplane Systems ..... MONITOR 1/2**

### Engines

As duties permit monitor EPR, EGT, N1 and N2 parameters to ensure that all are within normal operating range; check that fuel flow indications are normal for the phase of flight; observe oil quantity, oil temperature, and oil pressure displays for normal indications.

### Fuel System

Verify proper fuel feed configuration and balance, normal fuel quantity indications and fuel temperature within normal range.

Monitor fuel consumption against your flight plan at constant intervals. Check Fuel on Board + Fuel Used=Block Fuel to detect eventual fuel leaks.

### Hydraulic System

Scan hydraulic system panel and observe that hydraulic pressure and quantity are normal and light/annunciations are off.

### Electrical System

Scan electrical panel for normal indications.

### Air Conditioning and Pneumatic Systems

Check air conditioning and pneumatic instruments for normal indications, monitor cabin temperature and adjust as required.


### Pressurization

Observe normal cabin climb rate, cabin altitude and differential pressure indicator shows normal pressurization operation.

*NOTE: If a rapid airplane climb or descent becomes necessary during flight, adjust the rate limit control knob so that the desired cabin altitude can be reached prior to or at the same time the airplane reaches the intended flight altitude.*

**Altimeters ..... CROSS-CHECK PF/PM**

When operating in RVSM airspace cross-check altimeters indications every one hour; check that the main altimeter indications are within the instrument tolerance (200 ft). The usual scan of flight deck instruments should be sufficient.

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## **DESCENT PREPARATION**

This procedure must be performed prior to start of descent. Completion ensures proper setting of airplane systems for the subsequent phase of the flight as well as acquisition of all operational data and information required for descent, probable holding and approach to landing.

**Weather Information ..... RECEIVE PM**

Obtain destination and alternate weather by the ATIS or ACARS.

**Landing Data ..... CONFIRMED 1/2**

CM2 computes landing data according to latest information received and using estimated landing weight rounded to the next 1000 kilogram. CM1 confirms these values. Landing data should include MLW, target speed VMAN and GA speed.

**V Bugs ..... SET 1/2**

Set the V bugs to VMAN UP/RET, VMAN 0/EXT, VMAN 15/EXT and VTH 28/EXT or VTH 40/EXT.

**MSA ..... CHECK 1/2**

**APPROACH and LANDING BRIEFING ..... PERFORM PF/PM**

**FMS ..... AS RQD PF/PM**

Prior to arrival phase, the flight crew should verify that the correct terminal procedure has been loaded.

- PF inserts RWY and APPR procedure, STAR and TRANS as applicable.
- PF should read on MCDU the track and distance to waypoint for STAR, APPROACH and MISSED APPROACH.
- PM should cross-check on applicable charts.

**Altitude Reference Bugs (If required) ..... SET 1/2**

Set altimeter altitude reference bugs to MDA value for non-precision approaches or DA value for precision approach.


**MDF ..... /X-CK 1/2**

Determine the MDF (Minimum Diverting Fuel) from flight plan and compare it with the estimated fuel on board at destination.

**Radio Altimeters ..... SET 1/2**

CM1 and CM2 set DH value for precision approach or 500 feet in case of non-precision or visual approach.

**TCAS A/N/B button ..... B (BELOW) 1/2**

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**EGPWS TERR Sw ..... AS RQD PM**

**Fuel Heat System ..... AS REQUIRED 1**

If indicated fuel temperature is 0°C or below, at stabilized engines operation, CM1 observe oil and fuel temperature, then momentarily move the fuel heat switches to ON and observe the FUEL HEAT ON lights coming on, followed by fuel temperature and oil temperature increase

**NOTES:**

- If fuel temperature indication is not available monitor closely the oil temperature.
- In case the test is unsatisfactory, refer to Abn. Proc. FUEL HEATER FAILURE.
- Both fuel heat switches and FUEL HEAT ON lights should be off before final approach.
- With engine at idle, the fuel temperature is low. If fuel temperature does not increase sufficiently, set 1.20 EPR and repeat heating cycle.
- No fuel temperature increase may indicate a malfunction in the first stage of the engine fuel pump.

