



FLIGHT HANDBOOK

PANEL OVERVIEW

NORMAL OPERATING PROCEDURES

NOTE:

Modified for Microsoft Flight Simulator --- DO NOT USE IN REAL AIRCRAFTS ---

PANEL OVERVIEW

Intro panel



Captain's panel



First Officer's panel



Overhead panel

Pedestal panel

Throttle Panel

Utility panel

Pushback panel

Intro panel



Here you can select how the aircraft should be loaded and in which seat you will take the flight:

Cold Cockpit	-	nothing is ON
Ready for Engine Start	-	You are cleared to start the engines All required switches are set APU running Bleed Air available
Ready for Taxi	-	You are ready to go

Captain's panel



1. Autopilot and warnings
2. Flight instruments
3. Engine instruments, fuel system and altitude control
4. Standby instruments, fuel indicators and CAT 2 system
5. Warnings
6. Lights and compass

1. Autopilot and warnings

Autopilot select panel



The mode selector is of the push to engage button type. The buttons have integral white lighting. When a mode is engaged, the lower half of the button is illuminated by a green light.

MODE OPERATION

Mode switching

ATH - Autothrottle armed

AP - Autopilot Master

Note: In real aircraft the AP-Master switch is to find on the middle console. The FS version also has the AP-Master switch on the Pedestal Panel, but for easier handling a second switch on the Mode Selector.



GLIDE - Glideslope hold

PITCH - If this mode is selected, the nose-up commands are limited to a maximum of 15 deg body angle.

HDG - Heading hold

IAS - IAS hold

ROLL - If this mode is selected, the bank angle commands are limited to a maximum of 30 deg.

Autopilot mode panel



IAS select switch - Set the required IAS then press ATH and IAS button on the autopilot select panel to hold IAS.

MODE OPERATION

Mode switching

- OFF - Flight director computer not in use
- SC - If this mode is selected (**only before take-off**) The Speed Command provides computed pitch command for take-off and optimum climb out pitch command with wings level.
- HDG - Heading armed
To hold selected heading press HDG button on the autopilot select panel
- VOR/LOC - VOR hold
If a VOR frequency is selected and available and the VOR course is set on the HSI the aircraft moves automatically to the VOR station.
- GS AUTO - Glideslope hold
If a ILS frequency is selected and available and the mode selector is set to HDG and after 3 seconds switched to VOR/LOC the localizer is armed.
Press GLIDE button on the autopilot select panel to activate this mode.
If glideslope is alive the mode selector switches automatically to GS AUTO.
- Note: In this mode there are no settings, HDG or Altitude required, but remember the IAS can only set in tenth steps.
- GS MAN - GPS drives NAV 1 if this mode is selected and the GPS auto flight button is ON.

ALTITUDE hold switch - Altitude hold

Autopilot flight panel



VSPEED display

- | | | |
|-------------------|---|---|
| VSPEED switch | - | VSPEED setting |
| HDG select switch | - | Set the required HDG then switch mode selector to HDG and press HDG button on the autopilot select panel to hold HDG. |
| GPS switch | - | activates GPS auto flight |

VHF NAV 1 panel



NAV 1 and NAV 1 STBY displays

- | | | |
|-------------------|---|--------------------------------------|
| NAV switches | - | NAV 1 STBY setting |
| NAV select switch | - | change between NAV 1 and NAV 1 STBY. |

VOR / ILS test:

If necessary the VHF-NAV / DME systems can be tested as follows:

First check for all following tests, that no ILS frequency is selected.

To test the VHF system:

- Set course at 180 deg
- Select VOR on RMI
- Push VOR test button
- RMI needle will move to 180 deg
- Course deviation needle will move to zero
- To - From pointer shows TO
- Nav flag will disappear until test is complete

To test ILS: (no ILS frequency select)

Select ILS test switch UP

GS and NAV flag will show

GS will show UP and deviation bar LEFT

Select ILS test switch DOWN

GS and NAV flag will show

GS will show DOWN and deviation bar RIGHT

GS and NAV flag will disappear until test is complete

Fuel Shut off



Shows OPEN if both fuel cut-off switches are open.

Shows SHUT if both fuel cut-off switches are closed.

Engine and APU Fire warning lights



2. Flight Instruments

Attitude Indicator (ADI)



Caution Light

-

Press to test

Speed difference needle on the left side shows the difference between the momentarily airspeed and the IAS setting.

If airspeed = IAS setting the needle will be in the middle position

If airspeed < IAS setting the needle move up

If airspeed > IAS setting the needle move down

Runway flag shows the height to the runway.

The flight director deviation needles will be shown if the flight director is ON.

The horizontal and vertical glideslop deviation needles come on if an ils frequency is active.

Decision Height light

Pitch control ball

Horitontal Situation Indicator (HSI)



VOR course switch

-

if required set course here

Airspeed Indicator



SF

-

if required set airspeed flags here

IAS select switch

-

set IAS / alternate on the autopilot mode panel

Altimeter



- | | | |
|-----------------|---|--|
| Caution light | - | Comes on if autopilot altitude hold switch is on and aircraft altitude is +/- 1000 ft difference from altitude setting |
| Baro switch | - | if required set Baro here |
| Alt flag switch | - | set flag if required |

RMI



- | | | |
|------------------|---|--|
| VOR/ADF switches | - | Change between VOR or ADF |
| DME 1 display | - | shows the distance to the VOR station in nautical miles (NM) if a VOR frequency is alive |
| DME 2 display | - | shows the distance to the VOR station in nautical miles (NM) if a VOR frequency is alive |
| DME 1 flag | - | shows red if a VOR frequency is not alive |
| DME 2 flag | - | shows red if a VOR frequency is not alive |

Vertical Speed Indicator

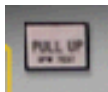


Autopilot Master light



If the autopilot is switched OFF the light comes ON.

Pull Up warn light



If the GPWS switch is ON and a low terrain is in case the light comes ON and an audio warning is heard.

Clock and Panel select buttons



Panel select buttons (from left to right)

OVH	-	to open the overhead panel
PDS	-	to open the pedestal panel
THR	-	to open the throttle panel
PB	-	to open / close the pushback panel
FO	-	to open the first officer panel
UTI	-	to open / close the utility panel
KNB	-	to open the fs kneeboard panel
GPS	-	to open / close the gps panel

Panel and Instrument lighting



Set INST LT to BRT if you want at night a panel lighting.
Set DIM LT step for step to BRT if you want a instrument lighting.

3. Engine instruments, fuel system and altitude control

Engine Instruments

GENERAL

BEFORE STARTING

- | | | |
|--------------------------|---|--|
| • Electrical supply | - | ON (check bus voltage) |
| • Fire warning system | - | TEST |
| • Engine overheat system | - | Checked |
| • THROTTLE lever | - | IDLE (close) |
| • HP FUEL VALVE lever | - | SHUT |
| • Oil pressure lights | - | Check on |
| • Anti-icing switches | - | OFF |
| • IGNITION switches | - | NORMAL |
| • Fire controls | - | Guards closed (check wirelocked) |
| • Engine instruments | - | Check |
| • Oil temperature | - | Above minus 40 °C, if below preheat engine |

- Vibration indicators - Checked
- BOOSTER PUMPS switches- ON (at least one per engine, lights out)
- TTC switch - T/O
- Air pressure - Check

NOTE: Minimum air pressure of approximately 20 psi should be indicated during the last part of the starting cycle at ISA sea level conditions.

STARTING

- BLEED AIR MAIN switches - Check on and position indicators in line
- BLEED AIR HP switches - AUTO
- STARTER MASTER switch - ON (Check ignitor light ON)
- HP FUEL VALVE lever - Select to START (appropriate engine)
- Engine Starter - Select to appropriate engine
- LP rpm - Check positive rotation

AT 15% - 20% HP rpm:

- Igniter light - Check out
- Oil pressure and TGT - Check increase

When TGT reaches 400 °C or 50% HP rpm is obtained:

- HP FUEL VALVE lever - Open (see NOTE 1)

Ensure engine idling rpm stabilized between 47% and 53% HP rpm. If below limits open the throttle slowly while monitoring TGT until 53% HP rpm is obtained. Due to the effect of engine carcass temperature the above listed limits are wider than adjustment limits.

CAUTION: IF THERE IS ANY EVIDENCE OF RAPID RISE IN TGT AND IT IS ANTICIPATED THAT 570 °C WILL BE EXCEEDED THE ENGINE SHOULD BE SHUT DOWN IMMEDIATELY.

NOTES:

1. Normally the HP FUEL VALVE lever removes automatically from START to OPEN if a HP rpm of 15 to 20 % is reached.
When the engine carcass is still warm, as indicated by an oil temperature of 40 °C or above, a cooler start may be obtained when the HP FUEL VALVE lever is selected from START to OPEN at 300°C TGT or 35% HP rpm.
2. The HP fuel valve should not be left in the start position during idling as this may cause overheating when the throttle is advanced.
3. For the second engine, a cooler and quicker start can be obtained using cross-bleed air from the running engine (SEE CROSSBLEED STARTING).
4. During the starting cycle, the air conditioning main valves will be closed automatically.
5. Engine light-up will occur 5 to 10 seconds after selecting the HP FUEL VALVE lever to START.
6. During starting, the TGT must not exceed 570 °C. If the rate of increase of TGT indicates that this limit will be exceeded, shut the HP fuel valve to shut down the engine and switch OFF the starter master switch. If the TGT has not exceeded 570 °C, attempt another start. If the TGT has exceeded 570 °C, record the maximum TGT and report.
If under normal starting conditions the TGT exceeds 510 °C, this probably indicates a fault in either the engine or aircraft starting system. Record and report.
7. If after starting the first engine, the igniter light remains on, select starter master switch OFF momentarily.

