Systems

ATR Training & Flight Operations Services

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An Alenia Aeronautica and EADS joint venture

Edition 2010

scan your aircraft

42-500 72-212A

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Introduction

This Systems guide is an essential tool for all ATR flight crew and engineer to learn or review **ATR systems** operation. To make learning process easier, systems are introduced in a user-friendly and efficient training method, including diagram and schematic display as appropriate.

This guide is a comprehensive document that efficiently complements FCOM 1st part – *Systems description*. Systems are organized as per FCOM chapter, including their ATA classification along with cockpit location. Cockpit panels familiarisation is presented with each relevant system description in a separate annex.

This new guide release is intended for training on ATR 42-500 and 72-212A. It presents a generic aircraft not customized to your own aircraft systems. Should you find any discrepancy between Systems guide and your customized ATR operational documentation (AFM, FCOM & QRH), the latter takes precedence.

NB: This Systems guide is also available for ATR 42-300 and 72-200 not PEC. This document will also be developed for the ATR-600.

The Training and Flight Operations support team.

Contents

Chapter G. Electrical Systems

Chapter H. Emergency equipment

Chapter I. Fire protection

Contents

Chapter J. Flight control

Chapter K. Flight instruments

Chapter L. Fuel system

Chapter M. Hydraulic

Chapter N. Ice and rain protection

Chapter O. Landing gear

Chapter P. Navigation system

Chapter Q. Power plant

Annexes

A. Aircraft general

FCOM 1.00

1. Doors location

ATA 52

Cargo door

Emergency exit type III

Service door / emergency exit type I

Pilot emergency hatch

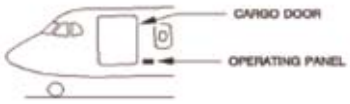
Pilot communication hatch

Rear entry door / emergency exit type I

Aft avionics compartment door

Forward avionics access hatch

2. Cargo door panel



ATA 52

ARMED light
– Selector armed green light is ON, when actuator selection switch working conditions are met:
– cover panel opened
– door unlocked by operating handle: all hooks are disengaged and FWD latchlock is unfastened

LCHD light
blue light is ON when all door hooks and latch locks are fully engaged

GND HDL light
Ground handling bus ON BAT red light is On when ground handling bus is directly supplied by HOT main bat bus: means that the battery is discharging even if the BAT toggle switch is in OFF position (visible even when the cover panel is closed)
This red light is ON when:
– The refueling panel is open
– The cargo door control panel is open
– The passenger door is open
and alert, that the battery is discharging before leaving the aircraft

Actuator selection switch
is used to operate the door (**OPEN** or **CLOSE**) when the CARGO DOOR ARMED green light is on

Panel cover switch
connects the ground handling bus on line when the panel cover is opened and allows operation of cargo door. During the opening, a self test of the MFC 1A and 2A is performed to initiate the control system of the cargo door.

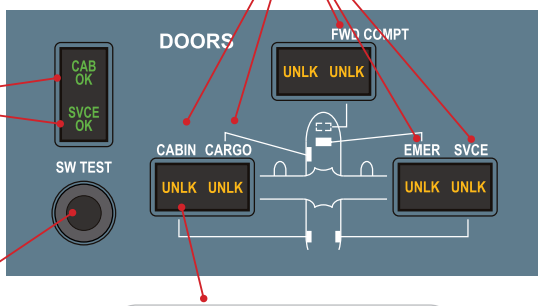
CARGO LIGHT switch
allows activation of the cargo bay light from outside

3. Doors panel

ATA 33

DOORS lights
CABIN and **CARGO** aural alarms are inhibited when the Condition Lever 1 is on FTR or FUEL SO
SVCE and **FWD COMPT** aural alarms are inhibited when the Condition Lever 2 is on FTR or FUEL SO

CAB OK and **SVCE OK**
Light on when SW TEST depressed and check microswitches operation

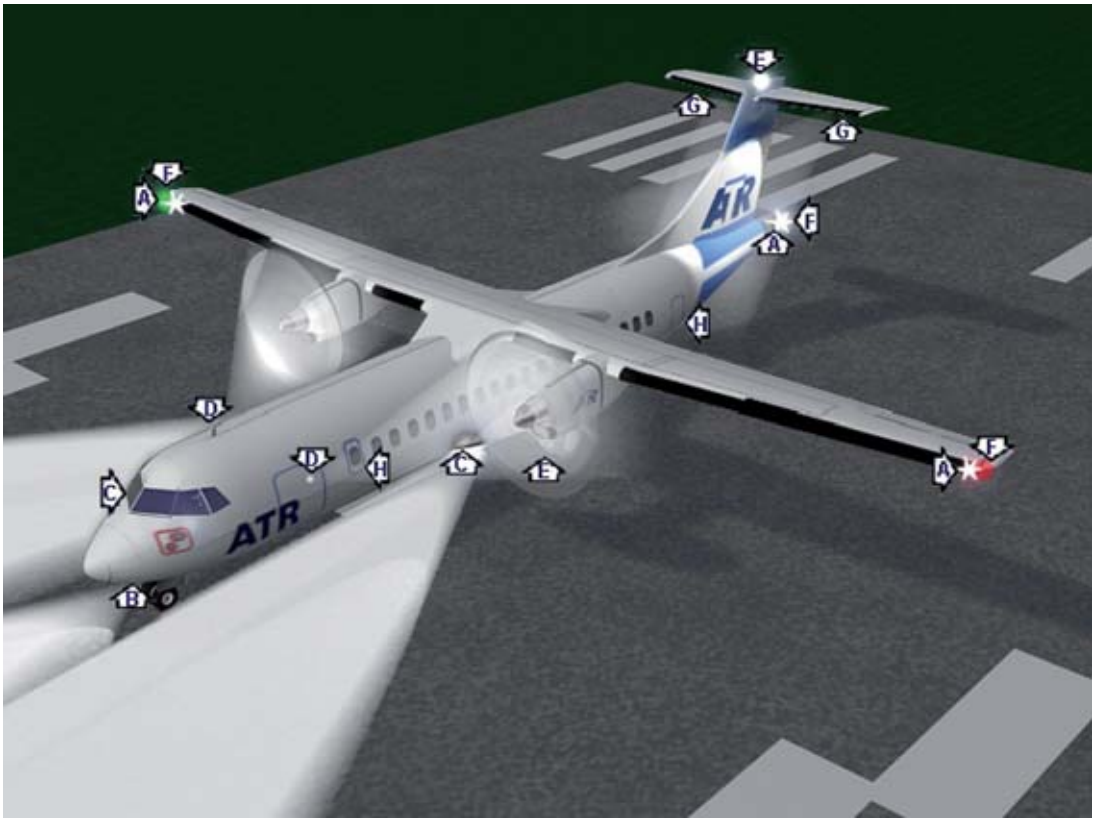


SW TEST
Tests continuity of microswitch system (on ground, doors opened)

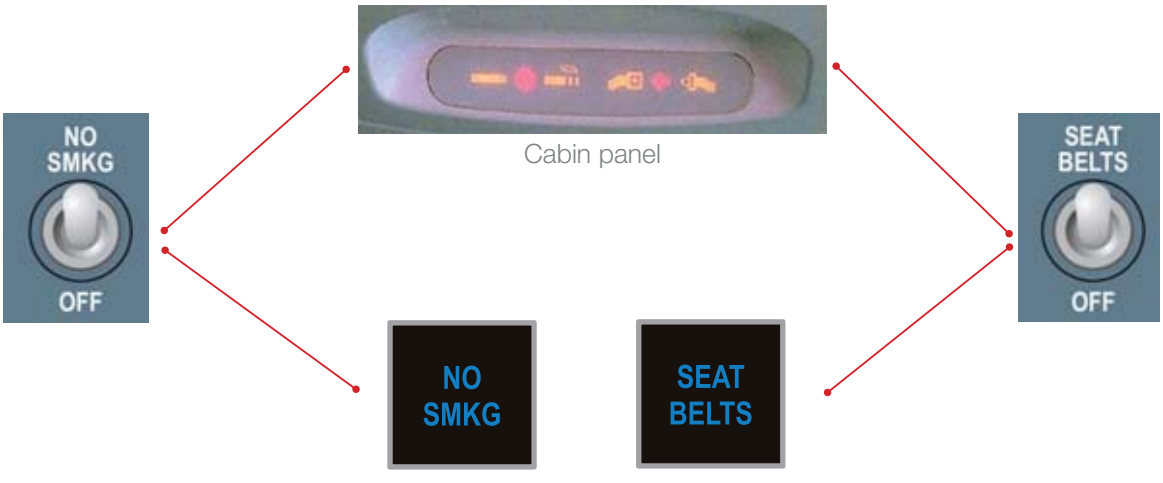
UNLK
At least 1 micro switch is opened

4. External lights

ATA 33



A - Navigation lights
B - Taxi and T/O lights
C - Landing lights
D - Wing lights
E - Beacon lights
F - Strobe lights
G - Logo lights
H - Emergency light



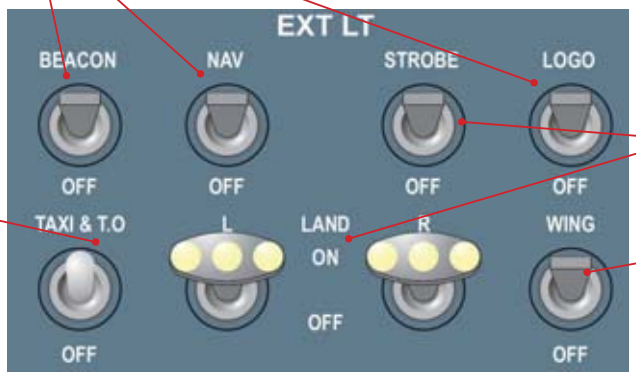
Cabin panel

Memo panel

5. EXT LT panel

ATA 33

BEACON and **NAV**
supplied by SVCE BUS and BUS 1
LOGO
supplied by SVCE BUS



STROBE, **LAND**
supplied by ACW BUS 1 (Left Hand), ACW BUS 2 (Right Hand)

TAXI & T.O
Supplied by ACW BUS 2

WING
Supplied by DC BUS 2

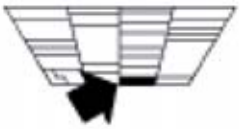
6. MEMO panel

ATA 33

NO SMKG
illuminates blue when associated switch is selected ON

SEAT BELTS
illuminates blue when associated switch is selected ON

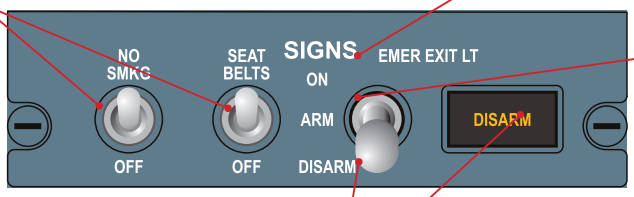
7. Signs panel



ATA 33

ON
emergency exit lights illuminates. Supply: DC STBY or 6 V BAT packs

NO SMKG and **SEAT BELTS**
Blues Lts on MEMO panel when ON. (DC BUS 2)

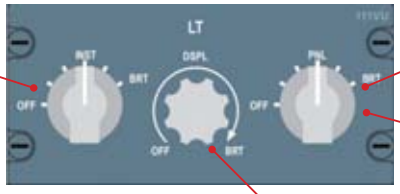


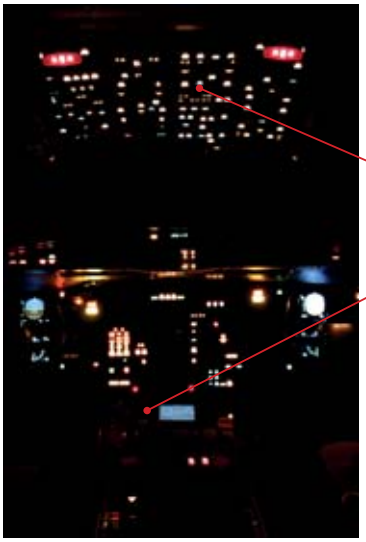
ARM
Emergency lights illuminate when <18 V on STBY bus or if both DC GEN off line. Emergency lights extinguish when >20V on STBY bus and at least 1 GEN operating

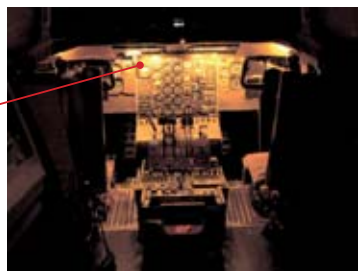
DISARM
system deactivated

8. Internal lighting

ATA 33





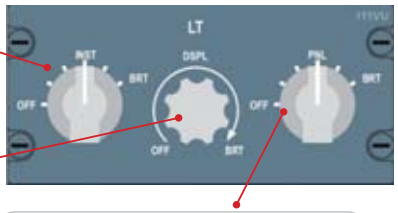


9. LT panel

ATA 33

INST
Selects activation and intensity of main panel instrument integral lighting

DSPL knob
selects activation and intensity of all digit lighting



PNL rotary selector
selects activation and intensity of glareshield, pedestal and overhead panels instrument integral lighting

FLOOD knob
selects activation and intensity of pedestal panel flood lighting. (**OFF** TO **BRT**)

10. ANN LT panel

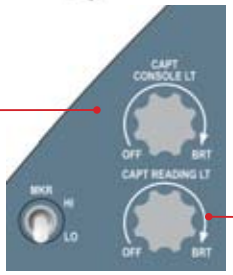
ATA 33

To check and control the intensity of:
– the annunciator lights on the overhead and pedestal panels
– the overhead panel flow bars
TEST: All the associated lights come on bright
BRT: associated light illuminate bright
DIM: associated light are dimmed

11. Side panel

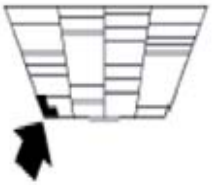
ATA 33

CAPT CONSOLE LT knob
selects activation and intensity of the respective lateral console



CAPT READING LT knob
selects activation and intensity of the respective spot light

12. FLT COMPT LT panel



ATA 33

DOME switch
BRT: dome lights are supplied with maximum intensity
DIM: dome lights are dimmed
OFF: both dome are off
DOME light: the F/O dome light becomes BRT when the switch in BRT or DIM if:
– dual DC GEN loss
– or on ground, with BAT supply only

STORM switch
On position, flood lights are ON with maximum intensity and fluorescent tubes are ON

STBY COMPASS switch
to illuminate the STBY COMPASS **ON** and **OFF** position

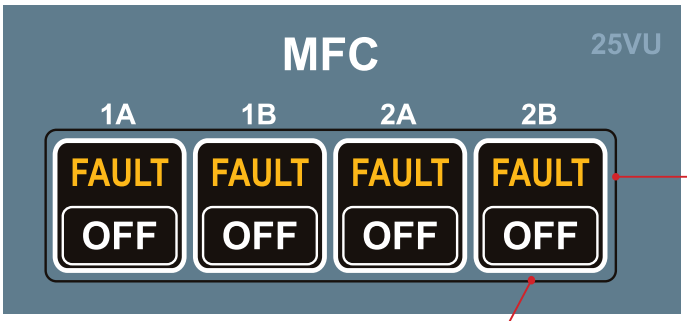
B. Multi Function Computer

FCOM 1.01

B. Multi Function Computer

Numerous logic funtions are performed by two independant computers (MFC1 and MFC2).
Each computer includes two independant modules (A and B)

The purpose of these computers is to:
– monitor, control, authorise operation of the aircraft systems
– manage system failures and flight enveloppe anomalies and command triggering of associated warning



FAULT
illuminates and the CCAS is activated when a malfunction or electrical supply fault is detected. The module automatically becomes inoperative.
This light also flashes during self-test of the module.
During powering, since all 4 modules are selected ON, the following sequence is executed:
MFC 1A and MFC 2A FAULT lights flashing (self-test of these modules)
MFC 1A and MFC 2A FAULT lights extinguish.
MFC 1B and MFC 2B FAULT lights flashing (self-test of these modules)
MFC 1B and MFC 2B FAULT lights extinguish

NOTE: Here, if the cargo door control panel is opened, the self test of MFC 1A and 2A are already done, and only the MFC 1B and 2B are tested.(See chapter A.2)

OFF
The module stops operating

The MFC functions can be treated: – in one module only
– in several modules (redundancy)
– partially in 2 modules

Example:

SYSTEM	FUNCTION	MODULE			
		1A	1B	2A	2B
FLIGHT CONTROLS	STICK PUSHER	◖	◖	◗	◗
	STALL WARNING		●		●

– The stick pusher function is integrated in modules 1A, 1B, 2A and 2B.

– The stall warning function is integrated in modules 1B and 2B.

– The stick pusher function is available if modules (1A AND 2A) OR (1A AND 2B) OR (1B AND 2A) OR (1B AND 2B) operate. This function is therefore not available if modules (1A AND 1B) OR (2A AND 2B) are lost.

– The stall warning is available if modules 1B OR 2B operate.
This function is therefore not available if modules 1B AND 2B are lost.

C. Centralized crew alerting system

FCOM 1.02

1. Cockpit philosophy

ATA 31

In normal operation, all the lights are extinguished (Dark cockpit philosophy). With few exceptions, the lights illuminate to indicate a failure or an abnormal condition.