After one minute, observe FUEL HEAT ON lights go off.

**WINDSHIELD ANTI-FOG Switch ..... AS REQUIRED 1**

When descending to airports with high humidity, CM1 should move windshield anti-fog switch to ON to prevent visual impairment during approach, landing and taxi.

**Hydraulic System ..... SET & CHECK 2**

CM2 move engine hydraulic pumps switches to HI, observe both hydraulic systems pressure indicate/reach between 2800 and 3200 psi and both HYD QTY amber annunciations on ESDP are off.

Then move auxiliary and transfer pumps switches to ON.

CM2 observe brake pressure indications are approximately same pressure or higher than respective hydraulic system pressure.

**Pressurization ..... CHECK/SET PM**


Before engine thrust reduction, PM verify on cabin pressure controllers:

- landing QNH set;
- landing field elevation set;
- rate limit control knob at dot INCR position.

During descent, after engine thrust reduction, PM check the cabin rate of descent and check that cabin altitude is approximately at field elevation before landing.

**NOTE:**

*For high speed descents or for descents from flight level 310 or above, select a higher cabin rate on cabin pressure controller.*

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**Descent Clearance** ..... **OBTAIN PM**

On PF's requests, PM obtain descent clearance from ATC.

**FGS** ..... **AS RQD PF/PM**

Use VNAV, V/S or IAS/MACH mode as required.

**Descent Checklist** ..... **COMPLETE PM**

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## DESCENT/APPROACH

**DESCENT ..... MONITOR PF**

**SPEEDBRAKE Lever ..... AS REQUIRED PF**

Descent should be planned without speed brakes, but if required they can be fully extended. This will increase the rate of descent by 1000 to 1500 feet/minute and reduce the deceleration time/distance by 50%.

It is recommended to keep one hand on the speedbrake handle until speedbrakes are retracted.

PF move speedbrake lever to desired position.

*NOTE: Operate speedbrake lever with care to avoid abrupt airspeed changes. Speed brakes effect is proportional to airspeed.*

*CAUTION: The speedbrakes shall be in the RET & DISARM position before lowering the flaps or extending the landing gear.*

**Radio and Flight Instruments ..... SET/CROSS CHECK 1/2**

CM1 and CM2 cross-check flight instruments for agreement. Observe that no warning messages are in view.

Set required radio aids for approach, verify VHF NAV and ADF equipment are tuned to desired frequency and necessary navigation courses are properly set. Verify that marker volumes on audio panels are properly set, if required.

**Cabin Signs ..... ON 1**

CM1 verifies the no smoking light switch is in ON and the seat belts light switch is in ON.

**Fuel System ..... SET 1**

CM1 check all left and right fuel tank pump switches are ON, set center fuel tank pump switches to OFF and verify the fuel crossfeed lever is OFF.


**Altimeters ..... QNH & X-CK 1/2**

At transition level CM1 and CM2 set altimeters to QNH and cross-check indications. CM1 will also set the standby altimeter on QNH.

*NOTE: If approach clearance has been issued, QNH may be set above transition level provided that level flight above transition altitude is not anticipated.*

**ENG SYNC Selector ..... OFF 2**

**Approach Checklist ..... COMPLETE PM**

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## **FINAL**

This procedure must be performed to prepare the airplane in the landing configuration. Completion ensures the airplane is safe for landing.

### **Initial Approach Configuration ..... ACHIEVE 1/2**

PF reduces airspeed at or below flap/slat operating speed and call, "Flap/slat \_\_\_/Extended".  
PM ensure that conditions for flaps and slats extension are met then acknowledge, "Flaps/slats \_\_\_/Extended" and move flaps/slat lever to \_\_\_/EXT.

PM observe that flap position indices show \_\_\_/\_\_\_, SLATS T/O light is on, and SLATS DISAG light is off and report, "Flaps \_\_\_/\_\_\_ light on".

### **FGS ..... SET FOR APPROACH 1/2**

For ILS, VOR or VORDME approaches intercept the ILS using the VOR LOC mode.  
For NDB approaches use HDG SEL mode to track NDB bearing.