When idling rpm and TGT are stabilized:

- Oil pressure - Check 16 psi minimum
- HP rpm - 47% to 53%
- LP rpm - 27% approximately
- Amber FUEL PRESSURE lights - OUT
- STARTER VALVE light - Check OUT
- Igniter light - Check extinguishing

When both engines are started:

- STARTER MASTER switch - OFF

ENGINE OVERTEMPERATURE WARNING

If a certain engine TGT is exceeded during ground operation a visual warning and an aural warning via the overspeed audio warning horn will be obtained. In flight the aural warning is inoperative. The visual warning is provided via the red aster warning light and an additional legend on the annunciator panel labelled “ENG. T.G.T.”.

At throttle positions of approximately 80° HP RPM and below the warning will be activated at a TGT of 590 °C or higher. (T/O datum plus 25 °C).

At throttle position beyond 80° HP RPM and with the TTC switch in T/O the warning will be activated at TGT of 590 °C or higher. (T/O datum plus 25 °C).

LP SHAFT ROTATION DURING STARTING

Because of the risk of engine overheating it is essential that the LP compressor is rotating in the **correct** direction before selecting the HP fuel valve to START. Special attention should be paid during tailwind starting, where the compressor may already rotating in the wrong direction.

STARTING USING EXTERNAL AIR SUPPLY

When starting engines using external air supply, the starting procedure is similar to that given under STARTING.

CROSS-BLEED STARTING

After starting one engine from either the APU or ground supply, the second engine may be started by cross-bleeding air from the running engine:

- MAIN BLEED AIR switches - ON (Both engines)
- HP BLEED AIR switches - AUTO (Both engines)
- RPM of running engine - Increase to obtain bleed air pressure of at least 35 psi

Proceed as under “Engine Starting”.

ENGINE JET PIPE FIRE

If during starting or shut down a jet pipe fire is identified by the ground crew, carry out a cranking cycle.

Shut down other engine to facilitate ground fire fighting.

CRANKING CYCLE

If it is necessary to carry out a cranking cycle, the normal starting drill should be followed except for:

- HP FUEL VALVE lever - SHUT
- Igniter light - Check OUT

After 30 seconds:

- STARTER MASTER switch - OFF

CAUTION: CONTINUED USE OF THE STARTER IS LIMITED TO THREE CRANKS WITH A MAXIMUM DURATION OF 30 SECONDS PER CRANK. AFTER THREE CRANKS FURTHER USE OF STARTER SHOULD BE DELAYED FOR A PERIOD OF LEAST 20 MINUTES.

THROTTLE LEVER HANDLING

There are no restrictions on throttle lever handling but coarse operation of the lever is undesirable as this causes high TGT and rapid temperature changes which adversely affect engine life.

However on advancing the throttle lever from idle or near idle, a check should be made that HP rpm is increasing to avoid possible stagnation and consequent overtemperature.

PRE TAKE-OFF

- | | | |
|-----------------------------|---|---|
| • Thrustmeters | - | Set subscale
(See Operating Limitations) |
| • BOOSTER PUMP switches | - | ALL ON |
| • ANTI-ICING MAIN switches | - | As required |
| • Oil and fuel PRESS lights | - | Check out |
| • TTC switches | - | T/O |

TAKE-OFF

For selection of thrust at the beginning of the TAKE-OFF either the FLEXIBLE TAKE-OFF thrust or the RATED TAKE-OFF thrust procedure shall be used and during this phase RATED thrust should be never deliberately exceeded. The FLEXIBLE TAKE-OFF thrust procedure should be used whenever operating circumstances permit.

RATED TAKE-OFF THRUST (Set Take-Off)

With the thrustmeters sub-scale set corresponding with the actual airport barometric pressure (QFE) and temperature, open the throttles until the detent is felt.

If the thrustmeter indication is 100 per cent or more, do not re-adjust.

If the thrustmeter indication is below 100 per cent, open throttles further to give 100 per cent thrustmeter indication.

Check HP rpm and TGT are within the limits and that oil pressure are not below the minimum requirement.

If an engine fails to achieve an indicated thrust of 100 per cent, the take-off should not be attempted.

FLEXIBLE TAKE-OFF THRUST (Rated take-off with reduced thrust)

With the thrustmeter sub-scale set corresponding with the actual airport barometric pressure (QFE) and the limiting temperature at which the aircraft can Take-off from the particular runway at a subject take-off weight, open the throttles until the detent is felt.

If the thrust indication is 100 per cent or more, do not readjust.

If the thrust indication is below 100 per cent, open throttles further to give 100 per cent thrustmeter indication.

Check HP rpm and TGT are within the limits and oil pressure are not below the minimum requirement.

If an engine fails to achieve an indicated thrust of 100 per cent, the take-off should not be attempted.

NOTE: When a rolling take-off is made the engine parameters should be checked during the initial take-off roll and before a speed of 60 knots since the relationship between the thrust and exhaust pressure varies with forward speed.

CLIMB

For reduction to climb thrust select:

- THROTTLE levers - In detent position
- TTC switch - CLIMB

To reduce cabin noise level synchronize HP rpm as accurately as possible.

NOTE: Although detent HP rpm is slightly below recommended climb rpm the recommended reduction is used for pilot's convenience. When desired the pilot may re-adjust the throttles to obtain climb rpm.

APPROACH

During the approach select:

- TTC switch - T/O

SHUT DOWN

- Fire warning system - TEST
- THROTTLE lever - IDLE
- HP FUEL valve lever - SHUT

Carry out cockpit checks as required.

NOTE: A too rapid shutdown of an engine can give rise to an increase in start up vibration. It is therefore recommended that engines should be run at low power (taxi time may be credited) for a minimum of 2 minutes prior to shutdown.

IN FLIGHT SELECTION OF MAX. THRUST

Whenever max. thrust is required in flight:

- Select full throttle
- When time permits, check HP.RPM, LP.RPM and TGT within limits and adjust throttle as necessary.

NOTE: Selection of max. thrust in flight is not required during normal operation and should be limited to conditions of operational necessity, such as engine failure during take-off, go around, wave-off, or for instance extreme adverse weather conditions.

RECOMMENDED OPERATING CONDITIONS

The following operating conditions are the maximum recommended for normal operation. However, where flight circumstances permit, the engine life will be improved by the use of conditions below the recommended maximum.

CONDITION	% RPM		MAX. TGT deg. C.	
	HP	LP		
DURING START MAX.TAKE-OFF	-- 102.5	-- 109.5	510 565	See NOTE 1 5 minutes limit See NOTE 2
OPER. ESSENTIAL CLIMB	97.5 96.5	108.5 108.5	510 500	See NOTE 6 Control to whichever parameter is limiting See NOTE 3, 4 and 5
CRUISE	95.0	108.5	480	Control to whichever parameter is limiting

NOTE:

1. If, under normal starting conditions using fuel temperature as a guide to engine carcase temperature, e.g. minus 10 deg.C. to plus 30 deg.C. indicated engine fuel temperature, the TGT exceeds or suspect to exceeds 510 deg.C. this probably indicative of a fault in either the engine or aircraft starting systems and should be reported for subsequent maintenance action.
2. For take-off, the throttles are selected to give 100 per cent thrust indication within the rpm and TGT limitations. A transient TGT overtemperature within the limits (see operating limitations) can be expected particularly during high ambient temperature conditions.
3. The relationship between TGT and HP rpm is affected by air-off takes, therefore when airfoil and/or engine anti-icing are switched ON and the TTC switch is not selected to CLIMB, the throttles may have to be re-adjusted to avoid exceeding the maximum TGT.
4. When the TTC switch is set to the climb datum after take-off, temperatures in excess of 500 deg.C. may be experienced for 10 to 15 seconds, while the engine is re-datuming to the climb setting.
5. If, however, after stabilization at the climb datum, temperatures in excess of 500 deg.C. are observed on the cockpit instruments, this should be reported and investigated. Due to tolerances in the system the cockpit TGT indication may slightly differ from the TTC setting when operating with the TTC switch at CLIMB.

6. Operationally Essential power is used when it is desirable to use more than the normal Climb or Cruise power, but less than Maximum Continuous power. The duration and reason for the use of Operationally Essential power must be recorded and reported.

Occasions when Operationally Essential power may be used are as follows:

When the normal scheduling altitudes lie between quadrantal heights and additional climb power is temporarily required to reach the best quadrantal height.

When conditions of icing and/or turbulence exist at the normal scheduling altitudes and additional altitude above such conditions is required.

7. If the overspeed limitations (RPM or time) are exceeded, the engine should be shut down.

ENGINE VIBRATION INDICATION (if fitted)

NORMAL OPERATION

a. Starting and stopping

The resonant frequency of the HP turbine assembly occurs below idling speed at Approximately 40% HP rpm and during the starting and stopping cycles the vibration reading may be seen to increase when passing through this speed.

b. Steady running between idle and max. take-off

There are two predominant resonances in this running range both associated with the LP shaft system. These are at approximately 36% and 81% LP rpm and the vibration readings may rise as the engine is slowly accelerated or decelerated through these speeds.

c. Rapid transient throttle movements

During rapid throttle movements the engine vibration may momentarily exceed the level acceptable for steady running. Such vibration indications during rapid throttle movements may therefore be disregarded.

d. Vibration during icing conditions

In some conditions of heavy icing there may be intermittent increases in Engine vibration meter reading. Take no action unless the other instruments suggest that a mechanical failure has occurred, then the procedure recommended in ABNORMAL PROCEDURES, the abnormal checklist must be observed.

The momentary use of high engine speeds will alleviate the condition, but in any case the readings should return to normal soon after icing has ceased.

RECORDING OF ABNORMAL INDICATIONS

If an abnormal indication is observed the following parameters should be recorded:

Vibration amplitude

Engine rpm (HP and LP)

Flight conditions (take-off, climb, cruise or descent)

Altitude and air speed

Any other symptoms of vibration

(e.g. sensed through throttles or aircraft controls)

and if circumstances permit:

I.O.A.T.

Whether air bleed or anti-icing, was in use.