Normal operation

Warning indication

Caution indication

Other than normal basic operation

Temporarily required system in normal operation

Back up or alternate system selected

2. CCAS description

ATA 31

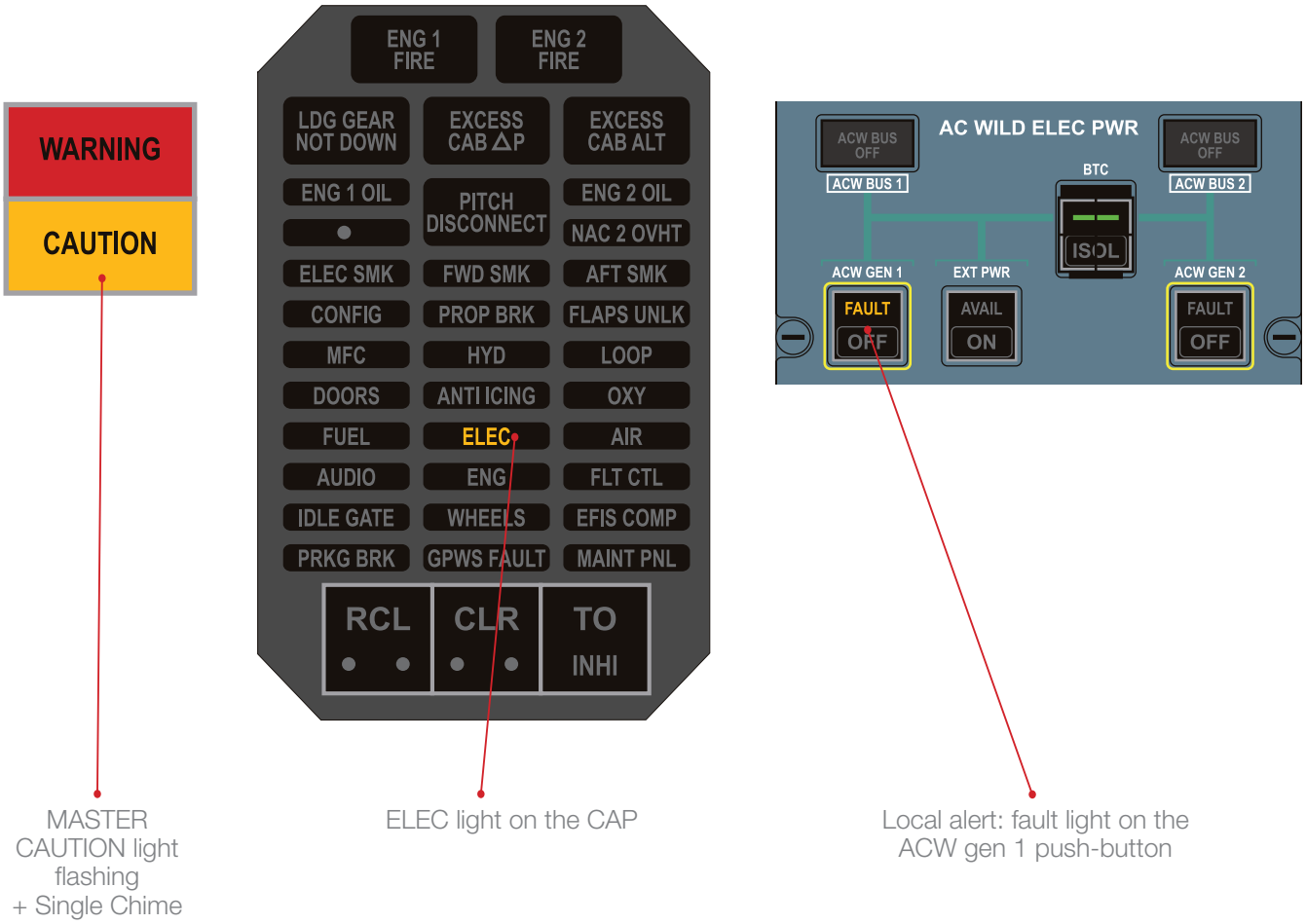
The CCAS draws crew's attention when a failure is detected and guides the crew to the system affected by the failure

Three types of visual devices are used: – MASTER WARNING and MASTER CAUTION lights
– CREW ALERTING PANEL (CAP) lights
– LOCAL ALERT lights

Detection sequence

INFORMATION IDENTIFICATION ISOLATION

Example: ACW Generator 1 failure



MASTER CAUTION light flashing + Single Chime

ELEC light on the CAP

Local alert: fault light on the ACW gen 1 push-button

C. Centralized crew alerting system

3. Crew alerting panel

ATA 31

FWD SMK
Forward cargo smoke

CONFIG
T/O config test or PL's at T/O with:
– PWR MGT not at T/O
– flaps not at 15 °
– trim out of green sector
– TLU LO SPEED green light not illuminated
– AIL LOCK light illuminated
– Parking brake handle not fully released (PLs only)

HYD
Either tank < 2.5 l
Either pump drain > 121°
Either pump < 1500 PSI and good conditions to run

DOORS
Any door not seen locked

AUDIO
RCAU failure or power loss

IDLE GATE
Automatic idle gate system failure

PRKG BRK
Parking brake not fully released

LDG GEAR NOT DOWN
Any gear not seen down and locked and:
1. flaps 25° or flaps 30°, ZRA < 500 ft and PL at low power
2. at least one PL at FI and ZRA < 500 ft (inhibited until 2.5 min after gear up)

PITCH DISCONNECT
Elevator uncoupling

PROP BRK
Prop brake not locked in full locked or in full released position

FLAPS UNLOCK
spurious Flaps retraction more than 3° (42-500), 4° (72-212A) when flaps extended

LOOP
engine fire loop fault

ANTI ICING
Loss of heating: windshield, horns, prop, static probes (on GND only), Pitot probes, Alpha probes and TAT probes (In flight only)
Common air mainfold < 14 PSI, distribution valves fault, ice detector fault, inflation sequence not correct, air temp > 230°, Mode sel auto fault, APM fault

WHEELS
Anti-skid failure or brake temp
> 160° (42-500)
> 150° (72-212A)

GPWS FAULT
GPWS computer fault or power loss

RCL
When pressed: all inhibited or cancelled caution lights will illuminate (recall) if the respective system is still degraded or manual cancellation of T/O INHI

CLR
When pressed, all amber lights are cleared, except PRK BRK, GPWS and MAINT PNL

T.O. INHI
When pressed: eng oil, smoke lights, all caution lights are inhibited (except PRKG BRK, GPWS FAULT, MAINT PNL, EFIS COMP, FLT CTL and ENG.

ENG 1 / 2 FIRE
Engine fire

ENG 1 OIL
Oil press < 40 Psi (inhibited 30 sec during engine start)

ELEC SMOKE
Avionics smoke

MFC
Any MFC module faulty or electrical supply loss

ELEC
Any DC or AC power failure

FUEL
Engine feed low press <4 psi or tank low levels

ENG
– PWR (MGT) not at T/O during T/O or config test
– ITT more than 800°C (715° in hotel mode)
– EEC / PEC failure
– Gust lock not engaged, propeller brake ON and ENG start selector on start (engine 2 only)
– Incorrect ADC switching
– Start light ON past 45% NH, Low pitch in flight, HP pump fuel filter pressure > 25 Psi
– GCU failure during start

EXCESS CAB ALT
Cabin altitude > 10000 ft

EXCESS CAB ΔP
Cabin press diff > 6.35 Psi

MAINT PNL
Maint panel rotary sel on either panel not in normal position

ENG 2 OIL
Oil pressure < 40 PSI (inhibited 30 sec during engine start)

NAC OVHT
RH NAC OVHT >170°C

AFT SMK
After cargo or lavatory smoke

OXY
Low press system < 50 PSI

AIR
– Bleed valve disagreement with selected position
– Bleed DUCT temp > 274°c
– Leak detected with a loop temp > 153 ± 8°C
– Pack valve disagreement
– Overheat downstream of compressor with temp > 204°C
– Overpressure > 80 PSI
– Overtemperature in air conditioning DUCT with temp > 92°C
– Fan (extract or recirculating) failure
– OVBD valve position disagreement
– X VALVE disagreement
– AUTO press FAULT
– Both OUTFLOW valves in DITCH position
– AFT COMPT/LAV fan failure

FLT CTL
– During T/O or T/O config test pitch trim out of green sector or flaps not at 15°, AIL LOCK actuators not fully retracted, disagreement between Ail lock acts and Gust lock lever
– Flaps asymmetry > 6.7°
– TLU fault
– Stick pusher or stick shaker fault or pitch trim asym
– AIL LOCK

EFIS COMP
AHRS or LOC/GS disagreement

4. EMER audio cancel & TO config test

ATA 31

EMER AUDIO CANCEL
Guarded switch, cancel the aural specific of an undue continuous aural except for landing gear, VMO, VFE, VLE, stall warning, pitch trim whooler, landing gear, AP disconnection

TO CONFIG TEST
– To check T/O configuration (PWR MGT in T/O+ TLU LO SPD illuminated + pitch trim in green sector+flaps 15° + ail lock light extinguished) by simulating power levers at T/O position, except PARK BRAKE
– To perform an automatic RECALL

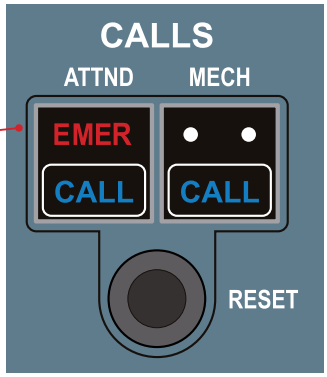
C. Centralized crew alerting system

5. Aural alarms

ATA 31

CLACKER
V_{MO}
V_{LO} - 5 kt
V_{FE} - 5 kt

DOOR BELL
Hostess or
ground calls



WHOOLER
Pitch trim in motion
(more than 1s)

CAVALRY CHARGE
AP Disconnects

C CHORD
Altitude alerts

CRICKET
Stall warning associated
STICK SHAKER/PUSHER
AOA (Angle Of Attack)

D. Air

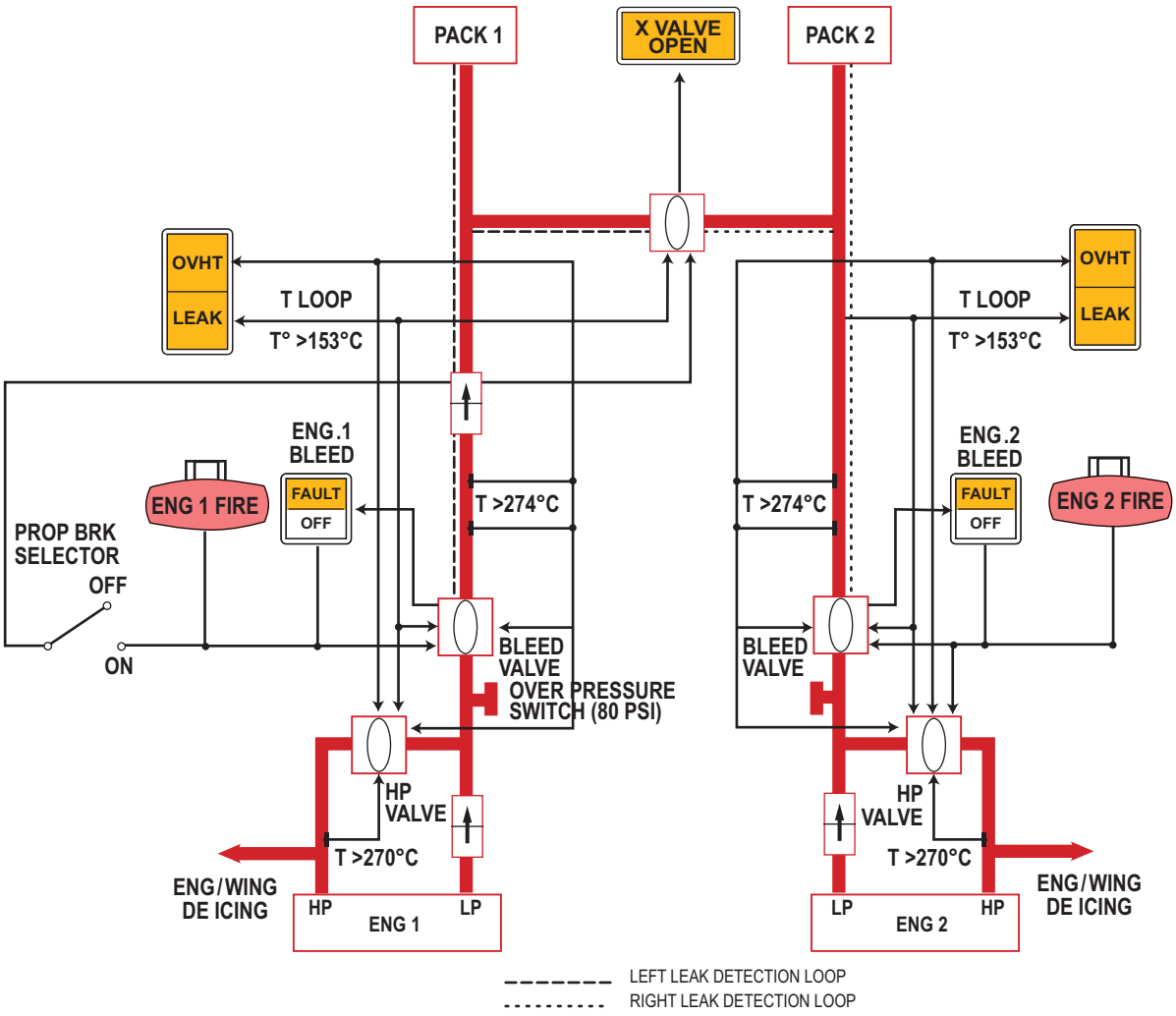
FCOM 1.03

1. Pneumatic system

ATA 21/36

The pneumatic system supplies aircraft systems which use pressurized air:
These systems are:
- Air conditioning
- Ventilation
- Pressurization
- De-icing

1.1. Schematic

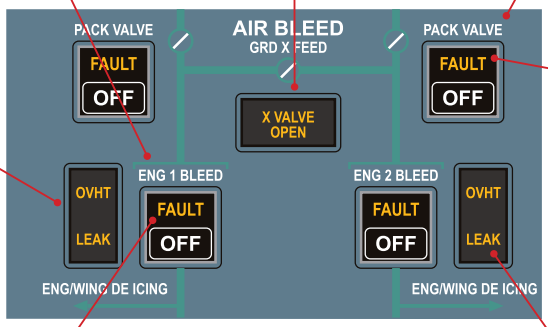


1.2. AIR BLEED panel

ENG BLEED
Controls both bleed and HP valves. Spring loaded closed. Must have air and electricity to open
Auto closure when OVHT, leak, overpressure, fire T pulled, when UPTRIM is triggered or prop break on (left one only). Inhibited during eng start

GRD X FEED
Spring loaded closed. Ground only inhibited in flight. Auto opens when only one bleed valve is opened

PACK VALVE
Spring loaded closed. Must have air and elect power to open. 6" delay on RH valve for pax comfort



OVHT
either duct temp switch above 274°C. CAP. Auto closure bleed valves (LP and HP). May be reset after cooling

PACK VALVE
FAULT
pack valve disagreement with pb / or OVHT downstream pack comp. (>204°C). CAP. Valve auto closed. Ground cooling turbo fan failure

ENG BLEED
FAULT
Bleed valve disagreement with selected position (or in case of **OVHT** or **LEAK**). CAP. Associated valves auto closed

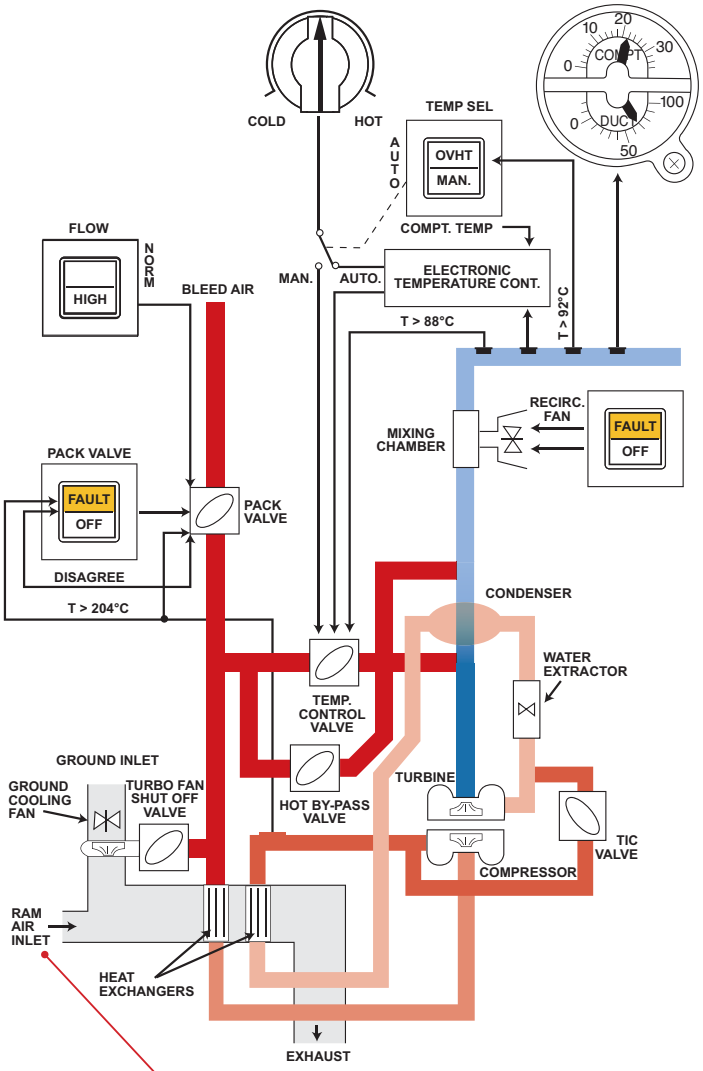
LEAK
activates when T° detected by bleed loop exceeds 153 ±8°C. CAP. Auto closure after 1" of following valves: Bleed, HP, pack and GND Xfeed if left bleed leak affected
DO NOT RESET BLEED

2. Air conditionning

ATA 21

The air conditionning system is provided to keep the flight compartments to the required temperature, pressure, humidity and cleanliness for the comfort of the passengers and crew.

2.1. Schematic



Cooling of air:

– by two ground turbo fans:
- IAS ≤ 150 kt and ldg gear is retracted for less than 10 min
- IAS ≤ 150 kt and ldg gear is extended.