### **FGS (AUTOLAND) ..... SET FOR APPROACH 1/2**

When airplane heading is 90° or less of the ILS approach course, push AUTOLAND mode button.

#### *NOTE:*

*If autoland mode is desired after having previously armed the ILS mode, disengage the ILS mode pushing HDG selector knob (HDG HLD engaged) before selecting AUTOLAND.*

### **Localizer/VOR Capture ..... MONITOR 1/2**

When the localizer/VOR radial starts moving, PM calls, "Loc/Radial alive". CM1 and CM2 monitor capture.

### **Glide Slope Capture ..... MONITOR 1/2**

When the glide slope pointer starts to move downward, PM call, "Glide alive", then CM1 and CM2 monitor glide capture.

PF set Missed Approach Altitude when appropriate.

For Non-Precision Approaches use V/S mode. Select required V/S 0.3nm prior to the FAF.  
Decelerate and configure in order to be at the FAF in final landing configuration.


### **Landing Gear ..... EXTEND 1/2**

PF calls, "Gear down". PM ensure that conditions for gear extension are met then acknowledge, "Gear down" and move the gear lever to DOWN. When the 3 green lights are on, report "Gear down, green lights".

*CAUTION: After complete gear extension, control that amber light is off.*

#### *NOTES:*

- Gear extension cycle time is 15 seconds.

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- Approach idle is available when nose gear extension cycle is completed.

**TRC ..... GA 1/2**

PM push the GA button and observe the GA light comes on.

**Landing Lights ..... EXT ON/BRT 1**

CM1 moves the wing landing and nose lights switches to EXT ON and BRT respectively.

**Final Approach Configuration ..... ACHIEVE 1/2**

**NOTE:**

*In icing conditions, tail de-ice should be activated approximately one minute prior to extending landing flaps.*

PF check airspeed not above 28 flaps operating speed and calls, "Flaps 28".

PM ensure that conditions for 28 flap extension are met then acknowledge, "Flaps 28" and move flap/slat lever to 28/EXT.

PM observe that flap position shows 28/28 and report, "Flaps 28".

**FLAP/SLAT Lever (If Required) ..... 40/EXT 1/2**

PF ensure that conditions for 40 flap extension are met and call, "Flaps 40". PM cross-check conditions for 40 flap extension then acknowledge, "Flaps 40" and move flap/slat lever to 40/EXT. PM observe that flap position indices show 40/40 and report, "Flaps 40".

**NOTES:**

- *During the entire final approach maintain the stabilizer properly trimmed to obtain maximum efficiency and full elevator travel.*
- *If during final approach, due to turbulence, wind shear or other reasons, an airspeed loss or an increase in rate of descent is encountered, in addition to the required (even considerable) attitude corrections, increase thrust (even considerably) without hesitation, even though autothrottles are being used.*

**SPEEDBRAKE Lever ..... ARM 1**


CM1 check that AUTO SPOILER FAIL annunciation is off then move the speed brake lever to ARM.

*CAUTION: Ensure that spoilers are not deployed until airplane is on the ground.*

**ENG IGN Selector ..... BOTH 1**

**FUEL HEAT Sw ..... OFF 1**

**EOAP ..... CHECK 1/2**

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RUDDER TRAVEL UNRESTRICTED light must be on.

**FGS ..... SET FOR G/A PF**

Check Missed Approach Altitude has been set. Set the bank angle limit selector to 15°.

**Final Checklist ..... COMPLETE PM**

**Radio Altimeter Callouts ..... MONITOR 1/2**

**Windshield Wipers ..... AS REQUIRED PM**

**Autopilot (If AUTOLAND Not Used) ..... OFF 1/2**

Reaching minimum altitude for autopilot use, if still engaged, PM call, "Autopilot disengage". The autothrottle will normally remain engaged until reverse thrust is applied.

## **GO-AROUND**

This procedure describes the actions required to perform a two engine automatic go-around after landing flap selection.