TESTING THE T.V.I SYSTEM (Indicator and amplifier)

To test the system:

- Push button - Check pointer deflects to approx. 4 scale deflections

FIRE WARN SYSTEM

PRE FLIGHT AND BEFORE ENGINE SHUT DOWN CHECK

To test the system:

- Fire warning test button - Push
The fire warn lights come on and after a view seconds automatically go out.

Engine N1 indicators



also a vibration indicator (small needle) is included

Engine Oil Press and TGT indicators



Engine Oil Temperature indicators



Engine Fuel Temperature indicators



Engine N2 indicators



also a vibration indicator (small needle) is included

Fuel System



NOTE: The indicator may be calibrated in kg.

DIGITAL FUEL FLOW / CONSUMED / AIRCRAFT WEIGHT INDICATOR

1. Display
(if fuel quantity is below 250 kg (542 lb) on both fuel display a warning light will come on)

FUEL QTY SEL switch settings:

TEST

(Gage will revert to zero, test lights ON)

COLL

If CONS knob is not pushed display shows fuel flow.

TOT

Display shows total fuel quantity.

2. SET WT knob
If SET WT knob is not pushed indicator will not indicate.
3. CONS knob
If CONS knob is pushed and FUEL QTY SEL switch is set to COLL fuel consumed indication is available.

RAMP knob
If RAMP knob is pushed A/C WEIGHT shows load weight.
If RAMP knob is not pushed A/C WEIGHT shows total aircraft weight.
4. Test lights
5. RESET knob
If CONS knob is pushed:
RESET knob - Push
(Check fuel consumed indication displays 000)
RESET knob - Push over again
(Fuel consumed indication is indicated)

NOTE: During normal operation the collector tank is kept full as long as fuel is available in the main tanks. Before the booster pumps are running the level in the collector tanks may have dropped to that of the main tanks. In this case the collector tank indicators may display barber pole. It may take some minutes after switching on the booster pumps, before the level in the collector tank is above its indicator level. The magnetic indicator will display black, when this level is reached. During all phases of flight, the magnetic indicator should display black, expect when:

1. High fuel flows are used during prolonged period.
2. Main tanks are empty and the level in the collector tanks is low,
3. Both booster pumps are inoperative.

Toggle switches



- | | | |
|---|---|---------------------------|
| 1 | - | to open/close ATC window |
| 2 | - | to open Flight Map window |

Gear Handle Lever



The gear handle lever has three positions as follows:

UP
LOCKED
DOWN

Autopilot Altitude indicator



- | | | |
|-------------|---|-----------------------|
| Select knob | - | set required altitude |
|-------------|---|-----------------------|

4. Standby instruments, fuel indicators and CAT 2 system

APU Caution light



Comes on if APU is running.

Standby Horizon and Stab Indicator



To activate Stab Indicator press buttons and check buttons show IN.

Marker Beacon



Blue light (Outer Marker) comes ON if the aircraft is over an ILS outer marker beacon

Orange light (Middle Marker) comes ON if the aircraft is over an ILS middle marker beacon

White light (Airways Marker) comes ON if the aircraft fly about an airways fan marker beacon

Radio Altitude Height Indicator



T = Press test button to test function.

If required set decision height, if aircraft passing decision height the alert light comes ON.

Stabtrim Indicator



Speedbrake Indicator and Speedbrake light



If the speedbrakes are OUT the speedbrake light comes ON and the indicator show the degrees.

Fuel Indicators and FUEL QTY SELECT switches



Fuel Indicators:

- Left - Fuel quantity left wing tank
- Center - Fuel quantity center tank
- Right - Fuel quantity right wing tank

To test center tank quantity switch center tank switch.

FUEL QTY SEL switch settings (see Fuel system)

CAT 2 System



T = Test buttons, push to test

AP AND FD PROGRESS ANNUNCIATOR:

- CAT 2 - Will show green when:
 - ° Approach mode selected
 - ° AP in GLIDE mode armed or captured
 - ° FD in GS AUTO mode armed or captured
- VOR/LOC - Will show amber when:
 - ° AP mode selector set at VOR/LOC (armed)
- GLIDE SLOPE - Will show amber when:
 - ° AP mode selector in GLIDE mode (armed)

ALT HOLD	-	Will show amber when: ° Altitude Hold is engaged
SPEED COMMAND	-	Will show green when: ° IAS Hold is engaged

To test Speed Command:

With the flaps in the up position:

Press SC light on the CAT 2 system
Check SPEED COMMAND light ON
Airspeed flag moves over 80 knots
Check IAS light on A/P select ON
After test is complete airspeed flag returns to ZERO
Check IAS light on A/P select OUT

5. Warnings

Gust Lock



Switch IN or OUT.

Stall Warning Light



Liftdumper Indicator



Liftdumper IN	-	Indicator show IN
Liftdumper ARMED	-	Indicator show RDY
Liftdumper OUT	-	Indicator show OUT

Master Warn Lights



Red light

Yellow light

-

WARNING

-

CAUTION

6. Lights and Compass



Compass

Lights



Landing Light switches

Strobe Light switch

Navigation Light switch

Beacon Light switch

Taxi Light switch

First Officer's panel



1. Landing Gear Indicator, Flap Indicator and Hydraulic Pressure Indicators
2. Flight director
3. Move mouse into this area to open the Captain's Panel

1. Landing Gear Indicator, Flap Indicator and Hydraulic Pressure Indicators

LANDING GEAR POSITION INDICATION



The lights on the landing gear position indicator have the following meanings:

GREEN	-	landing gear down and locked
RED	-	transient condition of landing gear and/or door
AMBER	-	main landing gear door may be damaged during landing

With the landing gear down and locked and the main landing gear door closed and locked, all green lights are illuminated.

With the landing gear retracted and the doors closed and locked, all lights are extinguished.

DUPLICATION OF DOWNLOCK INDICATION

(normal and back up indicating system)

Main landing gear down and locked position is indicated by two equivalent green lights which are energized by two different busses (DC bus 1 and DC essential bus). In case of a failure in one of the two independent indicating systems one green light will indicate a down and locked main landing gear. In case of a failure of nose gear indicating system the down and locked position can be checked on the mechanical indicator in the cockpit floor.

GROUND OPERATING

Landing gear selector - DOWN
5 green lights ON, red and amber lights OUT

TAKE-OFF

Landing gear selector - UP
The green lights will go out and the red and amber lights will transiently come on and then go out

LANDING

Landing gear selector - DOWN
The red lights will come on when the doors unlock.
The green lights will come on when the landing gear is down and locked.
Subsequently the red and amber lights will go out.

LANDING GEAR AUDIBLE WARNING

If one throttle is below approx. 76% HP rpm while the landing gear is not locked down, the audible warning will sound. The warning can be silenced by means of a push button on the pedestal or by moving the throttle levers above 76% HP rpm.

If the landing gear is not selected down when the wing flaps are extended beyond the initial approach position the audible warning will sound continuously. In this case no manual silencing is possible.

- Note:
1. The L/G warning switch should be in the ON position for the particular landing.
 2. During a go-around after selecting landing gear up with the flaps still beyond the initial approach position the audible warning will sound. (Unless a time delay relay is installed).

Nose Wheel Steering

NORMAL OPERATION

Nose Wheel Steering Switch - ON

Turn Steering Wheel as desired.

At landing gear up selection the nose wheel is centered hydraulically through the steering mechanism. In up position the nose gear is kept in the center position.

Nose wheel steering shall be switched off when the aircraft is towed with the utility system pressurized.

CAUTION: IF THE NOSE WHEEL STEERING SWITCH IS IN THE “OFF” POSITION, NOSE WHEEL CENTERING IS NOT AVAILABLE. THEREFOR IT IS NOT ALLOWED TO RETRACT THE LANDING GEAR WITH NOSE WHEEL STEERING OFF.

Note: Steering angle 76° in both directions

Flap Indicator



NORMAL OPERATION

Flap selection is accomplished by means of the flap handle on the pedestal.
Flaps position is indicated on an indicator.

ALTERNATE FLAP OPERATION

A (low speed) electrical mode is available, to be used when the flaps fail to extend or retract hydraulically.
Selection is effected by means on a switch of the pedestal.

As soon as the switch concerned is moved from the spring-loaded OFF position to the UP or DOWN position, the hydraulic system is disconnected from the flap.

In flight resetting to normal mode is only possible on the maintenance test panel.

On the ground resetting to normal mode occurs automatically when the flap lever is selected from one gate to another.

During electrical operation of the flaps, flap position is indicated in the normal way.

OAT Indicator

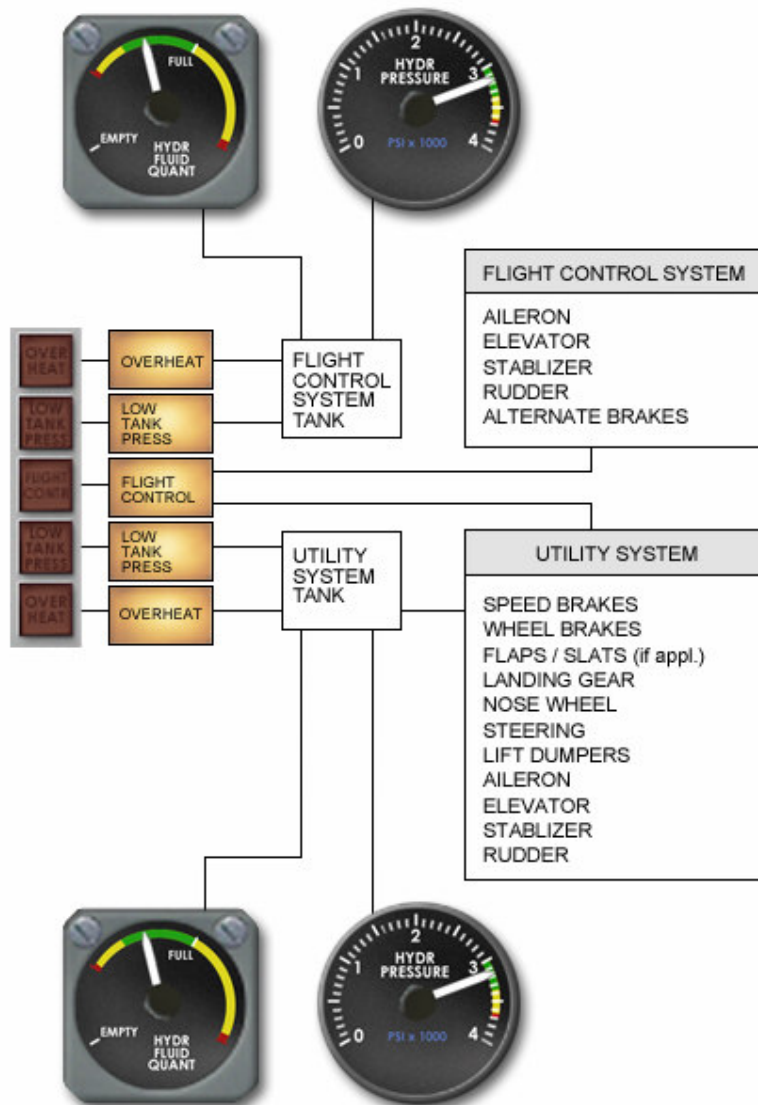


Show the temperature outside the aircraft.