– by ram air when IAS >150 kt

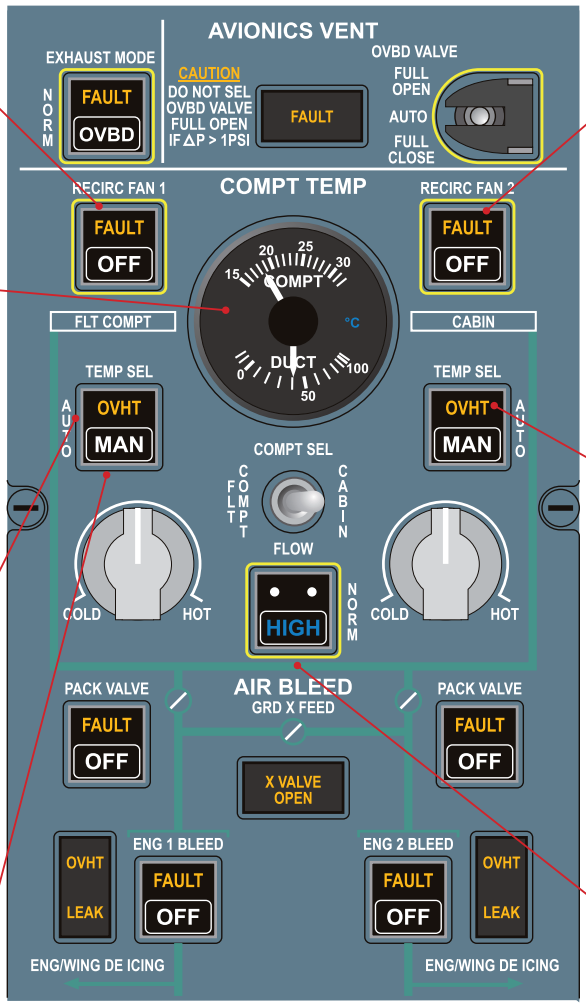
2.2. COMPT TEMP panel

RECIRC FAN
Assists pack air flow

COMPT INDICATOR
Duct temperature limited to 88°C. (191°F) by pneumatic temp.limiter

TEMP SEL
OVHT: duct overheat > 92 °C + **AIR** on CAP. Pack valve will not auto close

MAN
compt temp knob controls directly temp control valve



RECIRC FAN
FAULT: fan low speed or motor overheat + **AIR** on CAP. No auto disconnect

TEMP SEL
AUTO: the temperature is closed by the electronic temperature controller, taking into account:
– duct temperature
– zone temperature demand selector
– associated compartment temperature
– aircraft skin temperature

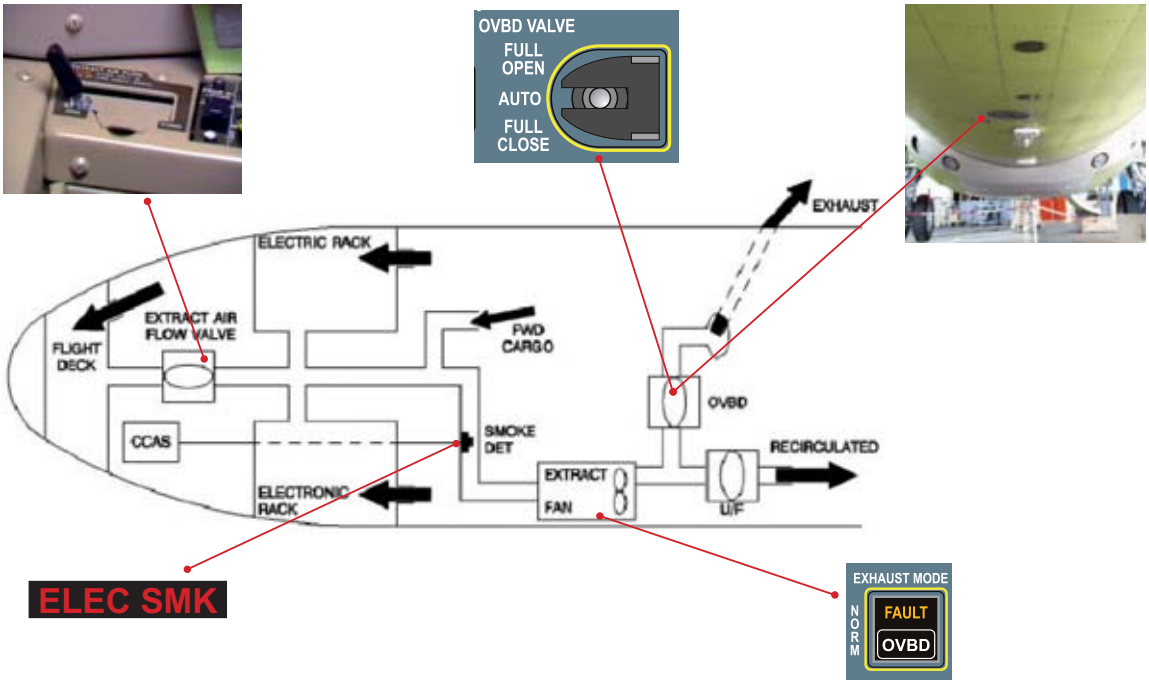
FLOW
NORM: 22 psi (pack valves)
HIGH: 30 psi (pack valves)

3. Avionics ventilation

ATA 21

The ventilation system provides cooling through ambient air extraction to limit the internal operating temperature of the electronic equipment

3.1. Schematic



3.2. AVIONICS VENT panel

EXHAUST MODE
NORM
– On ground, ENG 1 off: extract fan on. OVBD valve full open, U/F valve closed
– Air/ground, ENG 1 on: extract fan operates. OVBD valve closed. U/F valve opened

FAULT
fan failure/overheat (fan inhibited for 120 s. after eng start or after a GPU power on. **AIR** on CAP)

OVBD
extract fan off
OVBD valve partially opened (in flight only). U/F valve closed

FAULT
OVBD valve in disagreement with ovbd valve SW position

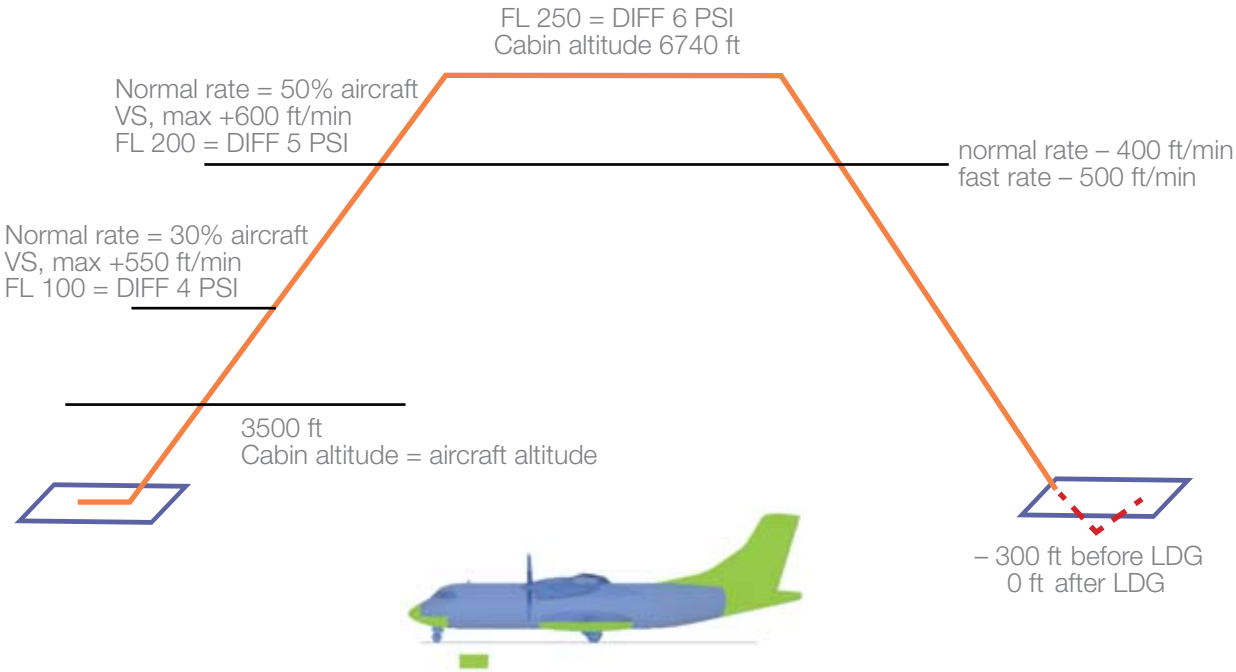
OVBD VALVE
– AUTO except for emergency
– direct control of OVBD valve.
The full open position is possible only if the delta P is <1 psi

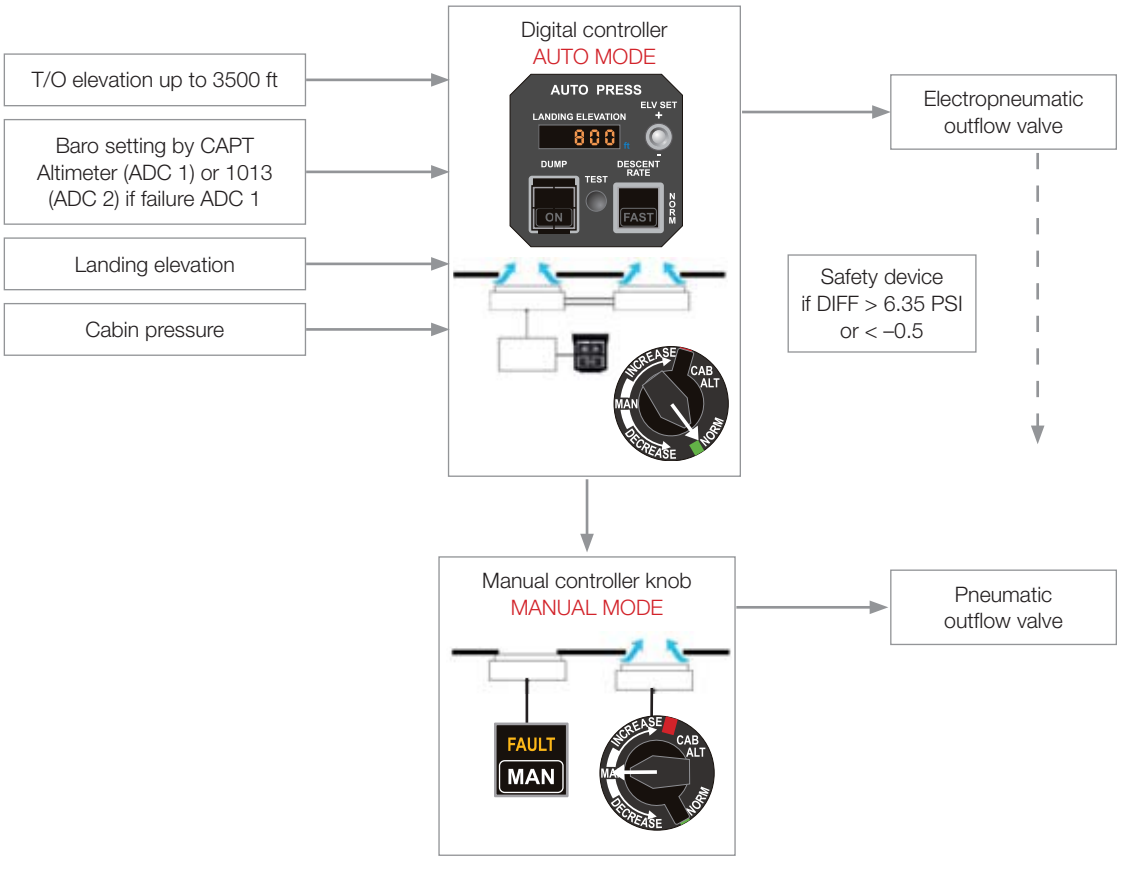
4. Pressurization

ATA 21

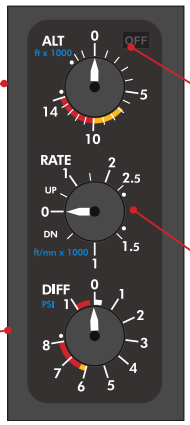
Compressed air is delivered by the packs. Pressure is controlled by the amount of cabin air discharged outboard.

4.1. Schematic





4.2. Cabin pressure indicators



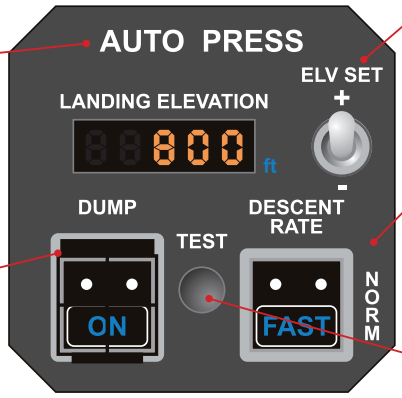
ALT
Cabin alt: based on 29.92 in.hg (1013,2 Hpa)

DIFF
Differential pressure: max +6.35/–0.5

FLAG
OFF flag

RATE
Cabin rate of climb

4.3. AUTO PRESS panel



AUTO PRESS (DC BUS)
Memorize departure field elevation up to 3500 ft

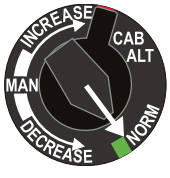
DUMP
FUNCTION ON
(guarded pusbutton)
Both outflow valves fully open in auto mode only.

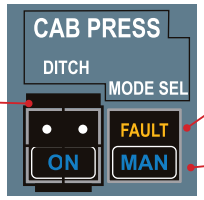
ELV SET
Trigger switch to set landing elevation

DESCENT RATE
NORM= –400 ft/min
FAST= –500 ft/min
Fast is used when Vs > –1500 ft/min

TEST
Displays alternately 18800 and –8800, FAULT appears on MAN pb. Test is inhibited in flight

4.4. MAN RATE KNOB and CABIN PRESS panel





DITCH
pb **ON** both outflows are fully closed

NORM
AUTO MODE position. When used in MAN mode, cabin rate selection +2500/–1500 fpm

FAULT
digital controller failure. CAP + AIR on CAP

MAN
digital controller out of operation. (no more digits in landing elevation display)

E. Automatic flight control system

FCOM 1.04

1. Schematic

ATA 22

HDG knob
selects HDG bug on both EHSI

FD bars
SW to set ON/OFF

ALT knob
controls the preselected altitude on ADU

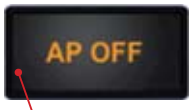
CRS 1 knob
selects course on CAPT EHSI

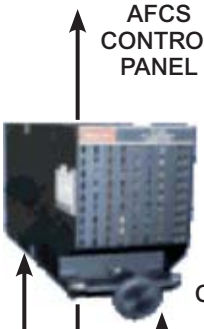
CRS 2 knob
selects course on F/O EHSI

FD bars
(horizontal bar for vertical modes and vertical bar for lateral modes)

When depressed actives, HDG HOLD and GA mode

AP quick disconnect pb
– disconnect AP when depressed once
– depressed again, clears AP OFF alert (aural and visual)





Touch Control Steering
pb allows to control temporary the aircraft. AP arrows extinguish.
In basic mode, attitude limits < ± 15° and bank angle limits < ± 35°

2. ADU

ATA 22

ADVISORIES
TCS ENG
CAT 1
CAT 2

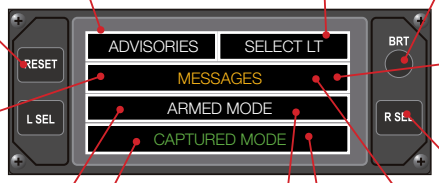
SELECT ALT
ALT SEL ---------FT
ALT SEL 3000 FT

BRT
Adjust ADU brightness

RESET
CANCEL A CAUTION MESSAGE

MESSAGES
AP/YD DISENGAGED
AP DISENGAGED
YD DISENGAGED
AILERON MISTRIM
PITCH TRIM FAIL
PITCH MISTRIM NOSE DN
PITCH MISTRIM NOSE UP
RETRIM ROLL R WING DN
RETRIM ROLL R WING UP

MESSAGES
DISENGAGED ANNUN DATA
FAULT
ENGAGE INHIBIT
CPL DATA INVALID
AHRS DATA INVALID
DADC DATA INVALID
AFCS DATA INVALID
AP INVALID



L/R SEL
SEL pb is used in AP ground maintenance test

ARMED and CAPTURED MODE
LATERAL MODE

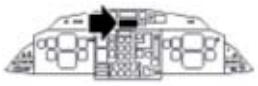
	HDG SEL LO	
	HDG SEL HI	
VOR	VOR*	VOR
LNAV	LNAV	
LOC	LOC*	LOC
	HDG HOLD	
BC	BC*	BC

ARMED and CAPTURED MODE
VERTICAL MODE

ALT	ALT*	ALT
	IAS --- KTS	
	IAS 160 KTS	
	VS ---- FPM	
	VS - 600 FPM	
GS	GS*	GS
	GA	

MESSAGES
NAV MISMATCH L SEL
NAV MISMATCH R SEL
EXCESS DEV
CAT 2 INVALID
CHECK NAV SOURCE
NO ENGAGEMENT ON GROUND

3. AFCS control panel



ATA 22

BANK pb
selects LOW bank angle (15°) or HIGH bank (27°)

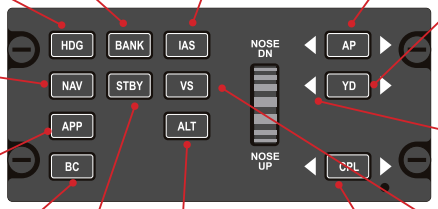
IAS mode
to use FD with a desired indicated airspeed.

AP pb
engages autopilot and yaw damper and disengages only autopilot

HDG mode
to use FD with HDG SEL

YD pb
engages yaw damper and disengages yaw damper and autopilot if engaged

NAV mode
to use FD with VOR and LNAV course



Pitch wheel
to adjust VS or IAS or pitch attitude in basic mode

APP mode
to use FD with ILS information course (lateral and vertical)

VS mode
to use FD with a desired vertical speed

BC mode
to use FD with localizer in back course

STBY pb
cancels all FD modes (both armed and captured) and return in basic modes with AP engaged.

ALT mode
to use FD with a desired altitude

CPL pb
permit to couple AP/FD on CAPT or F/O side
Double coupling below 1200 ft RA

F. Communications

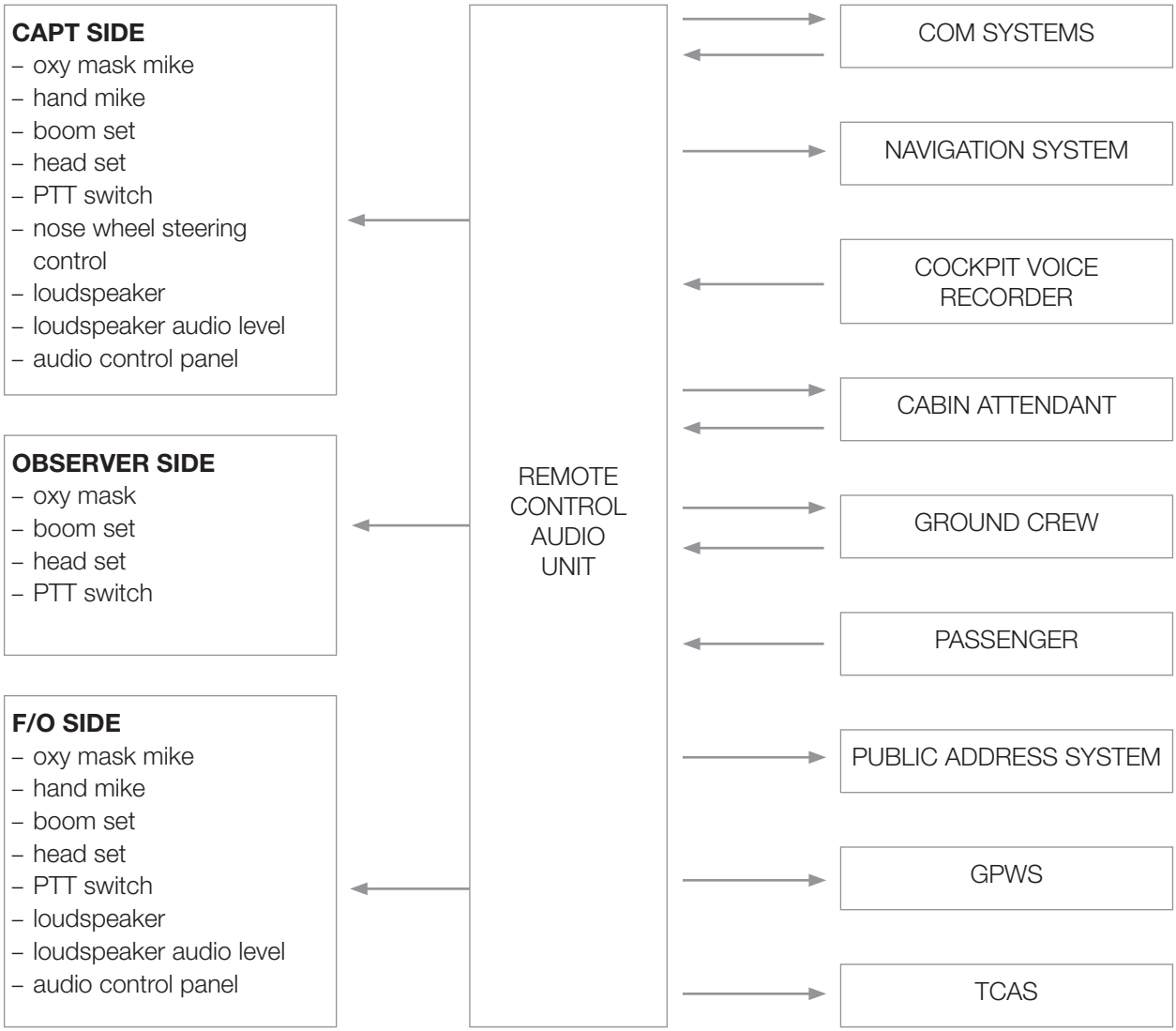
FCOM 1.05

1. Schematic

ATA 23

The communication system provides communication between:

– aircraft and ground stations
– cockpit crew stations
– cabin attendant station
– ground crew stations



2. PTT selector and NOSE WHEEL STEERING CONTROL SW

ATA23

PTT selector
interphone: forward position
neutral: center position
radio: backward position

NOSE WHEEL STEERING CONTROL switch
When depressed, BOOM SET or OXY mike is connected for transmission

F. Communications

3. Audio control panel

ATA 23

Transmission keys
Only one key can be engaged at a time. It illuminates white when selected

Volume control knob
to receive volume from associated communication or navigation facilities

VOICE ONLY key
When depressed, it inhibits NAV receivers station identification. Light illuminates amber when selected.