*CAUTION: If go-around is initiated after runway contact, manual go-around procedures must be used.*

*NOTE: The autopilot "minimum abort height" was determined to be 20 ft GND when using normal go-around procedure and with both engines operating. "Minimum abort height" is defined as the minimum altitude for initiating go-around without a wheel strike.*

After "Go-around" is ordered or announced:

**TO/GA Buttons/Thrust Levers ..... PUSH/ADVANCE 1/2**

PF push TO/GA button and manually advance thrust levers to GA EPR.


### **NOTES:**

- *If TO/GA button is pushed when flaps/slats are not in landing configuration, the autopilot will disengage and only FD go-around guidance is available.*
- *During missed approach procedure (Both two engines and one engine) the speed reference will be the speed of go-around initialization, but not less than 1,3 VS+5 KIAS (In case RUDDER CONTROL is in MANUAL not less than 135 KIAS) or greater than 1,3 Vs+ 25 KIAS.*

Autopilot will roll airplane to wings level and rotate it to a pitch attitude to maintain go-around reference speed (maximum pitch attitude is 20° airplane nose up). Airplane will maintain heading existing when bank angle is less than 3°.

*NOTE: Autopilot will disconnect if heading select is engaged, during a single engine go-around.*



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Autothrottle FMA's change from SPD (plus selected value) to EPR GA, arm mode goes blank, and roll and pitch annunciators display GO RND. The fast-slow pointer on each PFD will provide speed guidance during go-around.

**NOTES:**

- When pressure on the thrust levers is released, the autothrottle system will refine the go around thrust setting.
- The thrust rating panel automatically changes to go-around (GA) if not previously selected.

**FLAP/SLAT Lever ..... IMMEDIATELY 15/EXT 1/2**

On PF command, PM move flap/slat lever to the 15/EXT position.

**NOTES:**

- *If the airplane touches down momentarily after engagement of autopilot go-around, the autopilot will remain engaged. The autopilot disengages if the go-around mode is selected after runway contact is made.*
- *Rudder control will remain in parallel mode, until go-around mode is disengaged, to provide engine out compensation if required.*

**Landing Gear ..... RETRACT 1/2**

On PF command and after a positive rate of climb has been established, PM move the landing gear lever to UP. Observe landing gear light indications are normal.

**Alt Preselect Knob ..... PULL 1/2**

PM pull the alt preselect knob to arm missed approach altitude capture.

**Airspeed/SPD MACH Readout ..... CHECK/SET 1/2**

PF verify speed at or above go-around speed, X-checking airspeed indicator and PFD. PM select 250 knots on speed readout.

**Autopilot ..... ON PF/PM**

When desired, engage the autopilot by ordering "Autopilot ON". Observe AP 1 or AP 2 light on.


**FGS ..... AS RQD PF/PM**

When above 400ft AAL, select HDG SEL or NAV as appropriate. Before engaging NAV mode, assure that the "to waypoint" displayed on the ND is sequenced to the desired one.

**At Thrust Reduction/Acceleration Altitude**

**Climb EPR ..... SET 1/2**

At Thrust Reduction Altitude PF commands "Climb thrust". PM push CL mode button on thrust rating panel and observes light is on, autothrottle CLMP mode disengages, and autothrottle FMA's display EPR/CL.

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PM verify thrust settings and report, "Climb thrust set".

**FGS ..... VNAV/IAS SET PF**

At acceleration altitude select VNAV or IAS mode and accelerate to desired climb speed.

**Flaps/Slats ..... RETRACT 1/2**

At or above flap/speed schedule PF calls, "Flaps zero".

PM ensure conditions for flap retraction are met then acknowledge, "Flaps zero", and move flap/slat lever to O/EXT detent. PM observes flap position moving symmetrically toward zero and when up reports, "Flaps up".

At or above slat/speed schedule PF call, "Slats retracted". PM ensure conditions for slat retraction are met then acknowledge, "Slats retracted", and move flap/slat lever to UP/RET. When SLATS DISAG and SLATS T/O lights go off, PM report, "Lights out".


**ENG IGN Selector ..... AS REQUIRED PM**

If engine ignition is not required, CM1 rotates engine ignition selector to OFF, otherwise select SYS A or SYS B alternatively every 10 minutes.