Hydraulic Pressure Indicators



HYDRAULIC SYSTEM SUPPLY



NORMAL OPERATION

During all phases of flight the pump-off loader switches should be in the NORMAL position.

During engine starting the hydraulic pumps of the utility system are off-loaded automatically, regardless of the position of the switches.

If pressure is delivered to the systems by the pumps, the pump failure lights will be out.

System pressures are displayed on the indicators:

Normal Pressure is approx. 3.000 psi.

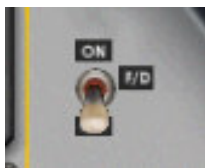
Each pump is capable of bringing the associated system to full capacity.

For test purposes on the ground electrically driven pumps are provided.

Hydraulic Brake Pressure Indicators

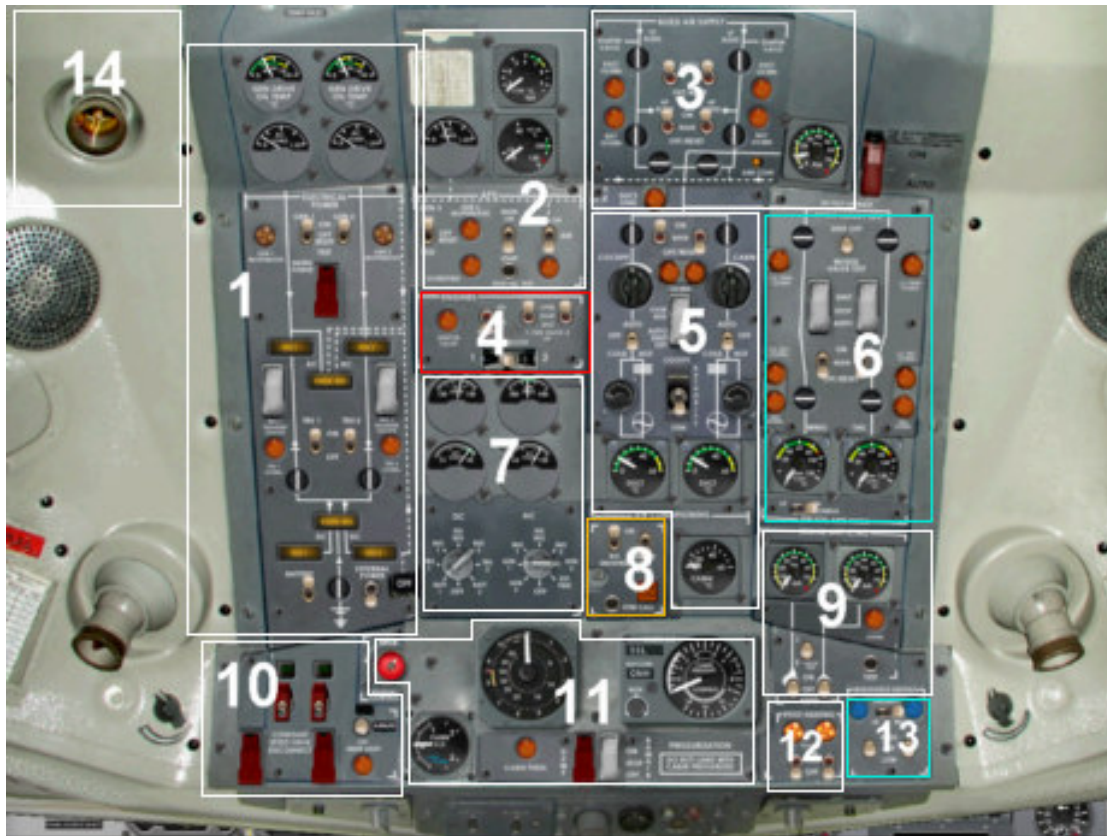


2. Flight director



Flight director switch

Overhead panel



1. Electrical System
2. APU
3. Bleed Air Supply
4. Engine Start System
5. Air Conditioning
6. Airfoil Anti-Icing
7. AC/DC Control
8. Passenger Address
9. Engine Anti-Icing
10. Emergency Control
11. Pressurization
12. Pitot Heating
13. Windshield Heating
14. Move mouse into this area to close the Overhead Panel

GENERAL for the complete Overhead Panel



this is a Line Indicator



Warning Light, to test press light
(the light will come ON
and after a few seconds automatically go OUT)



All guards (red and silver) had an opener (1)
and a switch toggle area (2)
To open Guard click in the area 1
To toggle switch click in the area 2

1. Electrical System

Battery and External Power



EXTERNAL POWER

If External Power is required, first push the Ground Call button on the Pedestal Panel to allow the Ground Crew to connect External Power.

If External Power is connected the External Power light show RDY.
Switch External Power switch to ON.

If External Power should disconnect, push the Ground Call button once again,
Then switch External Power switch to OFF.

Both AC and DC power can be obtained from an external AC power source.

CAUTION: THE EXTERNAL POWER SWITCH SHOULD NOT BE SELECTED TO ON, BEFORE AN EXTERNAL POWER SOURCE IS CONNECTED AND THE INDICATOR SHOWS RDY.

NOTE: When an AC external power unit is connected, DC obtained via the aircraft's TRU's cannot be used for APU starting. However the battery may be charged if the battery switch is selected to ON position.

Gen 1 and 2 switches



If the engines not running the GEN 1 and 2 INOPERATIVE Lights come ON.

If the engines running the GEN 1 and 2 INOPERATIVE Lights should be OUT.

To test the lights switch GEN 1/GEN 2 to TEST.

TRU 1 and 2 switches



AUTOMATIC TRANSFER SYSTEM

Normally when generators 1 and 2 are operating, AC bus 1 is fed from generator 1 and AC bus 2 from generator 2. Automatic bus transfer will occur when one generator becomes inoperative.

If a bus fault occurs, the transfer system will become inoperative automatically and the buses will be separated.

To isolate bus 1 from generator 2 or 3:

- BUS 1 TRANSFER ISOLATE switch - Isolate (silver guards)

To isolate bus 2 from generator 1 or 3:

- BUS 2 TRANSFER ISOLATE switch - Isolate (silver guards)

If both isolate switches are in the isolate position, generator 3 is isolated from the buses.

Bus 1 is fed from generator 1 and bus 2 from generator 2.

If in this case one of the generators 1 or 2 fails, no transfer will take place and the AC bus concerned will be deenergized.

AC Load Indicators



Gen Drive Oil Temperature Indicators



AC Load Indicators



GENERAL

PRE FLIGHT CHECK

- | | | |
|------------------------------|---|--------------------------|
| • Battery switch | - | Push |
| • Essential dc bus | - | Check energized |
| • Battery voltage | - | Check |
| • Emergency light switch | - | ON (light on) |
| • Emergency light switch | - | ARMED (light out) |
| • TRU 1 and 2 switches | - | ON |
| • Generator 1 and 2 switches | - | ON
(Check lights on) |
| • Generator 3 switch | - | OFF
(Check light out) |
| • All guards | - | closed |
| • Start APU | | |

AFTER STARTING APU

- | | | |
|---------------------------------|---|--------------------------|
| • Generator 3 switch | - | ON
(Check light on) |
| • AC and DC buses | - | Check energized |
| • TRU 1 and 2 | - | Check indicators in line |
| • TRU overheat lights (1 and 2) | - | OUT (Press to test) |

NOTE: If only the APU is running and the generator 3 switch is in the ON position all buses are fed by generator 3.

As soon as one engine is running and the associated generator switch is in the ON position, this generator will take over the load of its associated buses while the remaining buses remain fed from generator, until the second engine is started and its generator switch is in the ON position.

AFTER ENGINE STARTING

- | | | |
|------------------------------------|---|-------|
| • Generator 1 and 2 caution lights | - | OUT |
| • Generator 3 switch | - | OFF |
| • AC and DC | - | Check |

CRUISE

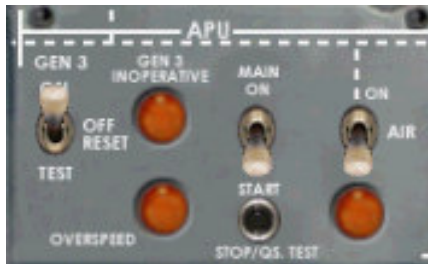
- | | | |
|-----------------------|---|-------|
| • CSD oil temperature | - | Check |
|-----------------------|---|-------|

AFTER PARKING

- EMRG. LIGHT switch - OFF
- Battery switch - OFF

NOTE: Allow 10 seconds for APU air inlet to close before battery off selection.

2. APU



GENERAL

The following will favourably influence APU hot section life.