INT/RAD selector
Provides selection of transmission mode when using OXY MASK or BOOM SET mike
INT: hot mike position. Interphone is always operative between crew stations. Other transmissions require to select a transmission key and use a PTT pb
NEUTRAL: only handmike is usable as long as one transmission key is selected
RAD: This position is required to automatically connect for transmissions BOOM SET and OXY MASK mikes without using a PTT pb

4. VHF

ATA 23

ON/OFF switch
energizes the control box and the associated VHF. When pulled, allows override of the automatic squelch

STO button
allows entering six frequencies in the memory. When depressed, the upper window displays the channel number of available memory (CH1 to CH6)

TEST button
is used to initiate the radio self-test diagnostic routine

XFR/MEM switch
This is a three positions spring loaded toggle switch
– NEUTRAL
– XFR: exchanges preset and active frequency.
– MEM: successive actions cycle the six memory frequencies through the display

ACT button
When depressed, second line displays dashes, and first line can directly be turned for frequency selection

5. AUDIO SEL pb

ATA 23

FAULT
illuminates amber and the CCAS is activated when an associated RCAU processing board failure or power loss is detected

AUDIO SEL
Controls functioning of associated RCAU processing board.
NORM: RCAU functions normally

ALTN
affected crew station is connected directly to VHF 1 for CAPT station or VHF 2 for F/O station.
Volume is adjusted by affected loudspeaker volume control

6. Loudspeaker volume knobs

ATA 23

LOUDSPEAKER
Communication reception.
In case of aural alert:
– normal volume is always available regardless of knobs position.
– during any transmission the volume of both loudspeakers is muted

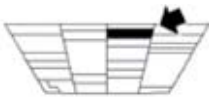
7. TCAS control box

ATA 34

TCAS rotary selector
STBY: TCAS system is under power but intruder visualisation, traffic advisory mode or resolution advisory are not operative
AUTO: normal operating mode of TCAS
TA ONLY: disables the RA mode of operation

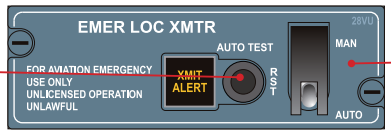
TEST
TCAS test function operates the test during cockpit preparation. Using in flight, TCAS operation are inhibited for up to 20“

8. EMER LOC XMTR panel



ATA 23

AUTO TEST RST
is used in case of undue alert or to test the emergency beacon. two cases are possible for the test
– net work X MIT ALERT illuminates amber during 2”
– failure XMIT ALERT It flashes during 15 seconds



Switch
AUTO transmission is made automatically at least on 121.5 MHz, 243 MHz and 406 MHz when deceleration exceeds 5 g
MAN allows commanded operation or test

9. Cabin attendant handset

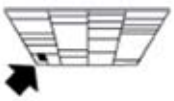
ATA 23

Cabin attendant handset
PA: public adress to make an annoncement to passengers
INT: internal communications with crew
EMER: emergency call

10. Handmike and handset

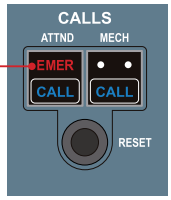
ATA 23

11. CALLS panel



ATA 23

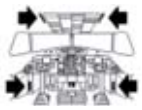
EMER
illuminates in case of emergency call from cabin



CALLS
ATTND to call cabin from cockpit.
One time for a normal call
three times for an emergency call
MECH to call the ground crew from cockpit
A horn is generated
In case of cabin crew or ground crew call, depress RESET to cancel both associated visual and aural alerts

12. Headset/boomset/ hand mike panels

ATA 23



Head set / boom set panel / hand mike panels
allows connection of a boom set, a head set and a hand mike

13. ATC box

ATA 23

IDENT button
when depressed, causes the transponder to transmit IDENT signal

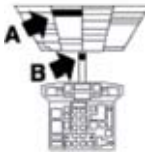
Power and mode switch
OFF: control box and receiver are deenergized
STBY: system is under power but does not transmit replies
ON: transponder replies to both mode A and mode C interrogations but without flight level information
ALT normal operating position. Transponder replies with flight level information

PRE button
Push and hold the PRE button allow to select a preset code for storage
The storage code can be recalled by momentarily pressing the PRE button again

TEST button
initiates the radio self test routine

14. CVR panel

ATA 23



TEST pb
when depressed and held, the test circuit is activated
– the pointer moves to a location between graduations 8 and 10
– if a headset is plugged into the jack, the 600 HZ signal is heard

COCKPIT VOICE RECORDER
Monitor indicator for test only. Movement of pointer in white band indicates all channels are operative

ERASE pb
provides fast erasure of tape recordings when the landing gear shock absorbers are compressed and parking brake is set (depress for 2 sec. to completly erase)
During erasure, a 400Hz audio signal can be heard in the headset

HEADSET jack
when headset is plugged into the jack:
– cockpit sounds picked up by the microphone are audible
– erase tone is audible when ERASE pb is depressed

B - MICROPHONE
picks up cockpit conversations and alert sounds

15. Crew oxygen mask

ATA 23

A micro is incorporated inside the crew oxygen mask

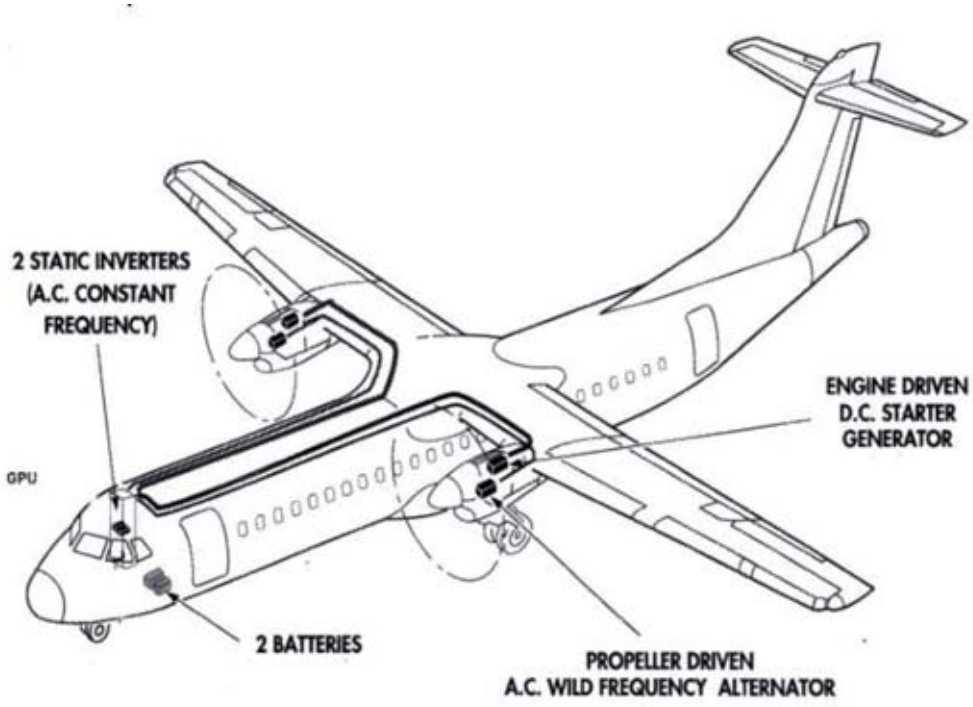
G. Electrical systems

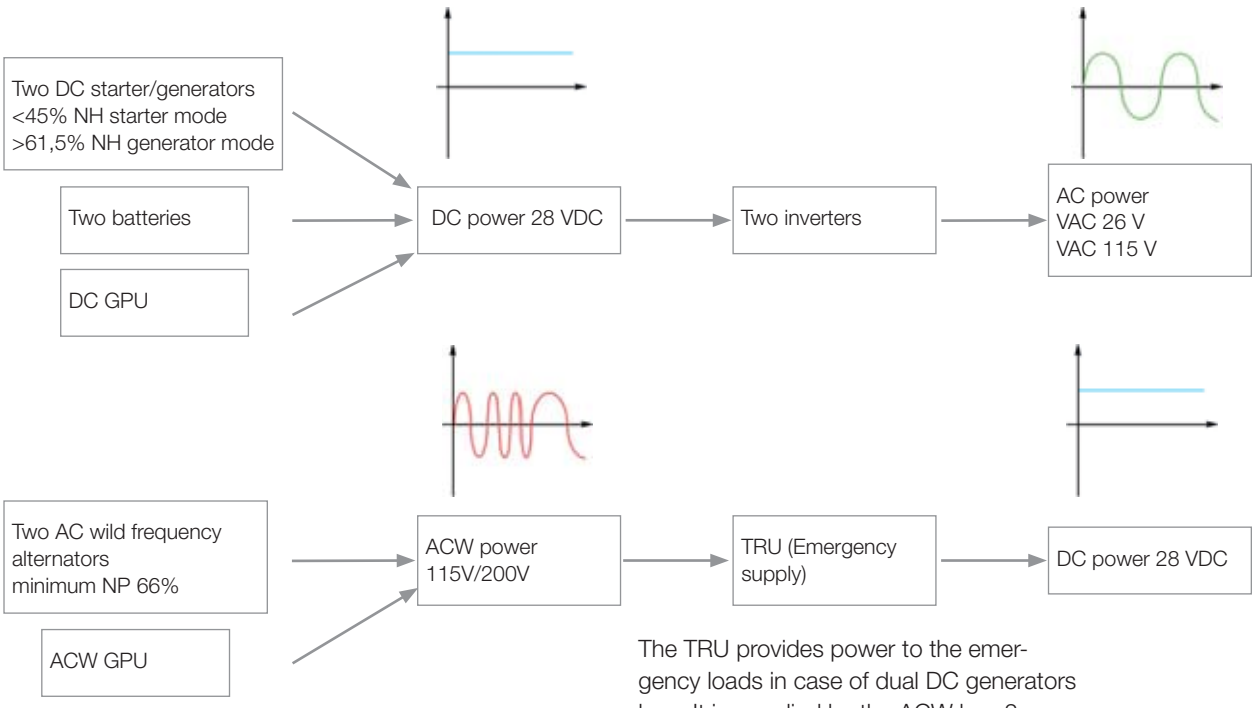
FCOM 1.06

1. Sources of power

ATA 24

Three kind of current are available: Direct current (DC)
Alternating current with constant frequency (AC)
Alternating current with variable frequency (ACW)



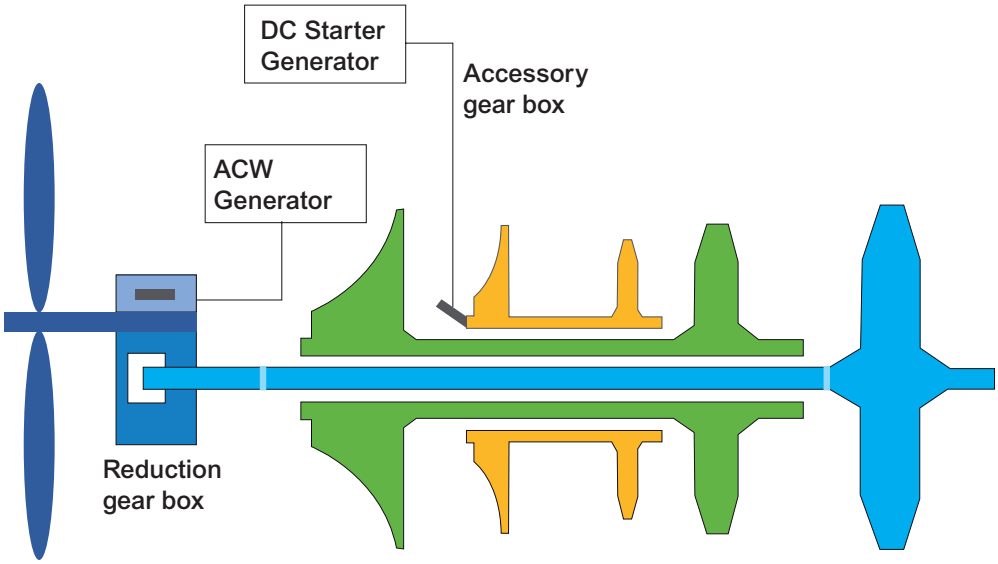


The TRU provides power to the emergency loads in case of dual DC generators loss. It is supplied by the ACW bus 2.

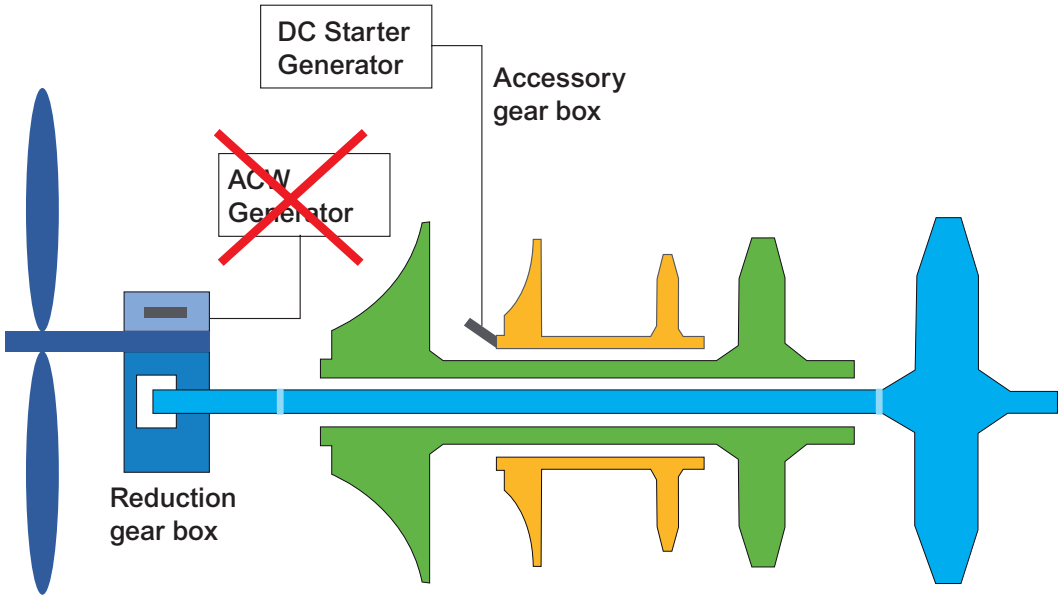
The DC Starter Generator is driven by the HP spool throught the Accessorry Gear Box (AGB)

– From 0 to 45% NH as a Starter
– Above 61.5% as a Generator

The ACW Generator is driven by the Reduction Gear Box, and is available with NP > 66%



In Hotel Mode or with the propeller feathered, there is no ACW.
When the propeller is unfeathered (CL in AUTO), The NP is maintained at a minimum of 70,8%, in order to have ACW (minimum 66%)

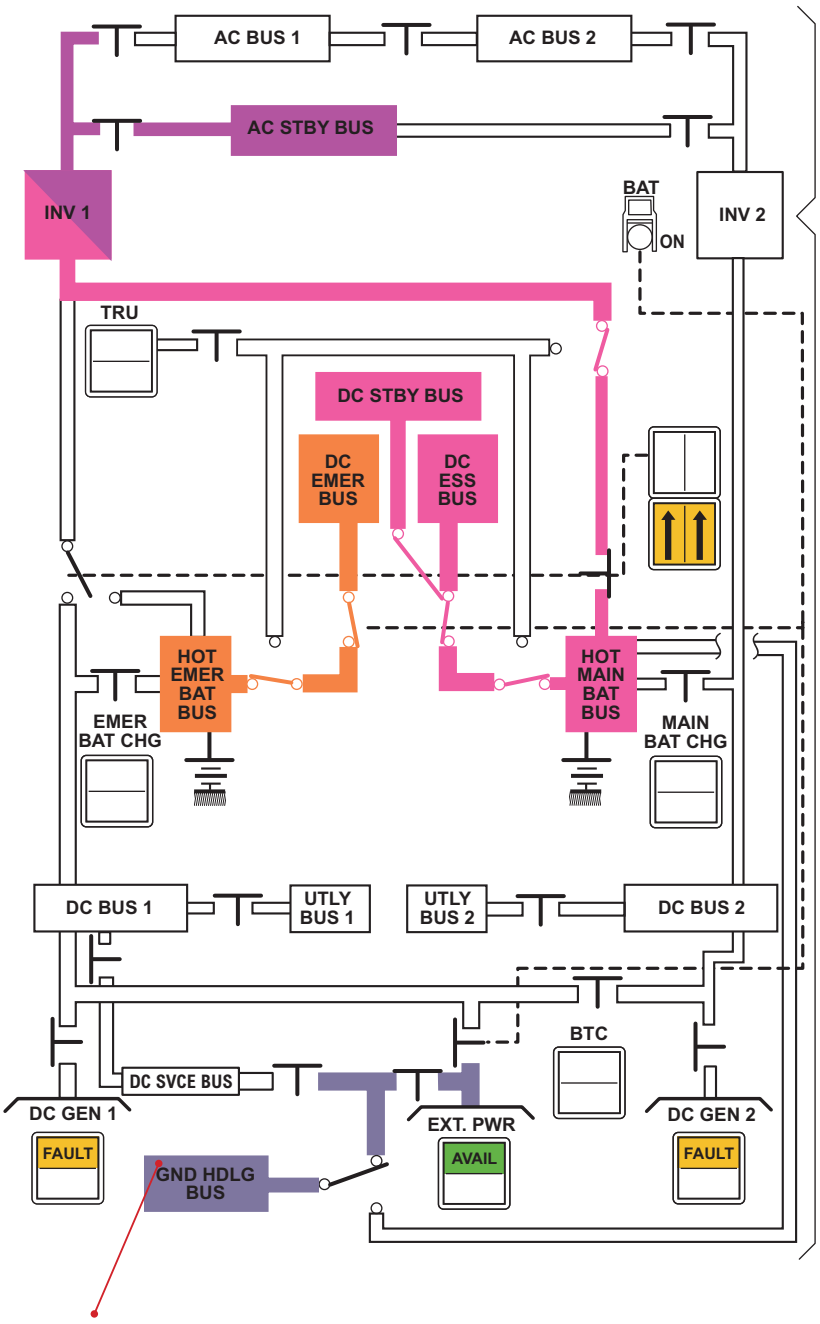


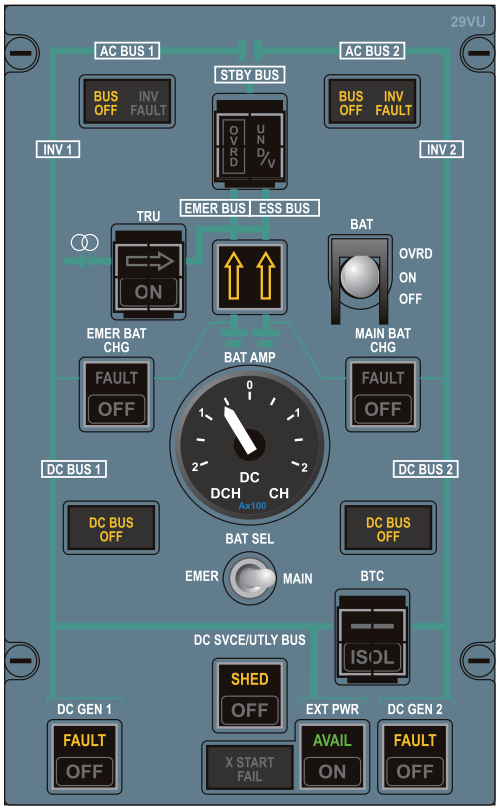
HOTEL MODE OR PROPELLER FEATHERED

2. DC-AC schematic

ATA 24

2.1. Normal supply: On ground with battery only





The **GOUND HANLING BUS** is supplied only on ground, in three different ways:

– BAT OFF or BAT ON with the EXT PWR not available, the GND HDLG BUS is supplied by the HOT MAIN BAT BUS for ground servicing only when:

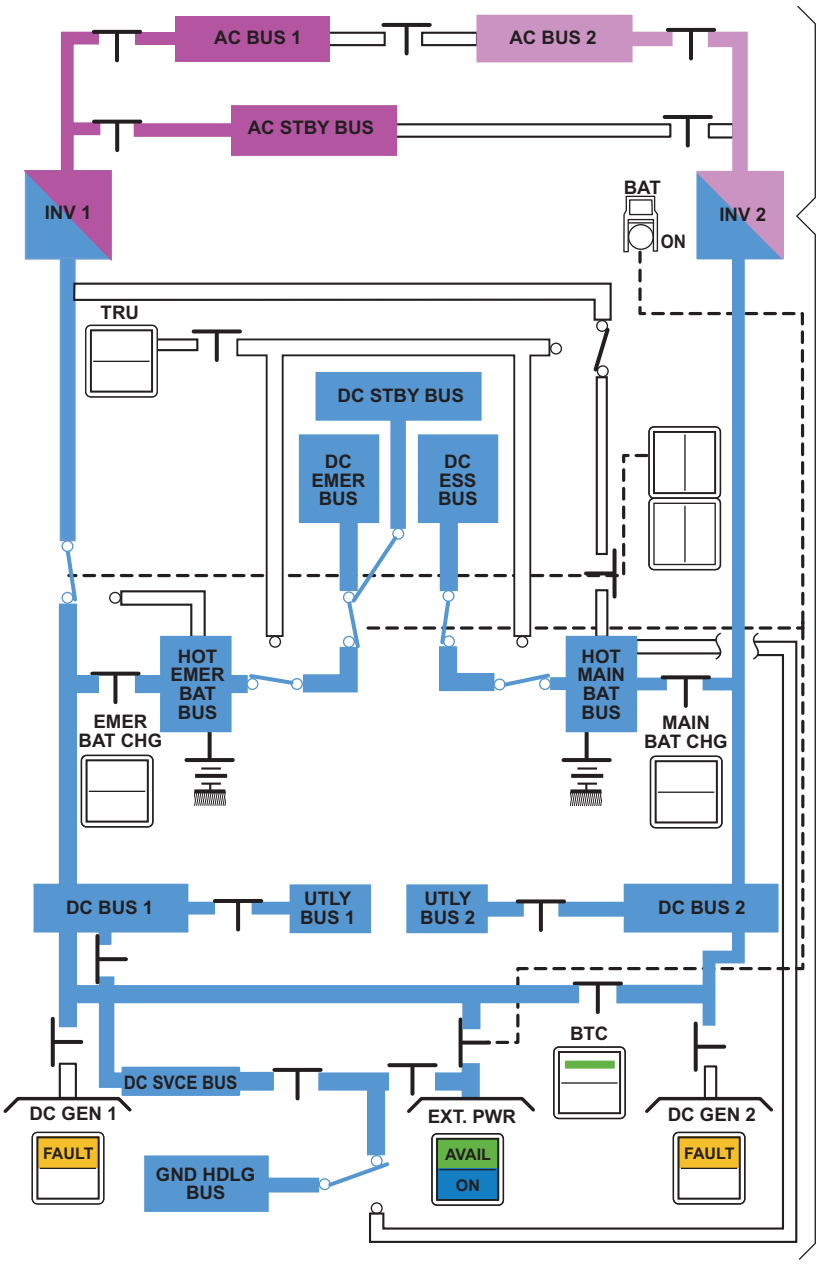
- The refueling panel is open
- The cargo door control panel is open
- The passenger door is open

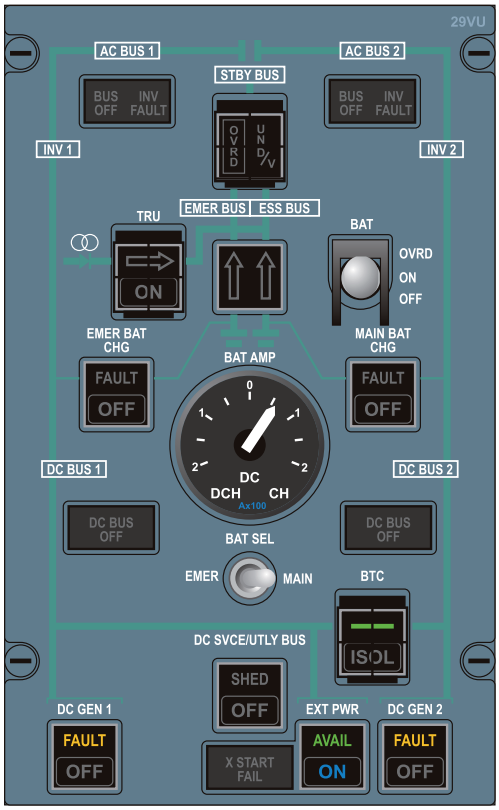
– BAT OFF or BAT ON with the EXT PWR available but not ON, the GND HDLG BUS is supplied directly from the EXT PWR

– BAT ON with EXT PWR ON or with one GEN on line, the GND HDLG BUS is supplied by the DC SVCE BUS.

NOTE: The GND HDLG BUS is disconnected when airborne.

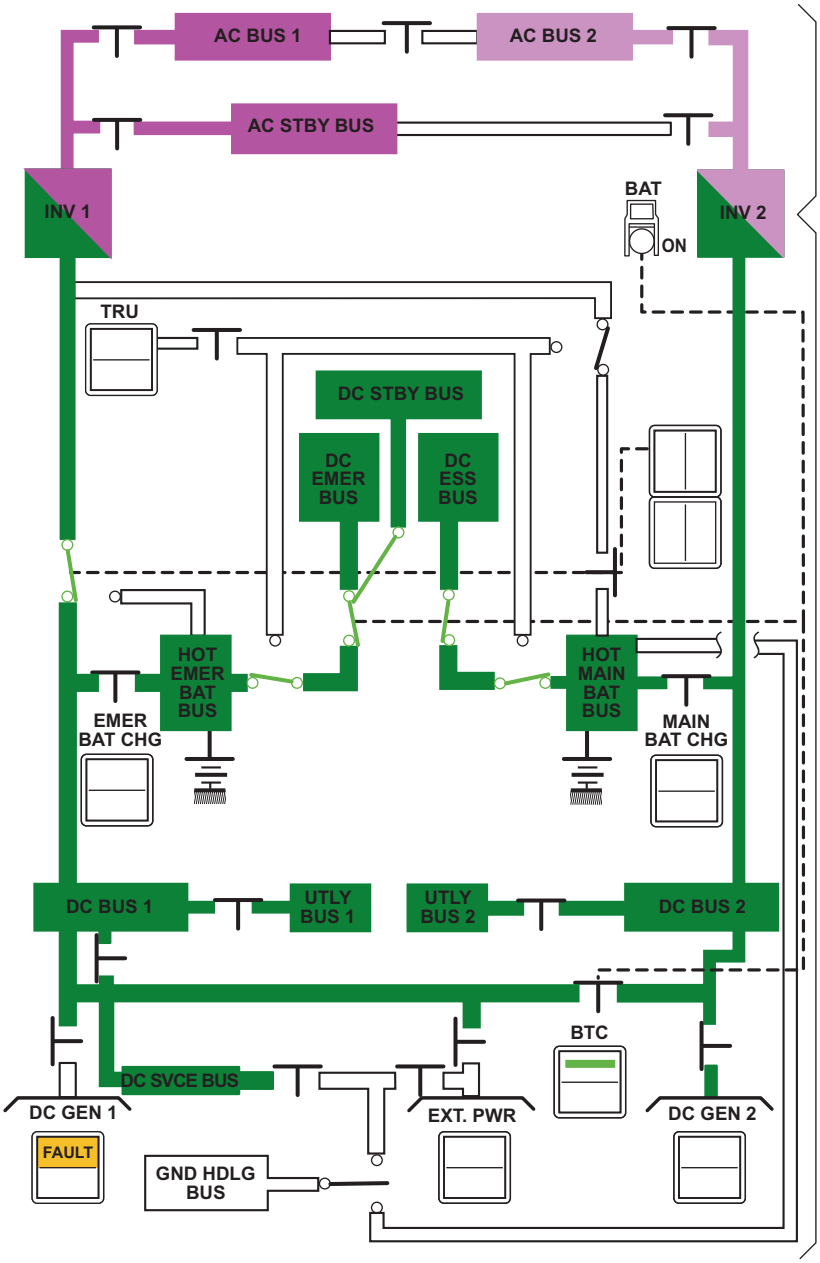
2.2. Normal Supply: On ground with external power

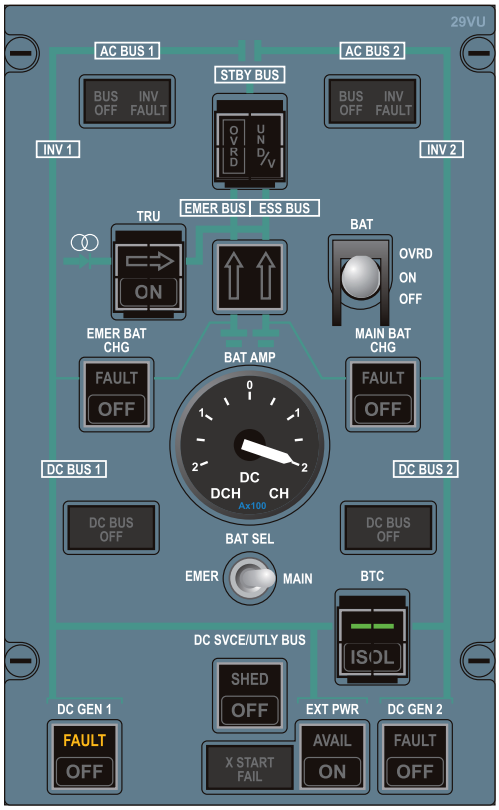




The BTC is closed and the GPU supplied all the DC and AC busses.
Even if the GEN are available, the GPU has always the priority

2.3. Hotel mode or DC GEN 1 FAULT

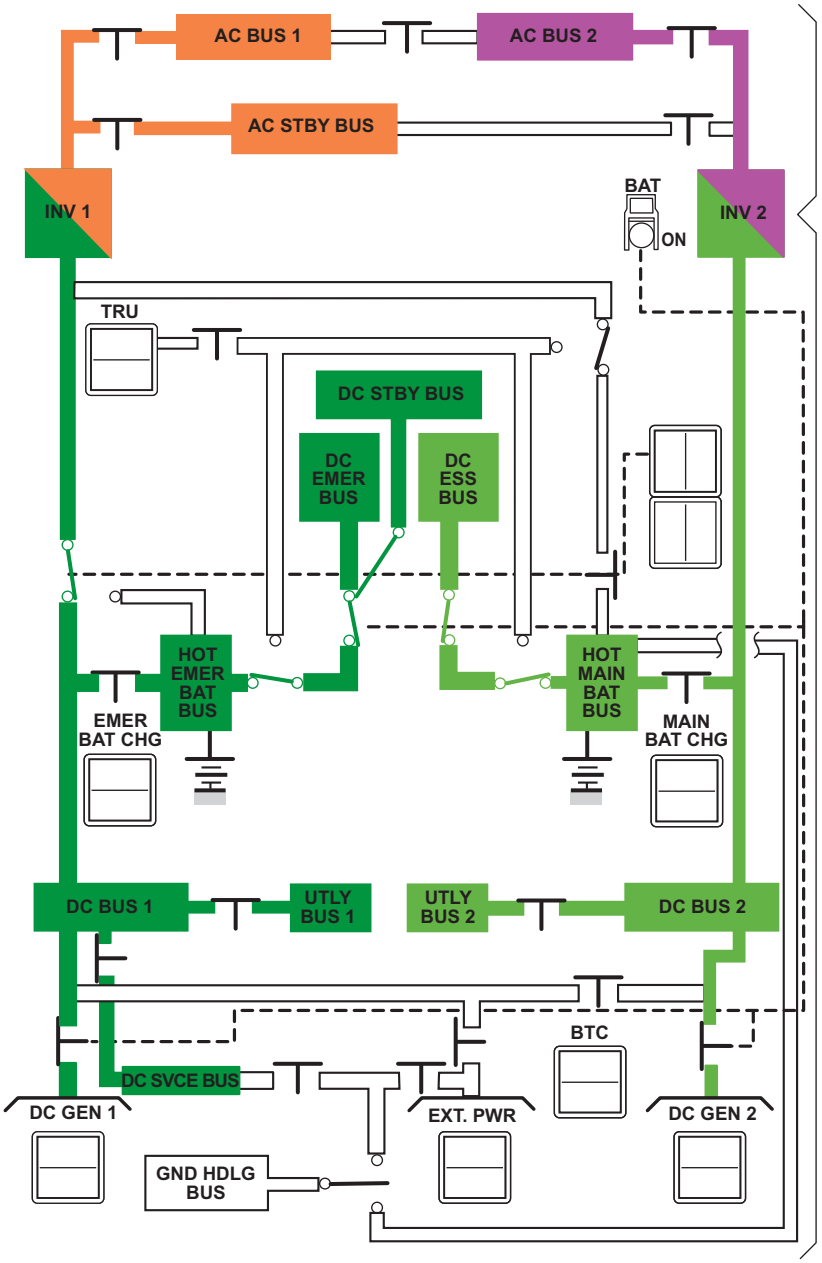


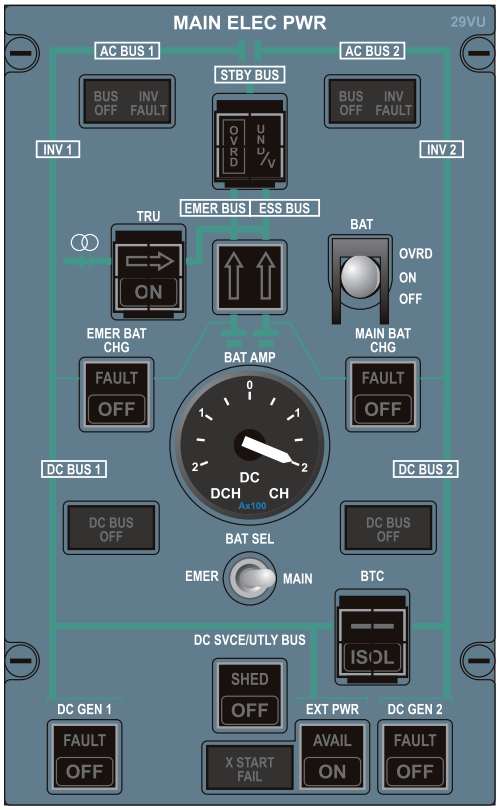


The BTC is closed and the GEN 2 supplied all the DC and AC busses.

In hotel mode the GND HDLG BUS is supplied by the DC BUS 1 through the DC SVCE BUS.

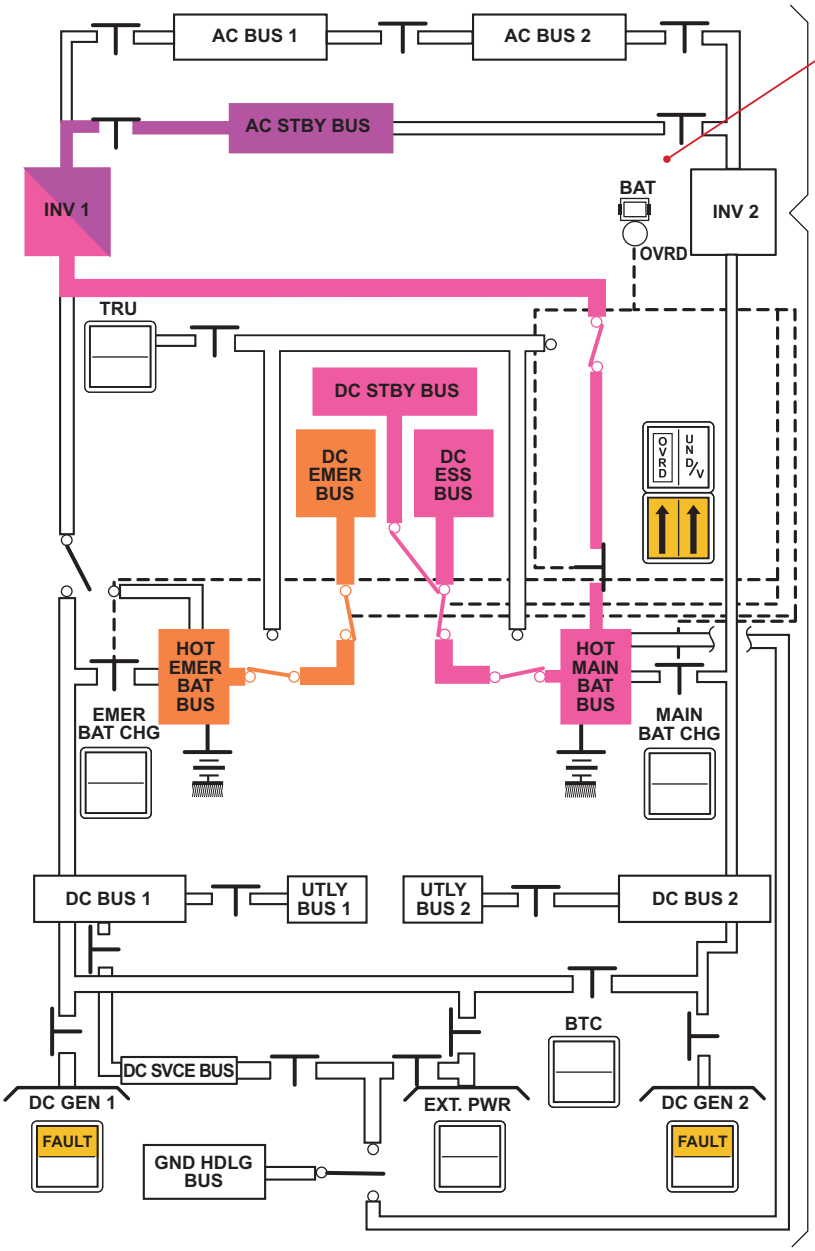
2.4. Normal supply: with two generators on line



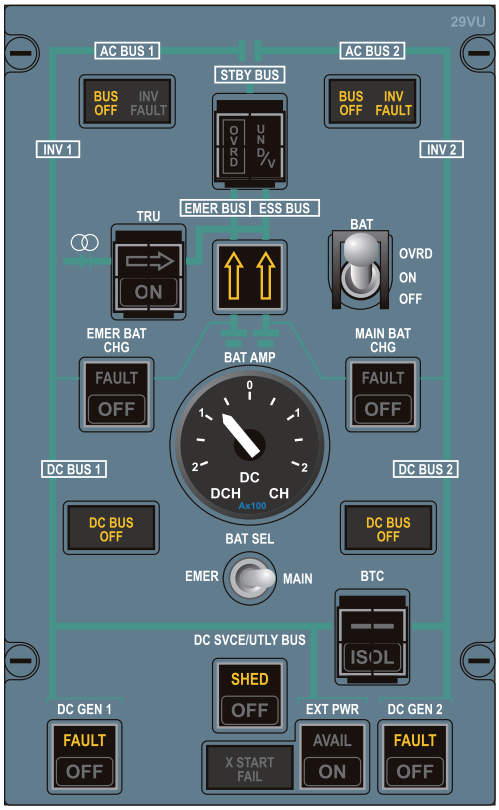


The BTC is opened and each GEN supply its own busses.
On ground the GND HDLG BUS is supplied by the DC BUS 1 through the DC SVCE BUS, and disconnected when airborne.