*NOTE: Ignition should be used to provide flameout protection when encountering inlet icing, severe turbulence, heavy rain or other unusual operating conditions.*

**SPEED BRAKE Lever ..... DISARM 1**

**After Takeoff Checklist ..... COMPLETE PM**

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## LANDING

### **FLARE ..... PERFORM PF**

PF cross the approach end of the runway at 50 feet, then, as the airplane enters ground effect (at approximately 20 feet) check the wings level and perform a gentle flare.

#### NOTES:

- In case of cross-wind landing, at approximately 100 feet (GND) gradually change the approach crab angle to wing low technique. Control drift with aileron into the wind and use opposite rudder to maintain airplane alignment parallel with the centerline. Airplane can touch down on upwind wheels first. Remember that wing tip will contact ground at approximately 9° bank angle.
- Approach and Touchdown speeds will be higher than normal, due to gust factor corrections, therefore do not hold off, but FLY airplane FIRMLY ONTO GROUND AND GET NOSEWHEEL ON RUNWAY FOR MAXIMUM CONTROL.
- After touchdown, maintain control wheel into the wind and apply corrective rudder inputs to aid for directional control.

### **Thrust Levers ..... IDLE 1/2**

If the autothrottles have not reached idle thrust by this time, manually reduce to idle. It is suggested to have both hands on the control wheel in order to avoid overcontrol during touchdown.

*CAUTION: With thrust levers out of idle, during spoiler extension at touchdown, the speedbrake lever will automatically disarm, retracting the spoilers surfaces.*

### **Nose wheel Contact ..... ACHIEVE 1/2**

After main gear touchdown, PF smoothly lower the nosewheel onto the runway.

*NOTE: In the event the aircraft should bounce after landing, hold or re-establish a normal landing attitude and immediately add thrust as necessary to control the rate of descent. When using this recovery technique, exercise extreme caution not to increase the pitch attitude above normal as this will only increase the height of the bounce and may trigger a stall warning. Do not push over, as this will only cause another bounce and damage the nose gear. If there is any doubt as to a safe recovery, the Captain will call for and conduct an immediately go-around. Apply go-around thrust and fly missed approach/rejected landing profile. Do not retract the landing gear until a positive rate of climb is established, because a second touchdown may occur during the recovery.*


### **Spoiler Operation ..... MONITOR 1/2**

PM observe speedbrake lever moves aft upon main gear wheel spin-up and report "Spoilers Deployed".

CAUTION: If the speedbrake lever doesn't move aft or doesn't remain at EXT, PM report to CM1 "NO SPOILERS". CM1 will move lever aft to full extend position and up to latched position.

### **Reverse Thrust ..... AS REQUIRED 1/2**

When nose gear is firmly on ground, PF move reverse levers to idle reverse. PM observe ENG REVERSE UNLOCK (amber) lights on, then observe ENG REVERSE THRUST (blue) lights on and call,

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"Ready for reverse". PF move the reverse thrust levers rearward and adjust levers to obtain desired reverse thrust.

*CAUTION: Lower thrust reverser buckets may contact runway if pitch attitude is in excess of 8 degrees. When reverse thrust is verified, set thrust symmetrically between idle reverse and 1.3 EPR as required. Below 80 knots, decrease thrust to the reverse idle detent. Thrust reduction to the reverse idle detent should be accomplished by 60 knots unless higher thrust is required for the existing conditions. If difficulty in maintaining directional control is experienced during reverse thrust operation, reduce thrust as required. Do not attempt to maintain directional control by using asymmetric reverse thrust. As airplane decelerates, reduce reverse thrust to avoid engine surging or popping.*

**NOTES:**

- *If during reverse applications the reverser interlock will not release, or reverse thrust lever returns to reduced thrust, move affected lever to forward idle and use unaffected lever as necessary for deceleration within limits of directional controllability.*
- *When operating on wet runways, apply down elevator after nose gear contact. Apply reverse thrust to idle reverse thrust detent. After reverse thrust is verified, gradually increase reverse thrust as required to no more than 1.3 EPR.*
- *When reverse thrust is applied, the autothrottle switch drops to the OFF position and ATS FMA's go blank. Red THROTTLE lights will not come on.*
- *On some airports, for low noise requirements, do not operate reverse thrust more than idle. This limitation, is not valid on contaminated runways (snow, slush, standing water) or with reduced braking effectiveness and when, at Captain's discretion, the maximum airplane deceleration is necessary.*

**EEDP ..... MONITOR 1/2**


PM monitor EEDP for any engine limit being exceeded.