- a. Reduction of the number of temperature cycles.
- b. Reduction of the magnitude of the temperature steps per temperature cycle.
- c. Reduction of the rate of the temperature change.
- d. Reduction of APU operation under high load to a minimum.

These general rules result in the following operation recommendations:

1. Allow a two minutes stabilizing period between selecting BLEED AIR MAIN switch to ON after APU starting and a two minute period after selecting BLEED AIR MAIN switch to OFF prior to APU shut down.
2. If the APU is supplying bleed air for airconditioning or engine starting, one airconditioning unit should be on.
3. Select APU AIR switch to OFF after engine starting.
4. Keep the APU running on very short flights.

NOTE: TGT increase as a result of selecting generator 3 ON is negligible.

STARTING

On the ground:

- Battery switch - ON
- DC switch - Set BATT 1
- Battery voltage - Check
- Fire warning - Test
- APU MAIN switch - ON
- Check GEN INOPERATIVE light on
- AIR switch - OFF
- Airconditioning main switches - one ON, one OFF/RESET

After 10 seconds from operating main switch:

- APU START button - Press
- RPM indicator - Check
- TGT indicator - Check
- START button light - Check out above 50% rp

When APU is running:

- GEN 3 switch - ON (light out)
- Voltage - Check
- All buses - Check energized
- AIR switch - As desired (see GENERAL)

IN FLIGHT

The APU may be started throughout the aircraft operating envelope.

Successful starts should normally be obtained up to 25 000 ft.

In flight starting procedure is similar to ground starting.

The frequency of generator 3 will increase at higher altitudes and may even slightly exceed the green band tolerance on the indicator.

NOTES:

1. Stop APU by moving the MAIN switch OFF if:
 - TGT or rpm limitations are exceeded.
 - starting time exceeds 30 seconds under normal ambient conditions or 60 seconds under low ambient conditions (below -10 deg °C).
 - starter button light remains ON above 50% rpm or if no sudden battery load decrease at approx. 50% rpm indicates proper starter disengagement, however if APU is used for engine starting, first start one engine without delay then stop APU. Use crossbleed for starting second engine.
2. Allow a two minutes drain period between consecutive start attempts.
Do not attempt more than three successive starts.
3. If an attempt to start the APU is unsuccessful check position of switches and reset the APU main switch to OFF and again to ON before attempting another start.
4. Booster pump operation is allowed but must be kept to a minimum to minimize the risk of fuel leakage from the main engine fuel flow regulator.
5. If necessary, the APU can be started from an external DC power unit. When the DC connector is plugged in (light near receptacle on), the battery is disconnected from the APU and the APU can be started from the power unit only.

SHUT DOWN

- | | | |
|-----------------------|---|-------|
| • AIR switch | - | OFF |
| • GEN 3 switch | - | OFF |
| • STOP/OS TEST button | - | PRESS |
| • MAIN switch | - | OFF |

NOTE: If pressing the stop-overspeed button fails to shut down the APU, (which means a malfunction overspeed protection circuit), the APU may shut down by selecting the main switch to OFF. However, this malfunction should be reported to maintenance. The APU should not be started again until the fault has been rectified.

AUTOMATIC SHUT DOWN

Monitoring system will shut down the APU automatically when any of the following faults occurs:

- Fire
- Overspeed
- Low oil pressure

NOTE: Generator 3 failure or a number 3 generator system fault may also cause an automatic shutdown on the ground.

After APU shutdown in case of FIRE, the fire extinguisher will discharge automatically. A generator 3 system fault will be indicated in the normal way by the amber caution light, and the action required while airborne is described under Electrical System.

In event of an automatic APU shutdown due to fire or overspeed:

- Do not restart

NOTE: It should be realized that a restart of an APU after an automatic shutdown other than due to fire or overspeed could potentially extend possible damage to the APU or its generator.

The monitoring systems permit unattended ground operation.

FIRE WARNING AND EXTINGUISHING TEST

If the extinguishing test light is on, the APU should not be started, but the extinguisher bottle should be checked for discharge.

If light is out, proceed with fire warning test as follows:

- | | | |
|---------------------------|---|---------------|
| • GEN 3 switch | - | TEST position |
| • APU FIRE light | - | ON |
| • GEN 3 INOPERATIVE light | - | ON |
| • GEN 3 switch | - | OFF/RESET |

APU OVERSPEED TEST

To test system:

- STOP/OS TEST button - PRESS (right mouse click)
Check OVERSPEED light on for a period of a few seconds.

APU Indicators (AC Load, RPM and TGT)



3. Bleed Air Supply



NORMAL OPERATION OF SWITCHES

Under all normal operating conditions:

- BLEED AIR MAIN switches - ON
- BLEED AIR HP switches - AUTO
- All Line Indicators - in Line
- Duct Leak light - Test

GRD CONT light :

- | | | |
|-------|---|---|
| OUT | - | no Bleed Air available and engines not running |
| AMBER | - | if engines running a minimum Bleed Air pressure is given (at least 5- 10 psi) |
| GREEN | - | Bleed Air available |

NOTE: When at the higher engine speeds bleed air pressure at the engines is above the setting of the pressure regulating devices of the main bleed air valves, these valves will regulate (50 to 60 psi).

Small differences between two valves and the engines may cause one valve to shut completely, where as the other engine will then supply all air. So, if one ain bleed air valve indicator shoes a shut position with the main bleed air switch in the ON position, this is not an indication of malfunctioning. To check the particular valve, reduce engine speed on side of open valve, after which the valve being checked should open. The pressure regulating function of the ain bleed air valves can be checked during ground running and taxiing, by momentarily increasing the H.P.rpm (range 50 to 60 psi).

MINIMUM ENGINE RPM FOR PROPER OPERATION

For proper CABIN COOLING below 15,000 ft at high ambient temperatures, bleed air pressure should not fall below 30 psi for extended periods.
Pressure can be maintained by increasing the minimum engine rpm of one engine to 80%.

Full CABIN PRESSURIZATION requires a bleed air pressure of 15 psi.
To maintain this pressure, the minimum engine rpm for at least one engine may have to be restricted to slightly above idling.

AUTOMATIC SHUT-OFF SYSTEM

An automatic shut-off system for the bleed air subsystems is provided to reduce thrust losses during take-off and single engine flight at high rpm in accordance with the following table.

ENGINE COND	GROUND START	TAKE-OFF	CLIMB CRUISE DESCENT	ONE ENGINE INOPERATIVE OTHER ENGINE BEYOND CLIMB POWER	
				BELOW 10,000 FT ALTERN. 16,000 FT	ABOVE 10,000 FT ALTERN. 16,000 FT
CABIN AIR COND	OFF	ON	ON	OFF	ON
COCKPIT AIR COND	OFF	OFF	ON	OFF	OFF

- NOTE:
1. Engine anti-icing of an inoperative engine can still be used provided the rpm of the operative engine is throttled below approx. 95%.
 2. If for any reason an engine must be started at altitudes above the setting of the altitude switch, cabin airconditioning remains activated and should be de-activated manually to avoid engine overheat.

4. Engine Start System



Normal operating of switches (from left to right):

- | | | |
|-----------------------|---|--|
| Ignitor valve light | - | comes ON when Engine Starter is set to ON and automatically go OUT at 15% - 20% HP rpm |
| STARTER MASTER switch | - | ON (Check ignitor light ON) |
| HP FUEL VALVE lever | - | Select to START (appropriate engine) |
| Engine Starter | - | Select to appropriate engine |
| LP rpm | - | Check positive rotation |
| at 15% - 20% HP rpm: | | |
| Igniter light | - | Check out |

NOTE: also see Engine instruments

5. Air Conditioning



Main switches and Line indicators

Overheat warning lights
Temperature selector switches

Temperature control switches
Auto shutoff switch

Authority switch

Temperature (Duct) Indicators



Cabin air temperature indicator

AUTOMATIC OPERATION

Normally the automatic systems should be operated as follows:

- | | | |
|------------------------------|---|------|
| Temperature control switches | - | AUTO |
| Temperature selector | - | SET |

The temperature selection ranges are approx. as follows:

Temperature selector position	COLD	HOT
Cockpit inlet (duct) temperature	2 °C 35 °F	60 °C 140 °F
Cabin air temperature	15 °C 60 °F	27 °C 80 °F

The temperature control switches permit manual control by holding the switch in the COLD or HOT positions and then releasing it to OFF.

The valve position and resulting duct temperature are indicated.

The authority switch permits the transfer of the cabin temperature control from the cockpit to the cabin attendant's panel and vice versa.

ACTIVATION and SHUTDOWN

Under all normal operating conditions:

Air conditioning main switches	-	ON
Auto shutoff switch	-	AUTO SHUT OFF (guard closed)

An automatic shutoff system is installed, which will override the main switches as indicated in the table under bleed air supply.

The automatic shutoff system may be de-activated manually; thereafter the air conditioning main valves will be under the sole control of the main switches.

NOTE: One air conditioning system is capable to maintain full cabin pressurization at engine speeds above 75%.

AIR CONDITIONING DURING TAXIING AND WAITING

The APU may be started immediately after landing for improved airconditioning during ground operation. In tailwind conditions engine exhaust may be ingested by the APU and the engines.

6. Airfoil Anti-Icing



Line indicators
Shut Off/Module Valve Test switch

Overheat warning lights
Auto shut/stop switch

Main switches
Overheat warning lights
Line indicators

Temperature Indicators

LH / RH mode selector switch

GENERAL

The airfoil anti-icing system should be used when icing conditions are observed or thought to exist.

The system has been designed for continuous operation. However, by virtue of its capability to rapidly remove ice it can be used as a shedding system provided the following conditions are fulfilled:

- a. When ice accumulation becomes apparent on windshield wipers, windshield post or wings, the system should be activated before 0.5 inch has built up on the wing leading edges. When shedding a thicker layer there exists a remote chance of ingestion by the engines which is considered undesirable.
- b. Before approach and landing the wings and stabilizer must be cleaned.