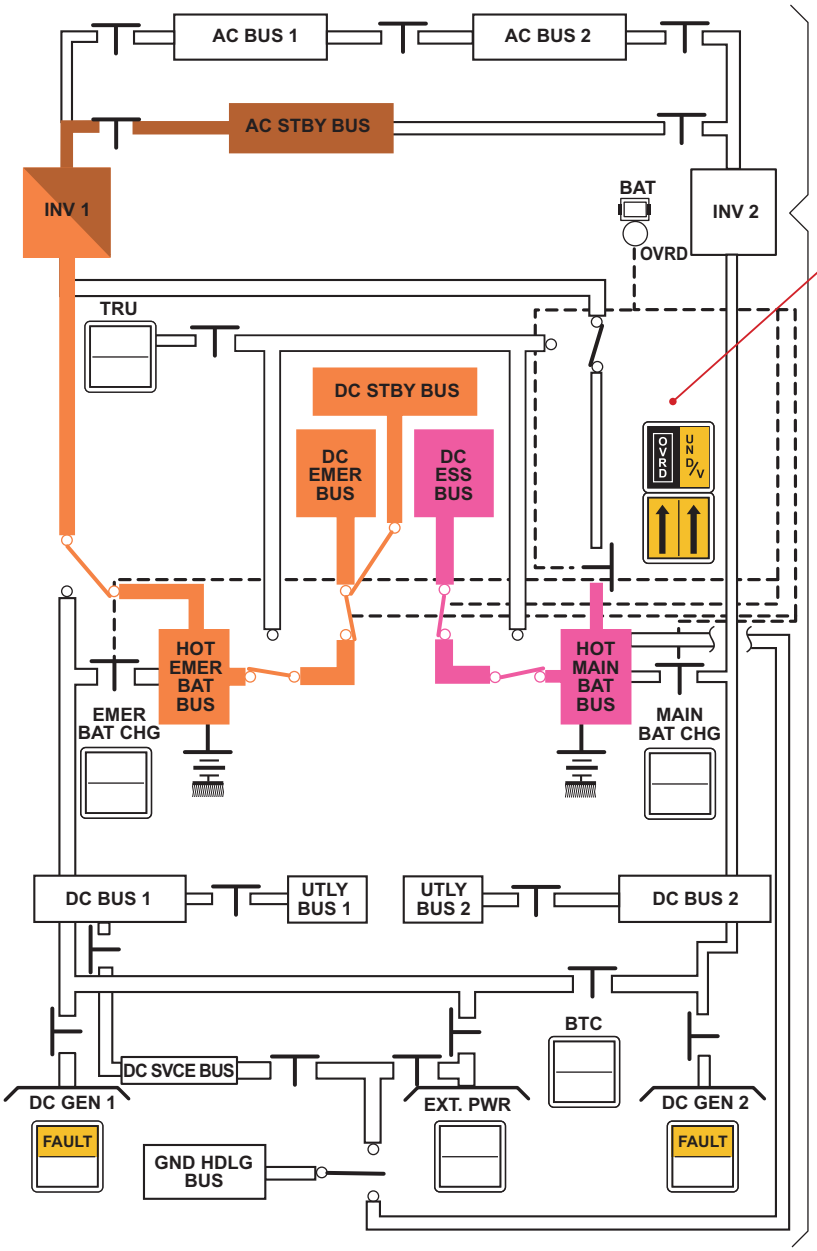
2.5. Emergency supply: In dual DC GEN LOSS with the battery toggle switch on OVRD



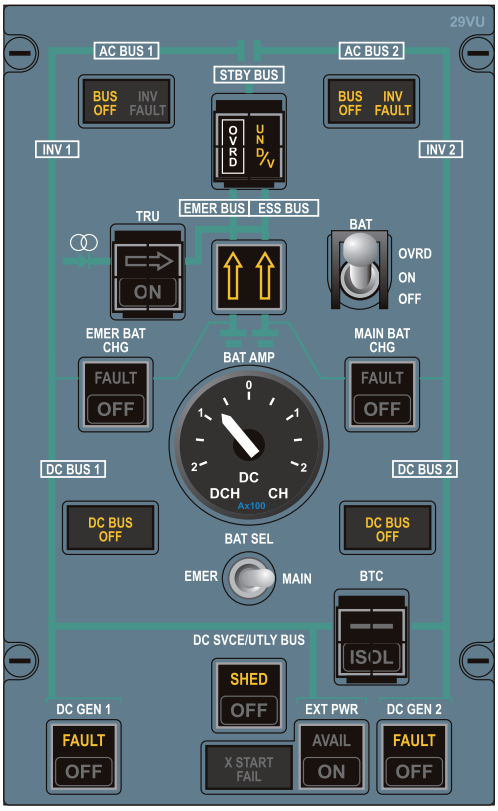
The BAT toggle switch has to be selected to OVRD.
The OVRD position allows to be sure that busses are supplied by their respective battery by overriding all protections. This position is protected by a guard.



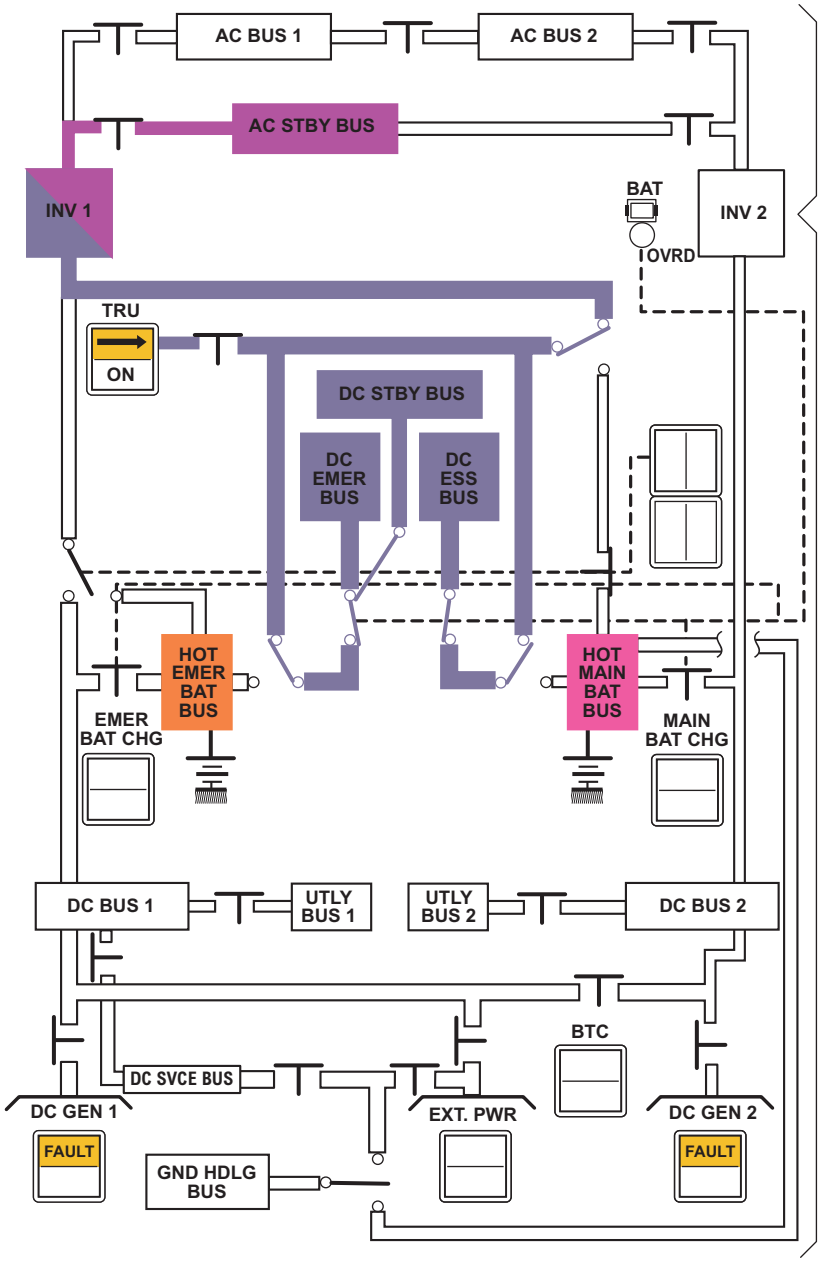
2.6. Emergency supply: In dual DC GEN LOSS with the battery toggle switch on OVRD and second OVRD selected

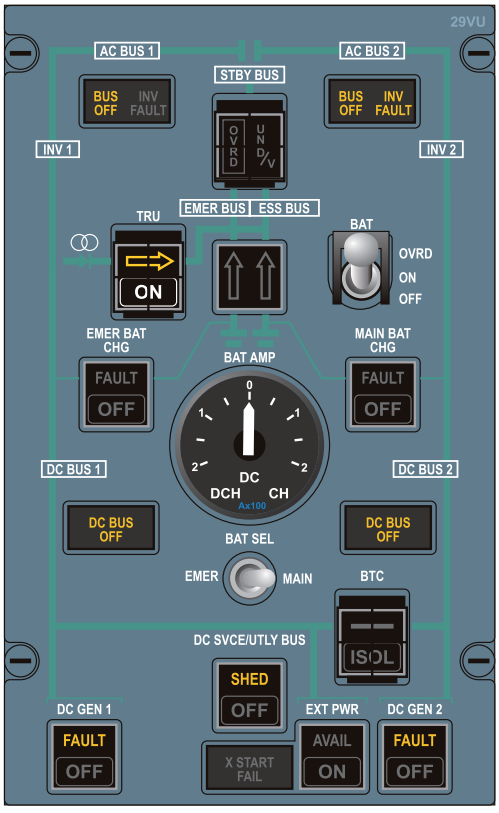


After a Dual DC GEN loss, the UNDV is triggered when the DC STBY BUS <19,5 V.
Then, by pushing on the OVRD the DC and AC STBY BUS are transfered from the HOT MAIN BAT BUS to the HOT EMER BAT BUS



2.7. Emergency supply: In dual DC GEN LOSS with TRU





The TRU connected to the ACW BUS 2 supplies DC EMER BUS, DC ESS BUS, DC&AC STBY BUSSES

3. DC-AC panel

ATA 24

UNDV
DC STBY < 19.5 V. (No CAP)

BUS OFF
Associated bus deenergized.
ELEC on CAP

OVRD
Xfer/stby busses from HOT MAIN to HOT EMER BAT BUS

Arrows
Emergency supply indicators (respective battery discharging)

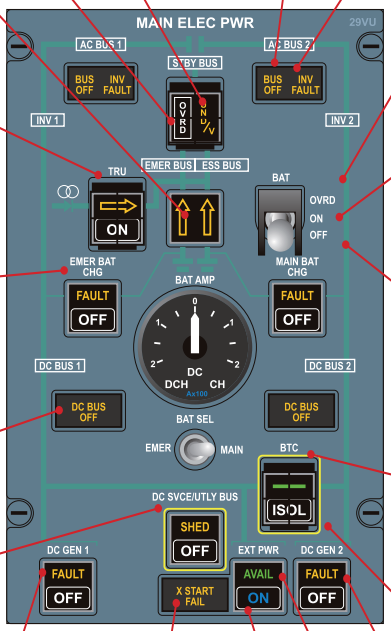
TRU
ON PB in. TRU is connected to ACW BUS 2. Arrow illuminates amber when DC EMER, DC STBY, INV 1, AC STBY and DC ESS BUS are supplied by TRU

EMER BAT CHG
FAULT: Overheat detected by MFC or failure of contactor. **ELEC** on CAP
Contactor auto opens if: thermal runaway/bus voltage <25 V. Start sequence: Bat sw on OVRD

DC BUS OFF
Respective bus not supplied.
ELEC on CAP

DC SVCE/UTLY BUS
In automatic shedding
One of the DC SVCE/UTLY 1 and 2 busses is shed 1 bus **SHED** (BCPU). **ELEC** on CAP.
In OFF
all DC SVCE/UTLY 1 and 2 busses are shed
DC SVCE supplies power in flight and on ground during airplane servicing operations.
UTLY BUSSES suplly non-essential loads

DC GEN 1
Generator **FAULT** Lt.
Extinguishes above 61.5% NH if GEN is operating normally



INV FAULT
Under/over voltage at INV output. (INV failure or supply loss). Auto-Xfer of all AC busses to remaining inverter. **ELEC** on CAP

OVRD
Insures basic mode operation by overriding all other protections

ON
Basic mode: STBY busses supplied by HOT MAIN BAT BUS.
Ext or gen power: DC STBY bus transferred to HOT EMER BAT BUS AC STBY BUS to DC BUS 1

OFF
ESS BUS, DC STBY BUS + INV 1 are isolated from HOT MAIN BAT BUS
DC EMER BUS is isolated from HOT EMER BAT BUS

BTC
Allows BPCU to control BTC operation. Ext power, hotel mode or single gen operation, BTC is closed (green flow bar)

ISOL
BTC and BTR opened (released out)

DC GEN 2
FAULT: protection trip by GCU; Auto reset if underspeed: in other cases manual. BTC auto closes

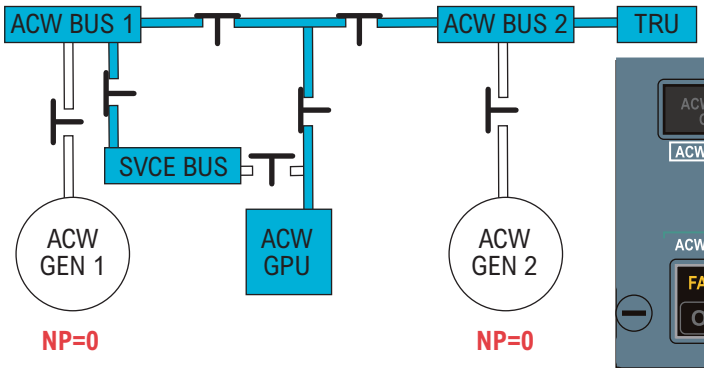
AVAIL
GPU has been checked by BPCU for over/under voltage, over current and polarity

X START FAIL
Opposite generator has not come on line to assist start at 10 % NH

EXT PWR
AVAIL + **ON**: GPU has prioity on both generators

4. ACW schematic

ATA 24

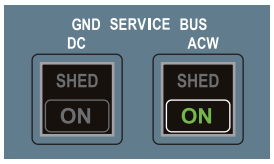


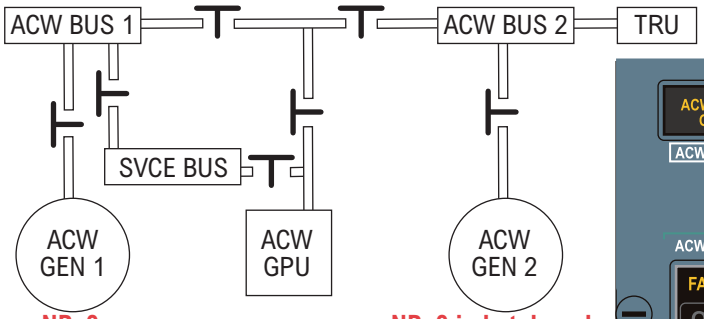
ACW supplied by the External Power

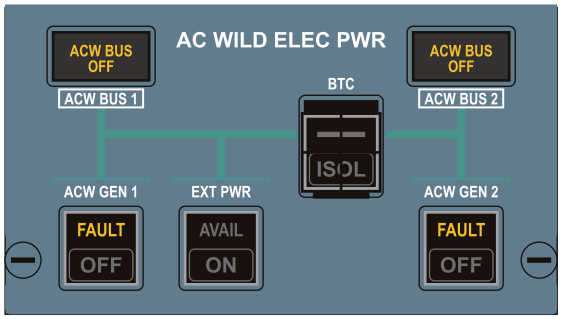
– When the ACW GPU is available (**AVAIL**) but not ON, the GPU supplies only the ACW Service Bus, if the GND Service Bus switch, on the ⊠ight attendant panel, is ON.

– When the ACW GPU is **ON**, the GPU supplies through the BTC, the ACW BUS 1, the ACW BUS 2 and the ACW SVCE BUS.

– Even if one ACW generator is available, the GPU has always the priority.







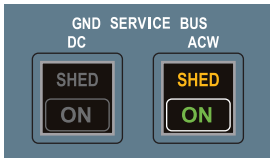
ACW in Hotel mode or with the propeller feathered

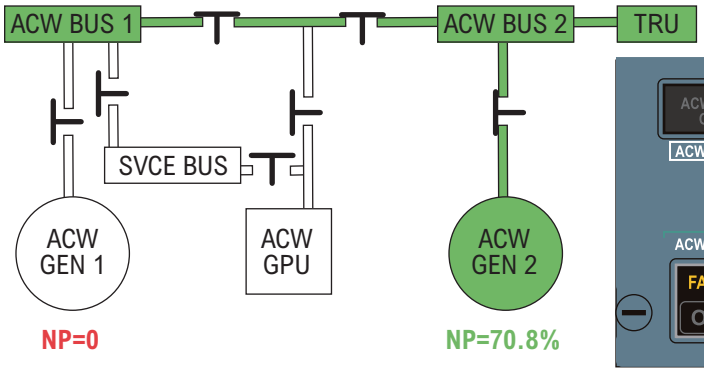
NOTE: An ACW Generator is available if the NP is above 66%.