**Airplane Directional Control ..... MAINTAIN 1/2**

PF control airplane with rudder pedal steering.

**NOTES:**

- It is recommended that use of the nose gear steering wheel will be restricted to taxiing and never be used for control of the airplane on the runway at ground speed in excess of 15 knots.

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## **AFTER LANDING**

This procedure must be performed after leaving the active runway. Completion ensures that the airplane is safe for ground operation after the landing phase and prepares the airplane for parking.

### **CAUTION:**

*Crew should be sensitive to ice that may form during taxi in.*

*Periodic engine run-up (with the engine anti-icing system on), to as high a thrust setting as practical, (70% N1 for a minimum of 15 seconds is desired or alternatively 60% N1, for a minimum of 40 seconds) should be performed to minimize the possibility of ice build-up during extended ground idle operation in suspected icing conditions. It is suggested that such run-ups need not be made more frequently than at ten minutes intervals.*

### **SPEEDBRAKE Lever ..... DISARM 1**

Push down on the speedbrake lever and observe that it moves forward to RET.

### **Exterior Lights ..... AS REQUIRED 1/2**

Move the wing landing lights switches to RET OFF and nose lights switch to DIM or BRT as desired.

### **FLAP/SLAT Lever ..... 15/EXT 2**

Set flaps to 15 for maximum protection against foreign object damage to the engines.

*NOTE: To preclude engine FOD do not use high taxi speed. The recommended maximum taxi speed is 20 kts.*

### **ENG IGN Selector ..... OFF 2**

### **Pitot and Static Heaters ..... OFF 2**

### **AIR FOIL and ENG Anti-Ice Switches ..... OFF 2**

### **WINDSHIELD ANTI-FOG Switch ..... OFF 2**

### **WINDSHIELD ANTI-ICE Switch ..... AS REQUIRED 2**


Generally, the windshield anti-ice switch should be moved to OFF. For short stops, at low ambient temperature, the switch should be left in ON to decrease thermal expansion and contraction cycles.

### **EGPWS TERR Sw ..... OFF PM**

De-select EGPWS system.

### **ATC/TCAS ..... XPNDR 2**

### **APU (If Required) ..... START/BUS ON 2**

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If single engine taxi will be performed or environmental conditions/number of passengers require maximum cooling, start the APU, as required move the APU bus switch to ON and/or APU AIR Switch to ON.

**Air Cond Sys ..... AS REQUIRED 1/2**

In order to reduce the load on the remaining generator, if one engine is shutdown, move the related air conditioning supply switch to OFF. If both air conditioning systems are required, start the APU in advance to supply the other air conditioning system.

**One Engine (If applicable) ..... SHUT DOWN 1**

As a fuel saving procedure and at Captain's discretion, it is recommended to shut down one engine during taxi-in. Ensure adequate time for cool-down (5 minutes a stabilized idle thrust is advisable) in order to reduce potential for oil coking and to improve starting reliability. Shut down the engine (preferably the right one) every time all the following conditions are satisfied:


- Taxi weight is not greater than 52 tons.
- Taxiways are not contaminated.

*NOTE: With airplane on the ground and only one engine running ART INOP light will come on.*

**Radar ..... OFF 2**

Remove PWR from WXR RDR Control Panel.

**After Landing Checklist ..... COMPLETE 2**

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## **PARKING**

This procedure ensures that the airplane is secured through its station and prevents undue wear.

**APU (If Required) ..... START/BUS ON 2**

For electrical power supply, GPU in lieu of APU is economically favorable.

**Exterior Lights ..... OFF 1/2**

Exterior lights, when used, shall be normally switched off before entering the parking stand in order not to blind ground personnel. Anti-collision lights should be off after engine shutdown and position lights should be off when no longer required.