ACTIVATION IN FLIGHT

- MAIN switches (wing, tail) - ON
- Anti-Icing (outlet) temp. Indicators - Check

- NOTE:
1. Activation at IOAT 15 deg C should be avoided since this may result in bleed air system auto shut-off.
 2. Normal outlet air temperature indications are:

Wing : 45 to 50 deg C (wings equal within 10 deg C)
Tail : 55 to 60 deg C
 3. For performance reason the system should normally not be used during take-off and initial climb up to an altitude of 1500 ft above field elevation.
However, if circumstances necessitate the use of airfoil anti-icing during take-off and initial climb, refer to section performance information.
 4. Ice accumulated on the leading edges will be shed within 20 seconds from system activation.

**CAUTION: Take-Off with the airfoil anti-icing system ON may cause a roll tendency during rotation and lift-off.
This phenomenon may occur when hot air leakage influences the airflow over the wing.**

ICE PROTECTION CAPABILITY AND ENGINE SPEED

Protection against **design maximum continuous** ice conditions is provided down to engine speeds for holding. During descent reduced anti-icing is available to a minimum of 75% HP rpm.

With only one engine operating icing conditions up to 80% of **design maximum continuous** can be coped with in climb and level flight.

SYSTEM TESTING

- APU or main engine running
- VALVE TEST switch - Select modulating valves and shut-off valves alternately
- Valve position indicators - Check

7. AC/DC Control



DC:

DC Amps Indicator, DC Volts Indicator

Normal DC selector switch operating:

OFF	-	Indicators not indicated
BATT 1	-	Indicators show Volts and Amps from Battery 1
TRU 1	-	Indicators show Volts and Amps from TRU 1 BUS
BUS 1	-	Indicators show Volts and Amps from BUS 1
ESS BUS	-	Indicators show Volts and Amps from ESSEN BUS
BUS 2	-	Indicators show Volts and Amps from BUS 2
TRU 2	-	Indicators show Volts and Amps from TRU 2 BUS
BATT 2	-	Indicators show Volts and Amps from Battery 2

AC:

AC Freq Indicator, AC Volts Indicator

Normal AC selector switch operating:

OFF	-	Indicators not indicated
GEN 3	-	Indicators show Volts and Freq from Generator 3
GEN 1	-	Indicators show Volts and Freq from Generator 1
BUS 1	-	Indicators show Volts and Freq from BUS 1
ESS BUS	-	Indicators show Volts and Freq from ESSEN BUS
BUS 2	-	Indicators show Volts and Freq from BUS 2
GEN 2	-	Indicators show Volts and Freq from Generator 2
EXT PWR	-	Indicators show Volts and Freq if External Power is connected

8. Passenger Address



No Smoking switch
Fasten Seat Belts switch

Stew Call - push black button if you want to call a Flight Attendant

9. Engine Anti-Icing



GROUND OPERATING OF ENGINE ANTI-ICING

Engine anti-icing should normally be used for ground running, taxiing and take-off:

- a. In icing conditions
 - b. If OAT is below +10 °C and visible moisture is present or runway are wet.
- Engine anti-icing switch - ON (check pressure indication)

CAUTION: IN FOG AND RAIN AT TEMPERATURES BELOW +1 °C THE ENGINE ANTI-ICING SYSTEM MAY NOT BE CAPABLE OF KEEPING THE ENGINES CLEAR OF ICE DURING PROLONGED TAXIING AND/OR LONG PERIODS OF IDLING. IN THESE CONDITIONS IT IS RECOMMENDED TO ACCELERATE THE ENGINES TO APPROXIMATELY 90% HP RPM FOR 3 TO 4 SECONDS AT INTERVALS OF NOT MORE THEN 8 MINUTES. BEFORE COMMENCING THE TAKE-OFF ROLL, SELECT TAKE-OFF POWER ON THE BRAKES TO CHECK SATISFACTORY ENGINE BEHAVIOUR.

FLIGHT OPERATION OF ENGINE ANTI-ICING

NORMAL OPERATION

- Engine anti-ice switches - AUTO

With the switches in the AUTO position, engine anti-icing is activated automatically by the ice detector, to obtain early activation.

If the switches are left in the AUTO position, the system will be switched off automatically 60 to 80 seconds after the ice detector light came on, provided no new signal has been received in the meantime.

The automatic activation shall be backed up by pilot's observation and action as follows:

When ice detector light come on or icing is observed:

- Engine anti-icing switches - ON
(check pressure indication)

When out of icing condition:

- Engine anti-icing switches - AUTO

The ice detector caution light will be operative irrespective of the position of the engine anti-icing switches.

The engine anti-icing should not be switched on at IOAT above +15 °C, other than for a functional check.

ENGINE RPM DURING ICING CONDITIONS

In icing condition normal icing speeds may be used during climb and cruise.

During descent engine speeds below 83% HP rpm for more than 10 minutes should be avoided.

During holding, a minimum engine speed of 83% HP rpm should be maintained.

PRE-FLIGHT CHECK ON ICE DETECTOR

- | | | |
|----------------------------|---|--|
| • Ice detector test button | - | Push |
| • Ice detector light | - | Check on (light remains on for about 60 seconds) |

TESTING THE ENGINE ANTI-ICING PRESSURE REGULATING VALVES

Functioning of the shutoff and pressure regulating valves can be checked as follows:

- Engine running
- Move valve test switch alternatively to position 1 and 2, and check pressures. A small pressure change is acceptable.
- At sea level and HP rpm above 85%, pressure should be 45 to 57 psi.

COMPREHENSIVE CHECK ON ICE DETECTION AND ANTI-ICING SYSTEM

- | | |
|----------------------------|--|
| • Both engines running | |
| • Engine anti-icing switch | - AUTO (both) |
| • Ice detector TEST button | - Push |
| • Ice detector light | - Check on (light remains on for about 60 seconds) |
| • Air pressure indicators | - Check indicating |

10. Emergency Control



Constant speed drive disconnect guards
Emergency switch
Emergency light

11. Pressurization



- | | | |
|---------------------------|---|---------------|
| Cabin Press Caution Light | - | Press to test |
| Dump switch | - | Guard closed |
| Ramair switch | - | Guard closed |
| Manual Control knob | - | Closed, wired |

AUTOMATIC OPERATION

At the full normal cabin pressure differential the following relationship between aircraft and cabin altitude exists:

Cabin pressure differential 6.6 psi		Cabin pressure differential 7.5 psi	
Aircraft altitude	Cabin altitude	Aircraft altitude	Cabin altitude
15,500 ft.	Sea level	20,000 ft.	1,000 ft.
20,000 ft.	2,700 ft.	25,000 ft.	3,600 ft.
25,000 ft.	5,400 ft.	30,000 ft.	5,900 ft.
30,000 ft.	8,000 ft.	35,000 ft.	8,000 ft.

The pressure controller facilities are as follows:

Cabin Altitude Indicator:

- | | | |
|--------------------------|---|---|
| • Rate of change knob | - | Desired rate of change |
| • Cabin altitude pointer | - | Desired cabin altitude |
| • Barometric correction | - | Barometric pressure for take-off and landing |
| • Window | - | Indicates max. flight altitude at which selected cabin altitude can be realized |

CAUTION: IF CABIN ALTITUDE IS NOT SET TO THE INDICATED MAX. FLIGHT ALTITUDE SHOWN IN THE WINDOW AND THE AIRCRAFT PASSING THIS ALTITUDE LEVEL, AN AUDIO WARNING IS HEARD AND WINDOW DISPLAYS PRESS IN AMBER COLOUR.

Setting for take-off

- For smoothest transition to pressure control after lift-off use either of the following settings as applicable.

Control regime	Barometric scale	Cabin Alt. pointer	Aircraft Altitude reading
Less than max. press. differential	QNH	1,000 ft above field elevation	not below cruise altitude
	1,013 mb	2,000 ft above field elevation	not below cruise FL.
At max. press. differential	1,013 mb	more than 3,000 ft above field elevation	Cruise FL to 1,000 ft above Cruise FL

Setting for landing:

- Cabin altitude - Field elevation
- Barometric correction - Barometric subscale QNH

WARNING: Landing with a significant differential pressure is not permitted. However, any residual differential pressure will be dumped automatically after touch-down.

12. Pitot Heating



NORMAL POSITION OF SWITCHES

- PITOT HEATING switches - ON

The lights are out when the pitot heating systems are on.

Although the heater elements are safeguarded against excessive temperatures, it is recommended to restrict the use of the heaters on the ground especially at higher ambient temperatures.

13. Windshield Heating



NORMAL OPERATION

If the indicated outside air temperature is +20 °C or below 5 to 10 minutes before take-off:

- WINDSHIELD HEATING switch - LOW

If icing is apparent:

- WINDSHIELD HEATING switch - HIGH

When ever circumstances permit, the heating switches should be left in LOW for a few minutes before switching to HIGH.

Pedestal panel



1. VHF NAV 1 panel
2. Avionics Master switch
3. VHF NAV 2 panel
4. Selcall panel
5. HF COM panel
6. Flight recorder
7. Stall/GPWS warning, Adi DH REF
8. Transponder
9. ADF selector
10. Mic select panel
11. Autopilot
12. Hydraulic system Flight Control/Utility
13. Trim panel
14. Move mouse into this area to close the Pedestal Panel

1. **VHF NAV 1 panel**



NAV 1 and NAV 1 STBY displays

NAV switches - NAV 1 STBY setting

NAV select switch - change between NAV 1 and NAV 1 STBY.

VOR / ILS test:

If necessary the VHF-NAV / DME systems can be tested as follows:

First check for all following tests, that no ILS frequency is selected.