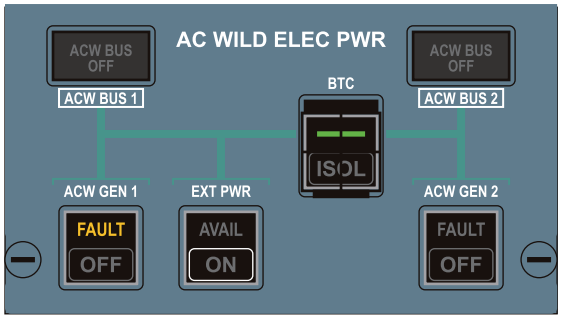
– When the right engine is running in hotel mode, the NP=0.

– When the engines are running but the propeller is feathered, the NP is bellow 20%

In both cases the ACW Busses are not supplied







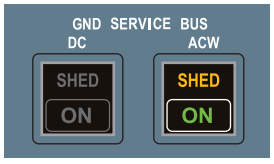
The propeller unfeathered and one ACW GEN on line

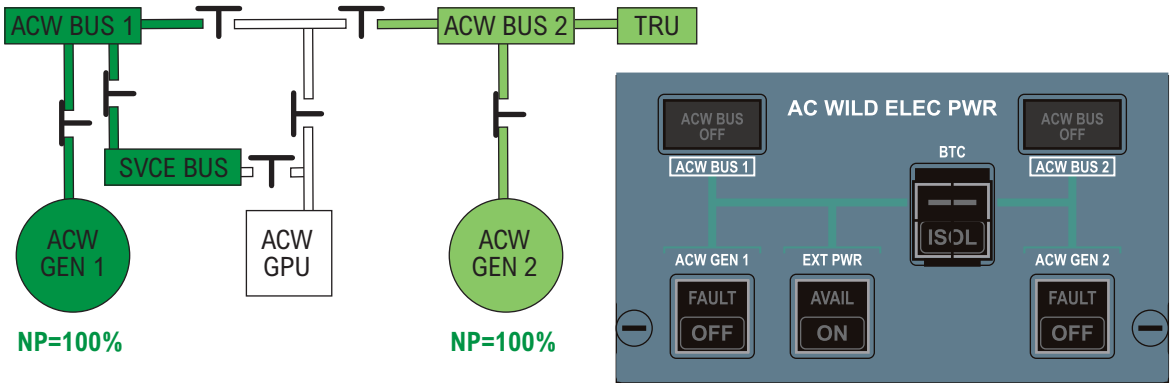
On ground, when the propeller is unfeathered, the engine is running on fuel governing mode.

The fuel governing mode, maintain a minimum NP of 70.8%, in order to have the ACW available (ACW GEN on line at 66%)

The ACW GEN supplies, the ACW BUS 2 and ACW BUS 1 through the BTC, but the SVCE BUS is shed (one generator is not able to supply all the busses)

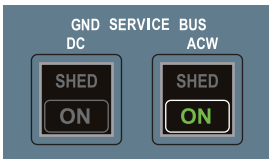
CAUTION: on ground in case of an EEC or PEC fault, the fuel governing mode is lost and the ACW generator is not available (NP<66%)

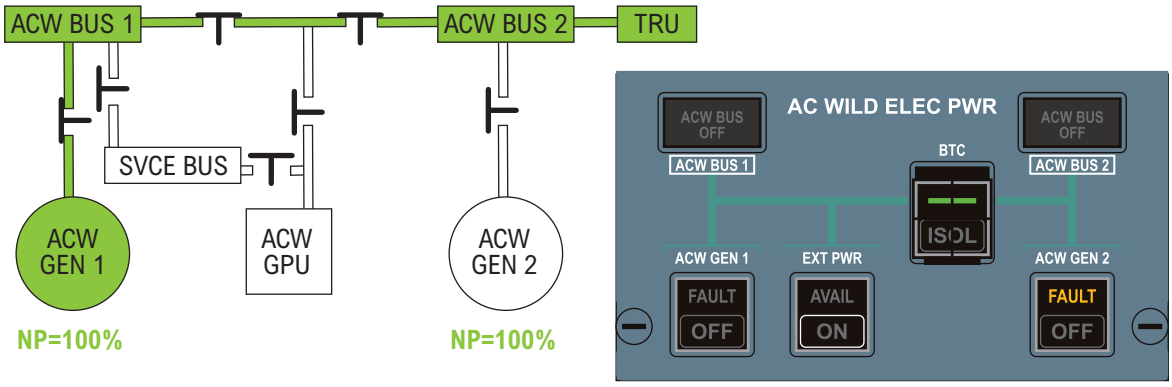




Normal condition in flight

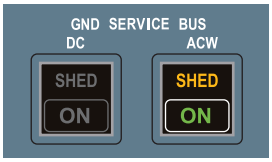
– The ACW GEN 1 supplies the ACW BUS 1 and the ACW SVCE BUS
– The ACW GEN 2 supplied the ACW BUS 2.
– The TRU is connected to the ACW BUS 2





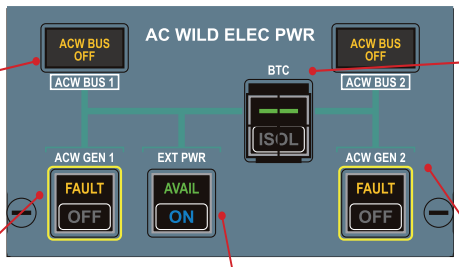
One Generator Fault

When one generator is fault, the other one supplies the ACW BUS1 and the ACW BUS 2 through the BTC.
The SVCE BUS is automatically shed (one generator is not able to supply all the busses)



5. ACW panel

ATA 24



ACW BUS OFF
Associated bus not supplied

ACW GEN 1 /2
FAULT: Auto reset in case of under/over speed: manual reset otherwise.
ACW SVCE BUS auto shed if 1 GEN is out

EXT PWR
AVAIL + **ON** GPU has priority on both GEN

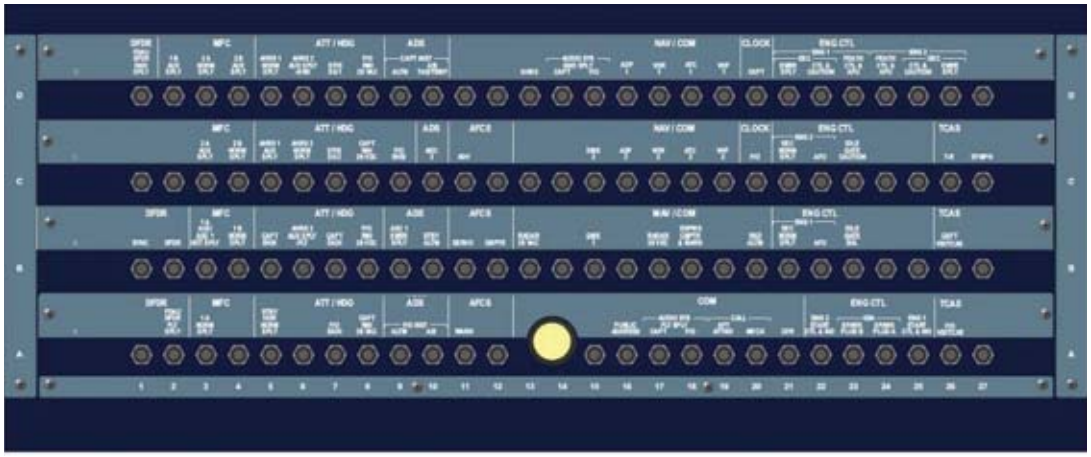
BTC (green flow bar)
Auto closure when either ACW GEN drops off line

ACW GEN 2 and ACW GEN 1
Min NP for ACW = 66 %.
The fuel governing mode maintains a MIN NP of 70.8% to be always above 66%.
The fuel governing mode is cancelled with the propeller feathered (No ACW)

6. Breaker panels

ATA 24

6.1. Overhead panel



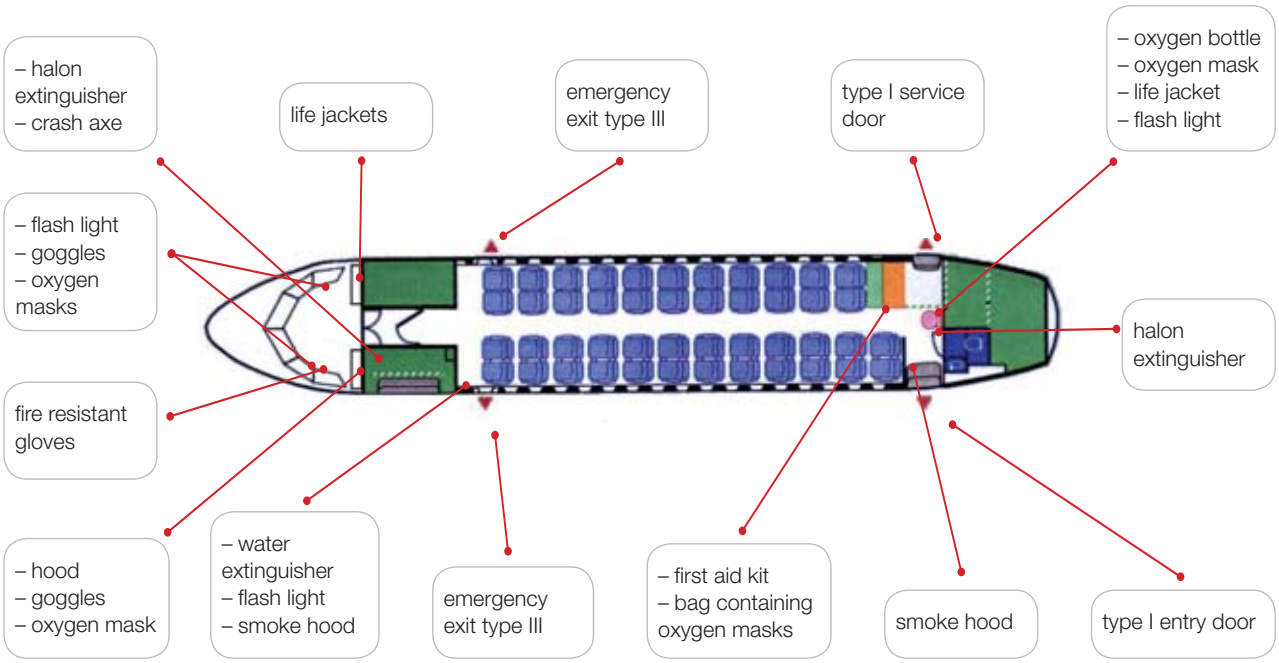
6.2. Electric rack behind F/O

H. Emergency equipment

FCOM 1.07

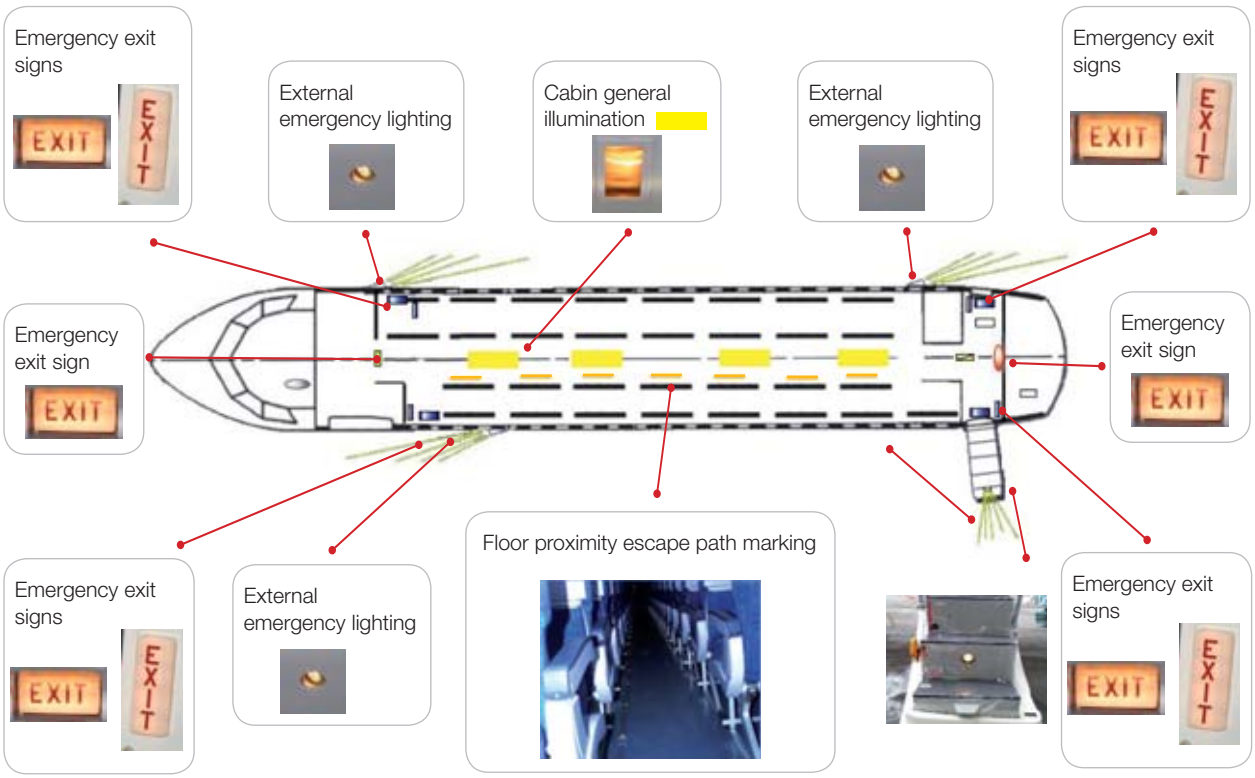
The aircraft is equipped with fire fighting, oxygen, first aid equipment and emergency lightning.

1. Emergency equipment situation



2. Emergency lighting system

ATA 33



3. First aid kit

ATA 25

contains bandages, burn dressings, small adhesive dressings, antiseptic wound cleaner, adhesive wound closures, disposable resuscitation aid, wound dressings, large and small, adhesive tape, safety pins and scissors, simple analgesic, antiemetic, nasal decongestant, first-aid handbook, splints, suitable for upperand lower limbs, gastro-intestinal antacid, anti-diarrhoel medication, disposable gloves

4. Crash axe

ATA 25

Crash axe with pick and edge Handle insulated up to 2000V to open of a door or a compartment

5. Megaphone

ATA 25

megaphone 72 only

6. Flashing light

ATA 25

With batteries, morse code switch

7. Life jacket

ATA 25

With oral inflation tube, CO2 sparklets, inflation red toggle, whistle, straps, battery, light

8. Escape rope

ATA 25

used to evacuate the cockpit

9. Gloves — ATA 25

To protect against fire

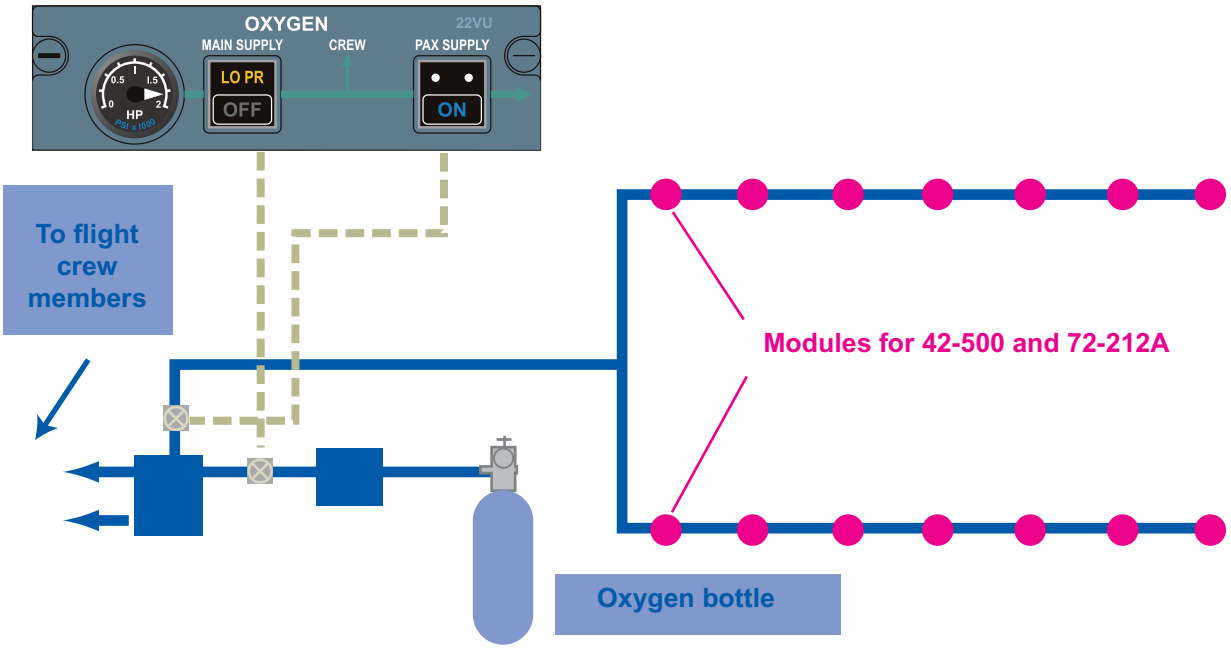
10. Water extinguisher — ATA 26

Water extinguisher
2 liters of water with an anti-ice additive
discharge time: 30 to 40 “

11. Halon extinguisher — ATA 26

Halon extinguisher
1.2 kg of halon gas
discharge time: 8 to 10 “

12. Oxygen schematic — ATA 35

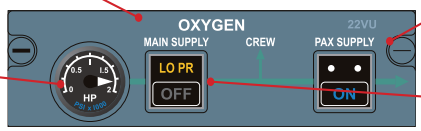


13. Oxygen panel

ATA 35

MAIN SUPPLY
pb in: crew supply only

HP INDICATOR
oxygen bottle pressure.
Red arc 0 to 85 psi
Green arc 85 to 2025 psi
If below 1400 psi, use table



PAX SUPPLY
ON 25% for 42-500/72-212A

LO PR
supply below 50 psi

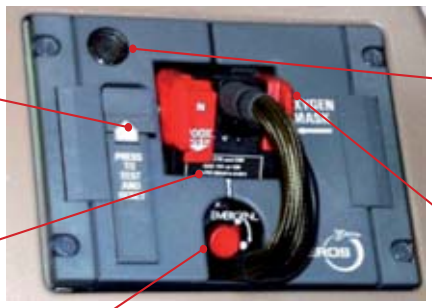
14. Cockpit crew oxygen mask

ATA 35

PRESS TO TEST AND RESET
permits a test of oxygen flow without removing the mask from the container. It is springloaded to the reset position

N/100% PUSH
rocker controls the selection of normal or 100% oxygen for mask delivery. It is locked in the 100% position by the unlock rocker

EMERGENCY
selector activates pressurization of mask delivery flow when N/100% rocker is at 100%



BLINKER
displays a yellow cross when there is oxygen flow and black when there is none.