**FLAP/SLAT Lever ..... UP/RET 2**

While entering the parking stand, CM2 move the flap/slat lever to UP/RET.

*CAUTION: When retracting the flaps/slats, leave the FLAP/SLAT handle in O/EXT position until the flaps are retracted. The FLAP/SLAT handle may then be moved to UP/RET. This delay will help prevent damage to the upper arm of the slat sequence mechanism crank.*

**Stabilizer Trim (If Required) ..... ZERO 2**

If parking in strong wind (Above 40 kts), or as precautionary measure during an overnight or long stop, set stabilizer trim to zero to prevent airplane from tipping onto tail.

**Parking Brake ..... SET 1**

Set parking brake and observe that PARKING BRAKE ON ann is on and brake pressure indication is normal.

**Electrical Power ..... APU/EXT 2**

If APU is operating, verify that APU PWR AVAIL blue light is illuminated on and APU generator voltage and frequency are normal.


If APU is not operating, ensure the availability of external electrical power and refer to Preliminary Cockpit Preparation.

**FUEL Shutoff Levers ..... OFF 1**

CM1 verify that the thrust levers are at idle, then move one at a time the fuel shutoff levers to OFF and observe FUEL FLOW, N1, N2 and EGT indications decrease.

*NOTE: If the engines have been operated at 85% N2 RPM or more for at least one minute during landing, a five minute cooling period at idle should be accomplished before engine shutdown.*

**SEAT BELTS Switch ..... OFF 2**

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## **FUEL TANK PUMP Switches ..... AS REQUIRED 2**

Move all fuel tank pump switches to OFF, except the right aft tank pump if APU is operating.

## **Pneu X-Feed Valves ..... OPEN 2**

## **APU AIR Switch ..... ON 2**

## **AIR COND SUPPLY Sws (one at a time) ..... AUTO 2**

## **SUPPLY AIR PRESS Indicator ..... 12 PSI or greater 2**

If pressure is less than 12 psi or APU EGT is in yellow arc, operate only one air conditioning system. Preferably close the L pneu x-feed valve and set L AIR COND SUPPLY Sw OFF.

## **Anti- Collision Lights ..... OFF 2**

## **Galley Power ..... OFF 2**

## **EFIS/FD Switches ..... AS RQD/OFF 1/2**

## **EOAP ..... CHECK 2**

Upon completion of flight, when combined messages appear on the EOAP, any EOAP discrepancies that were detected since the EOAP was initially powered-up, result in illumination of the MON cue switch/light. Pushing this light a summary of discrepancies will be displayed on the right screen (the left screen is blanked). This “post-flight discrepancies report” is available until power supply to the EOAP is removed.

## **Parking Brake (If Chocks In Place) ..... RELEASE 1**

When wheel chocks are in place, release parking brake.

## **Auxiliary and Transfer Hydraulic Pumps ..... OFF 2**

Wait until ventral stairway is completely extended before turning the auxiliary hyd pump off.


## **ATC/TCAS ..... STBY 2**

## **Cabin Air Outflow Valves ..... AS REQUIRED 2**

If a long stop is anticipated, or during inclement weather, partially close the outflow valves as follows:

Move the cabin pressure control lever to MANUAL (down);




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Push and rotate the cabin pressure control wheel until the outflow valve position indicator nears the INCR (VALVE CLOSE) position, then release control wheel.

*NOTES: With outflow valve position indicator in above position, the butterfly valve is closed thus preventing rain and snow entry into the fuselage.*

**DOOR LOCK Sw ..... UNLKD 1/2**

**Parking Checklist ..... COMPLETE 2**

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## LEAVING THE AIRPLANE

This procedure must be performed every time the airplane is left unattended or handed over to the responsibility of ground personnel.

**Emergency Lights ..... OFF 2**

Move the cabin emergency lights switch to OFF verifying that the emergency light at the top of the overhead panel is off.

**Position Lights ..... OFF 2**

**Station Lighting ..... OFF 2**

**APU ..... AS REQUIRED 2**

**BATT Switch ..... AS REQUIRED 2**

**Leaving the Airplane Checklist ..... COMPLETE 2**