To test the VHF system:

- Set course at 180 deg
- Select VOR on RMI
- Push VOR test button
- RMI needle will move to 180 deg
- Course deviation needle will move to zero
- To - From pointer shows TO
- Nav flag will disappear until test is complete

To test ILS: (no ILS frequency select)

- Select ILS test switch UP
- GS and NAV flag will show
- GS will show UP and deviation bar LEFT

- Select ILS test switch DOWN
- GS and NAV flag will show
- GS will show DOWN and deviation bar RIGHT

GS and NAV flag will disappear until test is complete

To test DME1:

- Push DME test on VHF-NAV 1
- RMI read out will be "0000"

2. **Avionics Master switch**



3. **VHF NAV 2 panel**



NAV 2 and NAV 2 STBY displays

NAV switches - NAV 2 STBY setting

NAV select switch - change between NAV 2 and NAV 2 STBY.

VOR / ILS test:

If necessary the VHF-NAV / DME systems can be tested as follows:

First check for all following tests, that no ILS frequency is selected.

To test the VHF system:

See VHF NAV 1 panel

To test ILS: (no ILS frequency select)

See VHF NAV 1 panel

To test DME 2:

Push DME test on VHF-NAV 2

RMI read out will be "0000"

4. Selcall panel



Flight Attend, First Officer and Ground Crew Calls

Manual setting is available whenever you wish for:

CAB CREW	-	ON (Welcome announcement is heard)
TAXI	-	ON (Taxiing announcement is heard)
TAKE OFF	-	ON (Take off announcement is heard)
CLIMB	-	ON (Climb announcement is heard)
DESCENT	-	ON (Descent announcement is heard)
FINAL APR	-	ON (Final announcement is heard)
ROLL OUT	-	ON (Roll out announcement is heard)

GRN CALL	-	ON (Ground Crew is heard)
----------	---	---------------------------

If you wish First Officer's call outs during flight:

CO PILOT	-	ON
----------	---	----

If you wish automatically Flight Attend call outs during flight:

AUTO	-	ON
------	---	----

5. **HF COM panel**



COMM 1 and COMM 1 STBY displays

COMM switches - COMM 1 STBY setting

COMM select switch - change between COMM 1 and COMM 1 STBY.

6. **Flight recorder**



Set Flight Number and Leg with left mouse click and right mouse click.

Toggle between DATE/YEAR and FLIGHT HOURS by pushing the black button.

RCDR button - ON

7. Stall/GPWS warning, Adi DH REF



GPWS / STALL warning system

TEST

Push TEST button
Check FAIL lights ON

To test STALL:

Push STALL button (right mouse click)
Check STALL FAIL light OUT
Check STALL normal operating light ON
Check STALL warning light (Main Panel) ON
Check audio STALL warning is heard
Fail light will appear again until test is complete

To test GPWS:

Push GPWS button (right mouse click)
Check GPWS FAIL light OUT
Check GPWS normal operating light ON
Check PULL-UP warning light (Main Panel) ON
Check the words "Pull-Up" and "Glide Slope" are heard
Fail light will appear again until test is complete

Push TEST button

Activate warning system:

TEST button	-	OFF
STALL button	-	ON
GPWS button	-	ON

ADI DH REF system

If required set decision height, if aircraft passing decision height the alert light comes ON.

8. Transponder



Transponder Main switch positions:

OFF	-	Transponder not indicated
STBY	-	manual input available
AUTO	-	FS set Transponder code automatically
TA ONLY	-	no function

If ATC ident is required push IDNT button.

IDNT button light comes ON
ATC is shown in the display

9. ADF selector



Set ADF frequency if required.

10. Mic select panel



Audio morse id:

VHF 1	-	COMM 1
VHF 2	-	COMM 1 Stby (COMM 2)
VHF 3	-	both COMM
NAV 1	-	NAV 1
NAV 2	-	NAV 2
ADF 1	-	ADF 1

11. Autopilot



This is the autopilot like in a real Fokker F-28. For better handling you find the Autopilot Master switch also on the Main Panels.

Autopilot settings (see Autopilot and warnings)

Yaw damping must be selected on this panel.

If ROLL switch (red) is set IN,
Roll light on the Autopilot select panel comes ON.

If PITCH switch (blue) is set IN,
Pitch light on the Autopilot select panel comes ON.

DOOR switch - to open/close the doors

NOTE: Do not forget to lock the DOOR switch before taxiing.

12. Hydraulic system Flight Control/Utility



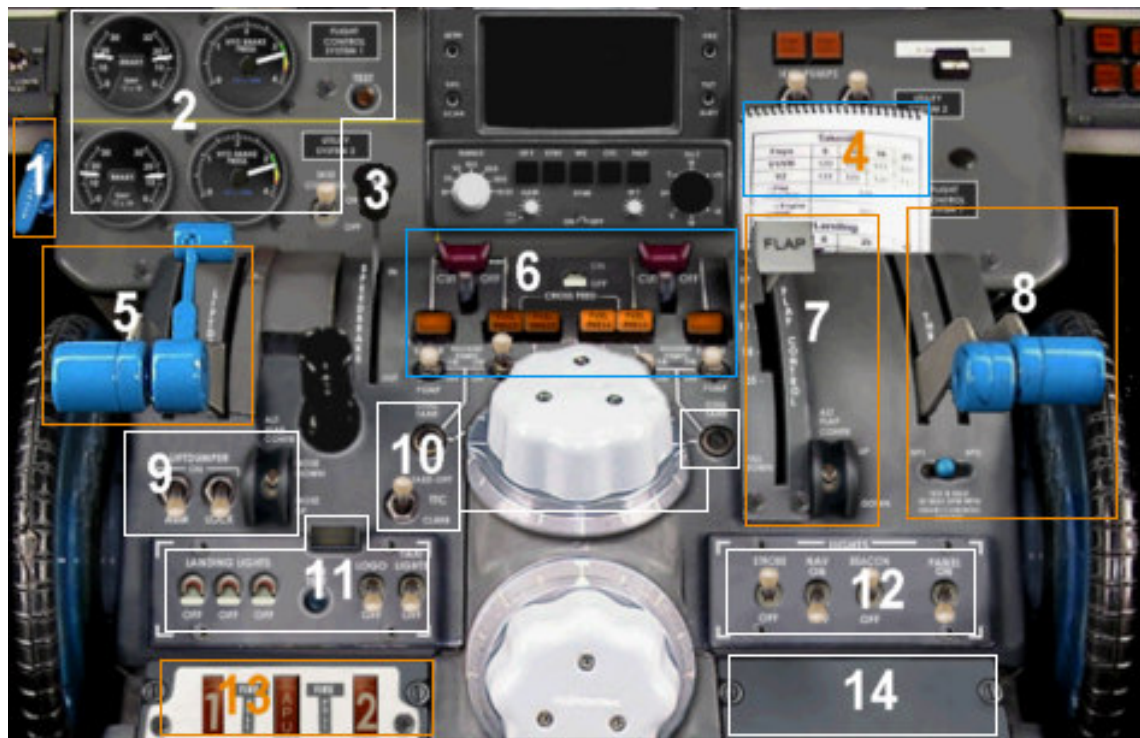
During all phases of flight the pump-off loader switches should be in the ON position.
(see Hydraulic Pressure Indicators)

13. Trim panel



Pitch and Rudder Trim Indicator.
Normally the indicators are set to zero.

Throttle Panel



1. Parking Brake
2. Speed Pressure Indicators
3. Speedbrake lever
4. Move mouse into this area to open the FS Kneeboard
5. Throttle lever Captain's side (Engine 1)
6. Fuel system switches
7. Flap lever
8. Throttle lever First Officer's side (Engine 2)
9. Liftdumper
10. TTC switch and Coll Tank lights
11. Light switches
12. Light switches
13. Fire handle switches
14. Move mouse into this area to close the Throttle Panel

1. Parking Brake



Parking Brake lever

GENERAL

To set parking brake, depress brake pedals and pull parking brake handle.

To release parking brake, depress both brake pedals.

If the parking brake is on, the skid control system is deenergized and cannot be tested.

ALTERNATE BRAKE OPERATION

If normal brake pressure is not available, (less than 1600 psi) differential braking remains possible by means of the alternate brake handles, in Flight Simulator use ”.” or “CTRL” + ”.”.

If brake temperature are above 225°C it is not recommended to set the parking brake.

2. Speed Pressure Indicators



SKID CONTROL SYSTEM SWITCH

The skid control system switch should be in the ON position during all phases of flight.

If the switch is in the ON position and the ground speed is above 19 Knots the skid control system is inoperative.

Brake accumulator pressure is displayed on a brake pressure indicator.

SKID CONTROL SYSTEM WARNING CIRCUIT

During the braked run the warning light will not come on if a fault occurs. Therefore the system should be tested prior to take-off and landing.

TESTING THE SKID CONTROL SYSTEM

Operation of the skid control locked wheel prevention circuit can be tested with the gear down in flight or below 19 knots taxi speed on the ground.

Parking Brake	-	OFF
Skid Control switch	-	ON
Test	-	right mouse click

Check that warning light comes ON.

A drop in brake temperature may be observed during this test.

BRAKE TEMPERATURE INDICATOR

Indicators showing the temperature of each of the four brake units are mounted on the left hand-side throttle panel. The pilot should use the indications to adapt his taxi technique and the use of the brakes to avoid high temperatures and associated extra brake wear.

The temperature indication of the indicator should be interpreted as follows:

- If the pointer of the indicators is in the GREEN arc and not rising rapidly, no restrictions to brake operation will be applicable.
- If the pointer is in the YELLOW region and stationary or falling, TAXIING is allowed provided limited braking action is applied, so as not to exceed the 300°C limit beyond which the possibility of blown fuse plugs (and thus flat tires) exists.
- If pointer is on or over the 300°C limit, TAXIING for take-off and TAKE-OFF is not allowed.

NOTE:

1. The indicators inform the pilot within approx. 3 minutes after the end of the landing run whether high brake temperatures are being experienced.
2. The indicators inform the pilot about the performance of the anti-skid system.
If one brake is exceptionally cold, compared to the other brakes, after landing, then the appropriate part of the anti-skid system is suspect (e.g. wheel driven unit inoperative).

If an aborted TAKE-OFF is experienced, brake temperatures are in general beyond 300°C, because hard braking will have been applied.

3. Speedbrake lever



The speedbrake can be selected by means of the speedbrake handle on the pedestal. The position is displayed on the speedbrake indicator, a blue light indicates speedbrake not full IN.

Speedbrakes may be used in the whole speedrange up to V_D/M_D .

Trim change is very small nose up and only noticeable at high speed. Any intermediate position can be selected.

However, above 180-200 knots IAS a blow back feature will automatically limit extension, to provide a constant deceleration of 0.1 g.

The speedbrakes will extend further to the selected position during subsequent deceleration.

Full deflection can be obtained below 180-200 knots IAS.

If the speedbrake is selected OUT at high aircraft speed and the selector handle is left in the OUT position, the speedbrake will gradually extend towards the full OUT position with decreasing aircraft speed.

AUTOMATIC RETRACTION

If either throttle lever is moved beyond the detent position, the speedbrake will be retracted automatically, and the handle will be revert to the IN position.

CHECKING the SPEEDBRAKE SYSTEM

With electrical and hydraulic power available, the system can be checked as follows:

SPEEDBRAKE lever -	IN	- Blue light OUT
SPEEDBRAKE lever -	Select OUT	- Blue light ON
THROTTLE lever -	Open to MAX.	- Speedbrake lever returns to IN blue light OUT indicator display IN

NOTE: SPEEDBRAKE will automatically retract with one engine running at more than 96% HP rpm.

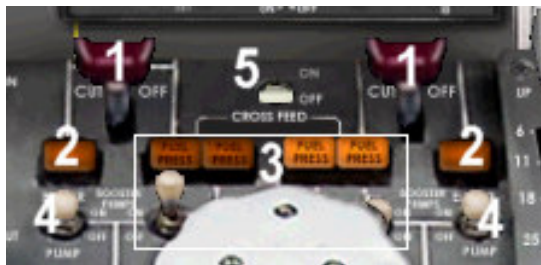
4. **Move mouse into this area to open the FS Kneeboard**

5. **Throttle lever Captain's side (Engine 1)**



The Fokker F-28 has two throttle levers, one for the captain and one for the first officer. This is a peculiarity of this aircraft, because both pilots handle the thrust.

6. **Fuel system switches**



1. Fuel cutoff switches
2. Fuel cutoff warning lights
3. Booster pump switches and warning lights
4. Electrical pump switches
5. Cross feed switch

NORMAL OPERATING

BEFORE ENGINE START

- BOOSTER PUMP switches - ON (lights out)

AFTER ENGINE START

- Amber FUEL PRESSURE light - OUT

TAKE-OFF

- BOOSTER PUMP switches - ON (lights out)
- Collector tank magnetic indicator - Display black

NOTE : As an engine-driven backing pump is provided, failing booster pumps during take-off will not require immediate action.

CRUISE

- BOOSTER PUMP switches - ON (lights out)

CROSSFEED OPERATION

- Crossfeed switch - ON
- BOOSTER PUMP switch of tank **in** use - ON (lights OUT)
- BOOSTER PUMP switch of tank **not** in use - OFF (lights ON)

NOTE: A single pump is capable to supply one engine with max. Flow or both engines with climb and cruise flow at normal pressure.

7. **Flap lever and alternate Flap control**



8. **Throttle lever First Officer's side (Engine 2)**



9. Liftdumper



ARMING BEFORE TAKE-OFF and LANDING

The liftdumpers extend automatically after touch-down or in an aborted take-off. Therefore, before the take-off run and before landing, the system must be armed as follows:

Before Take-off after lining up:

Throttle lever minimum 10%
Arm Switch - ON (indicator shows RDY)

Before landing:

Arm Switch - ON (indicator shows RDY)

NOTE: After take-off and during go-around or wave off with either throttle at full power, the system will disarm automatically and the magnetic indicator will display IN.

AFTER LANDING

After touch-down the liftdumpers will extended automatically if

- The system has been armed
- Both throttles are closed
- The spin-up signal from either both left-hand main wheels or both right-hand main wheels is received

Automatic activation should be backed-up by selection of the manual liftdumper handle.

The magnetic indicator will display OUT.

WARNING: DO NOT SELECT MANUAL LIFTDUMPERS BEFORE POSITIVE TOUCH-DOWN WITH BOTH MAIN GEARS HAS BEEN MADE.

NOTE: The RH throttle cannot be opened unless the manual lift-dumper handle is selected back to the normal position. When the throttles are opened the lift-dumpers will automatically be retracted, leaving the indicator displaying RDY.
Disarming is accomplished by pulling the arming switch.

ACCELERATE – STOP

During an accelerate-stop manoeuvre, the lift-dumpers will extend automatically, provided:

- The system has been armed
- Wheel rotation is above the equivalent of 50 knots aircraft speed
- Both throttles are closed

Automatic activation should always be backed-up by selection of the manual lift-dumper handle.

The magnetic indicator will display OUT.

10. TTC switch and Coll Tank lights



11. Light switches



The parking brake light comes ON if the parking brake is set.

To test the fire system - Press Fire Test button

Light switches from left to right:

Landing Light switches
Logo Light switch
Taxi Light switch

12. **Light switches**



Light switches from left to right:

Strobe Light switch
NAV Light switch
Beacon Light switch
Panel Light switch

13. **Fire handle switches**



to arm/open use right mouse button
to close use left mouse button

Utility panel



see First Officer's Panel

Pushback panel



1. Pushback panel
2. Alternate Engine Start panel

1. Pushback panel



NOTE: You can select between manual or automatically pushback

Parking Brake - Released

Manual Pushing Back:

Mode select switch - set MAN

for Left Push:

- use Left push switch
- click on the lower area of the button to start
- click once again to stop pushing

for Back Push:

- use Back push switch
- click on the lower area of the button to start
- click once again to stop pushing

for Right Push:

- use Right push switch
- click on the lower area of the button to start
- click once again to stop pushing

Automatically Pushing Back:

NOTE: Only available if the engines NOT running

Mode select switch - set AUTO

for Left Push:

use Left push switch

Set pushback HDG - by taking over the white input data

Set pushback DISTANCE (meters)

Set pushback LEFT deg

click on the upper area of the button to start

if

OK button lights ON - Push to confirm

for Back Push:

use Back push switch

Set pushback HDG - by taking over the white input data

Set pushback DISTANCE (meters)

Set pushback LEFT deg

click on the upper area of the button to start

if

OK button lights ON - Push to confirm

for Right Push:

use Right push switch

Set pushback HDG - by taking over the white input data

Set pushback DISTANCE (meters)

Set pushback RIGHT deg

click on the upper area of the button to start

if

OK button lights ON - Push to confirm

NOTE: If pushing back is active you get the permission for starting engines. The indicator shows "Engine start allowed" and the "OK" button lights ON. Push the OK button to confirm and begin with the engine starting procedures.

2. Alternate Engine Start panel

This panel allows you an easier handle of engine start by using pushback.



Powered Flight Controls

NORMAL OPERATION

During normal operation all switches on the flight control panel should be in the on position.

Before Starting Engines

- Flight Control Switches - ON

After Starting Engines

- Pumps - Check pressurized (lights OUT)
- Amber FLIGHT CONTROL Master Light - OUT

If Light ON

- Flight control panel - Check lights and push RESET button if necessary

When All Lights Are OUT

- Gust lock - Select OFF
- Controls - Check full and free movement (lights remain OUT)
- Stabilizer - Set as required
- AILERON TRIM - Neutral
- RUDDER TRIM - Neutral

- NOTE:
1. On the ground with the gustlock ON a jar against the control column may induce an oscillation in the elevator control system which is then sustained by the elevator hydraulic booster.
The same may occur when the control column is excited during at very high IAS in a control column free condition with autopilot OFF.
The oscillation can be stopped immediately by holding the control wheel momentarily.
 2. Do not turn stabilizer trim wheels without hydraulic power on the stabilizer system except when during flight return from manual to power is required.

COMPLETE CHECK OF THE FLIGHT CONTROLS

If for any reason a comprehensive check on the flight controls is required proceed as follows:

NOTE: Face the aircraft into the wind, when high wind or gusty conditions exist.

After Starting Engines:

- | | | |
|--|---|----------------------|
| • All flight control switches | - | Check ON |
| • Flight control switches
FLIGHT CONTROL system (4) | - | OFF (4 lights ON) |
| • Flight control switches
UTILITY system (4) | - | OFF (4 lights ON) |
| • Flight control switches
UTILITY system (4) | - | OFF (4 lights ON) |
| • Flight control switches
UTILITY system (4) | - | ON (4 lights OUT) |
| • RESET button | - | Press (if necessary) |
| • Flight control switches
FLIGHT CONTROL system (4) | - | ON (4 lights OUT) |

- RESET button - Press (4 lights OUT)
- Amber FLIGHT CONTROL master light - Check OUT
- Gust lock - Select OFF
- Controls - Check free movement (caution lights out)
- Trim controls - Check free movement and proper functioning
- Pump switches (4) - OFF LOAD
- (8 Flight control caution lights and the master caution light on)
- Controls - Check free movement in manual mode
- AILERON TRIM controls - Check free movement in manual mode
- ALTERN STAB CONTR switch - Trim both ways and check movement of stabilizer via the electrical position indicator
- Controls - Check for full and free movement in
- Pump switches UTILITY system (2) - OFF
- Pump switches FLIGHT CONTROL system (2) - NORMAL (All flight control system lights OUT, flight control master caution light ON, push reset button if necessary)
- Controls - Check for full and free movement in
- Pump switches UTILITY system (2) - NORMAL (All lights OUT, if flight control master caution light on, push reset button)

- | | |
|----------------|-----------|
| • Stabilizer | - SET |
| • AILERON TRIM | - Neutral |
| • RUDDER TRIM | - Neutral |