OXYGEN MASKS
quick donning inflatable harness type release clips: squeezing them to unlock the container doors

15. Portable oxygen bottle

ATA 35

Portable oxygen bottle (green)
with pressure gauge and
re-charge valve
120 liters under pressure
(1800 psi)
duration: 30 min at 4 ltr/mn
– 1 bottle –> 42-500
– 2 bottles –> 72-212A

16. Passenger oxygen mask

ATA 35

–12 Oxygen masks for 42-500
–19 Oxygen masks for 72-212A
equipped with valves, bag and elastic strap

17. Protective breathing equipment

ATA 26

Protective breathing equipment (PBE)
to supply 15 min pure oxygen with hood, visor, speaking diaphragm and oronasal mask
– 2 PBE –> 42-500
– 3 PBE –> 72-212A

PBE
stowage box

I. Fire protection

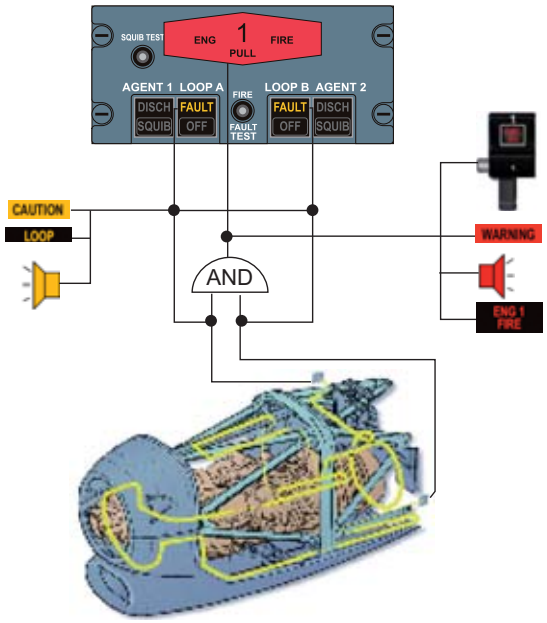
FCOM 1.08

The fire protection system provides detection, warning and extinguishing for each engine, cabin and lavatory.

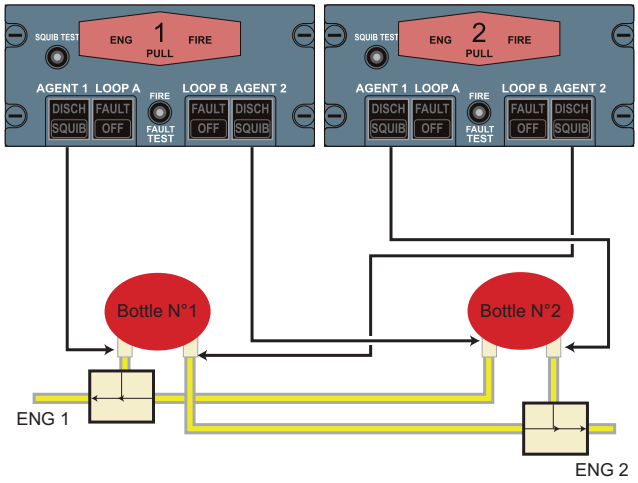
1. Schematic

ATA 35

FIRE DETECTION



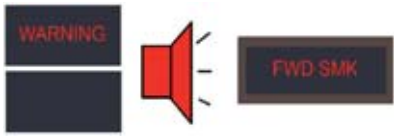
FIRE EXTINGUISHING SYSTEM



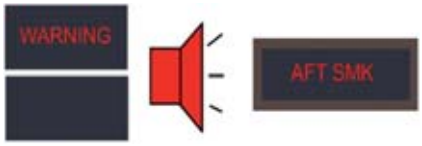
2. Avionics FWD and AFT smoke detection

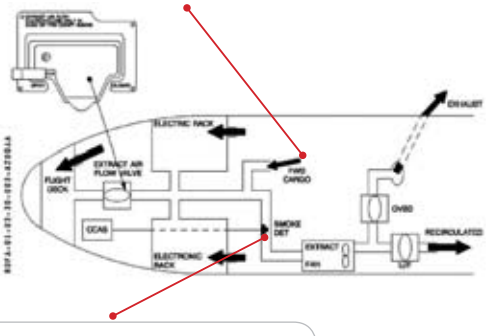
ATA 35

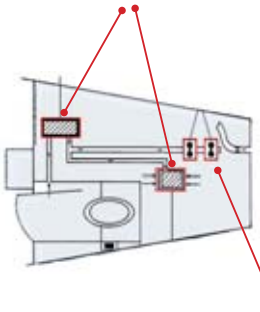
FORWARD CARGO SMOKE DETECTION



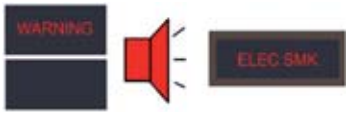
AFT CARGO OR LAVATORY SMOKE DETECTION







AVIONICS COMPARTMENT SMOKE DETECTION



AIR CAUTION / FAN FAILURE

3. Fire handle

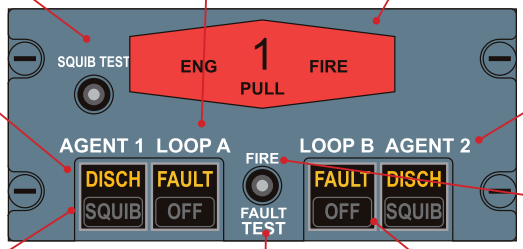
ATA 35

SQUIB TEST
Electrical test of the squibs

LOOP
FAULT: change in resistance, inhibits fire signal until turned off.
Loop on CAP (DC emer)

ENGINE FIRE HANDLE
Pulled on the respective engine:
– PROP: feather
– FUEL: LP valve closed
– AIR: BLEED and HP valve closed
– DEICING: deice and shutoff valve closed
– ELEC : DC and ACW gen. disconnected
– SQUIBS armed Its illumination
+ Hydraulic to prop brake closed on engine 2

AGENT 1
DISCH: Bottle depressurized. Opposite agent DISCH light will also illuminate on other fire panel. Bottle located in the wing fairing of the associated side



Agent 2 bottle located on the opposite side

FIRE TEST
MW + CRC + ENG 1 FIRE on CAP + fire handle illuminated + FUEL S/O light on CL (if out of FUEL S/O position)

AGENT
SQUIB
armed when T handle pulled.
Discharges bottle.
(DC EMER/HOT MAIN BAT)

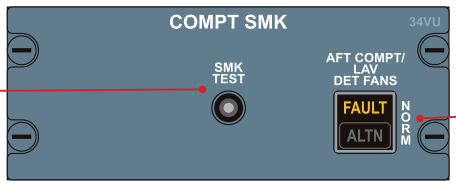
FAULT TEST
MC + SC + LOOP on CAP
Fault lights in A/B loop pb

OFF
takes respective loop out of parallel circuit. Allows other loop to activate fire signal alone.

4. Compartment smoke panel

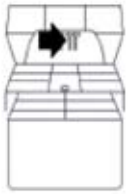
ATA 35

SMK TEST
Tests the smoke detectors working



NORM
one fan runs
FAULT: the fan is out of order and illuminates amber + CCAS is activated
ALTN: The alternate fan runs, ALTN light illuminates white

5. Condition levers fuel light



ATA 35

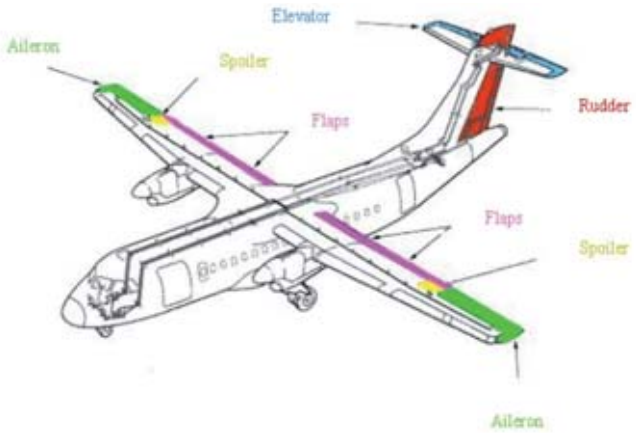
FUEL SO
Illuminates red in case of fire signal from associated engine. Extinguishes after CL is set at fuel shut off position or if fire detection signal stops

J. Flight control

FCOM 1.09

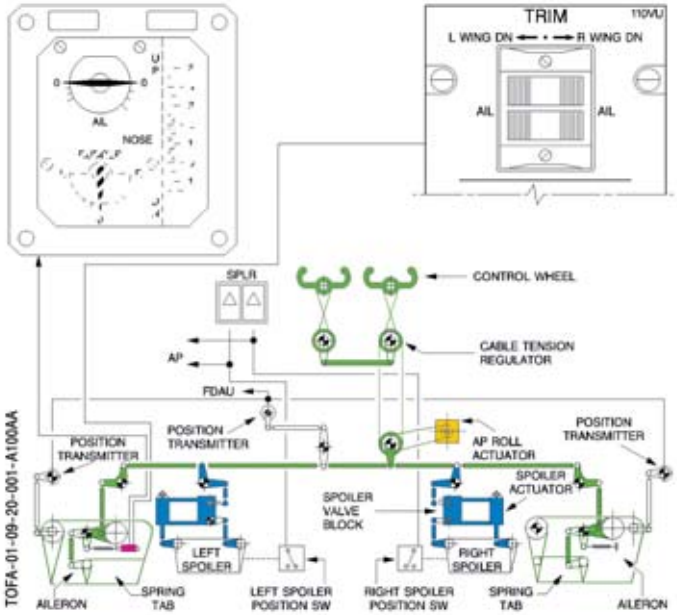
The elevators, ailerons and rudder are mechanically actuated

The spoilers and flaps are hydraulically actuated.



1. Roll schematic

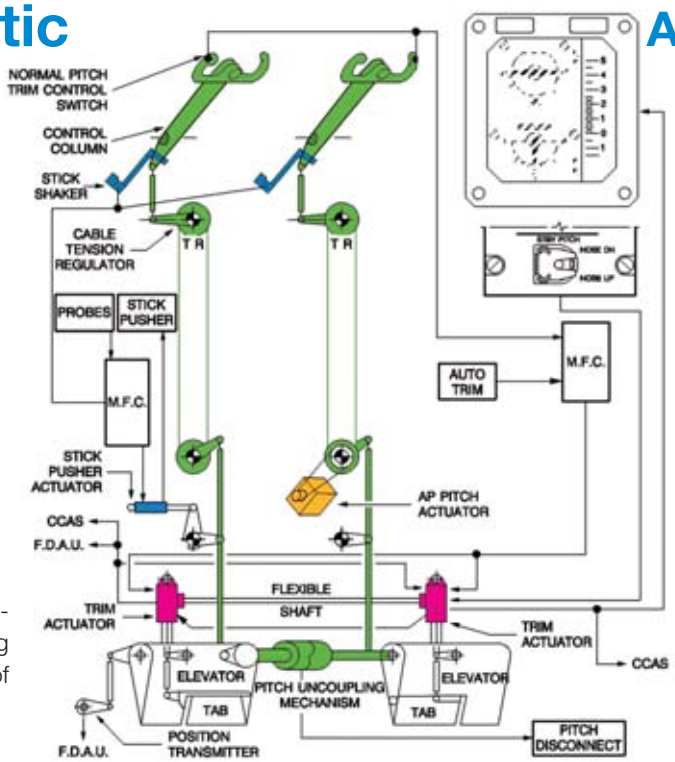
ATA 27



2. Pitch schematic

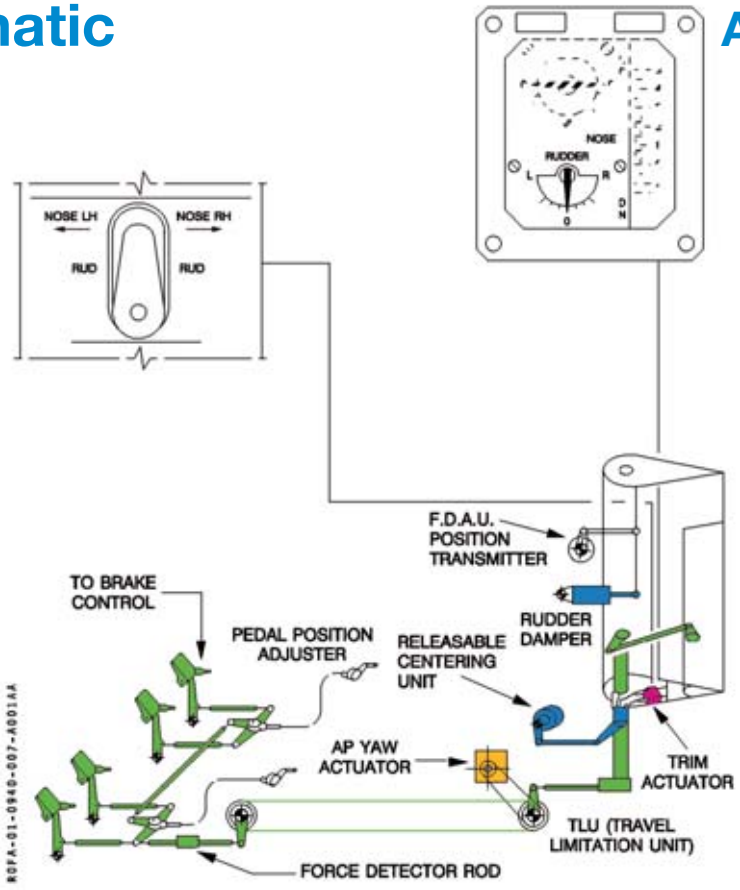
ATA 27

In case of jamming, pitch control will be recovered by disengaging the pitch coupling system (by applying a differential force of 52 daN).



3. Yaw schematic

ATA 27



4. Gust lock

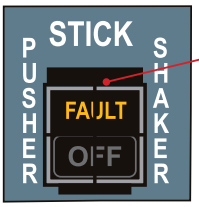
ATA 27

GUST LOCK lever
permits to lock mechanically the roll and pitch axes against the wing gusts. The PL travel is limited to slightly above FI.

For aircraft equipped with a spring tab on the aileron, the roll locking system is composed of two electro-mechanical locking devices.
The AIL LOCK is triggered whenever one of the locking actuators is in disagreement with the gust lock position (lock or unlock position)

5. Stick Shaker/Stick Pusher push button and light

ATA 27



STICK SHAKER/PUSHER PB
– **FAULT** light indicates a stick pusher or stick shaker failure
– OFF position: enables to switch OFF the stick pusher and the stick shaker system

PITCH PUSHER
illuminates to indicate that the stick pusher is operating

6. Spoilers position indicator

ATA 27

SPOILERS position indicator
When illuminated, each blue light indicates that the associated spoiler is not in the fully retracted position (more than 2.5° aileron travel)

7. Pitch trim asym light

ATA 27

PITCH TRIM ASYM
light illuminates to indicate a pitch tabs desynchronization greater than 0.7°

8. Trim position indicator

ATA 27

72PEC

42PEC

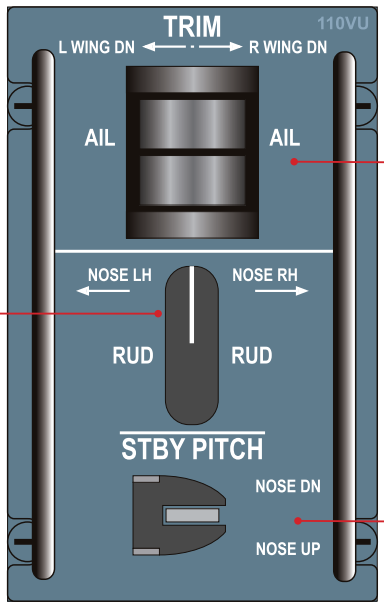
Pitch trim position
indicates the right trim actuator controlled tab travel.
A green sector identifies the take off range. If take off (or take off config test) is performed with pitch trim out of this range, CONFIG warning will be generated by the CCAS.

Roll trim position
indicates the LH aileron trim controlled tab travel

Yaw trim position
indicates units of trim motor displacement

9. Trim controls

ATA 27



Roll TRIM control SW
controls the roll trim actuator. For operation, both sws must be moved and held in the same direction (L WING DN or R WING DN) to energize the system (safety reasons). The roll trim is inhibited during autopilot operation.
When the autopilot is engaged, the "**RETRIM ROLL R(L) WING DOWN**" message can be triggered on the ADU. This message authorizes to retrim on the dedicated side. the other side is still inhibited

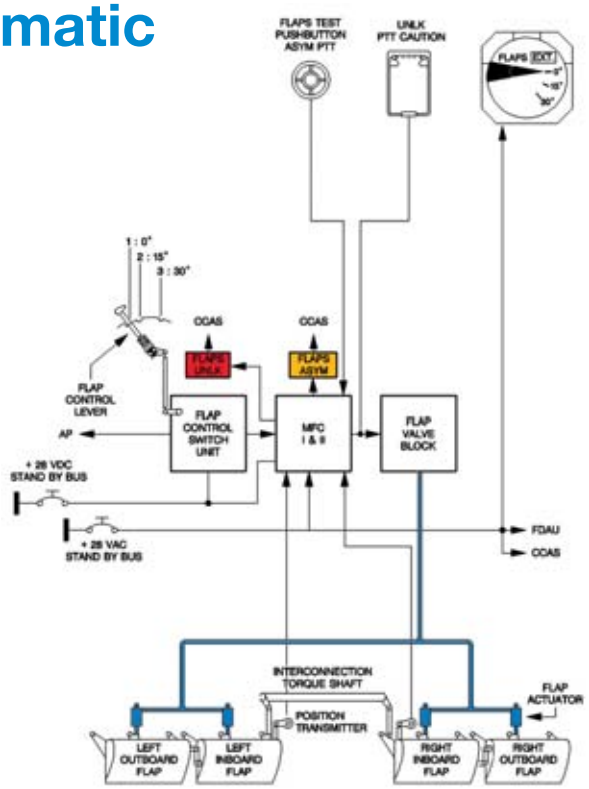
Yaw TRIM control switches
controls the yaw trim actuator. As a safety device both levers must be moved and held in the same direction (nose LH or nose RH) to energize the system and trim the aircraft. When used, the RCU is declutched

STBY PITCH control SW
is a guarded sw which controls the electrical motors of each trim actuator.
Action on this switch will disengage the autopilot.

Pitch trim rocker
two switches installed on each control wheel. It is necessary to operate both rocker switches to activate the normal electrical motor of each trim actuator and to control nose up or down. The switches are spring loaded to neutral position.
An aural whooler is generated by the CCAS if trim is used for more than 1 second.
Action on this switch will disengage the autopilot.

10. Flaps schematic

ATA 27



11. Flaps position indicator

ATA 27

ATR 72 PEC

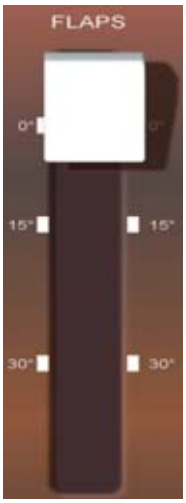
ATR 42 PEC

EXT flag
appears to indicate that the flaps valve is hydraulically commanding flap extension. If EXT flag appears when flaps are extended, it means that there is a leak in the flaps hydraulic circuit

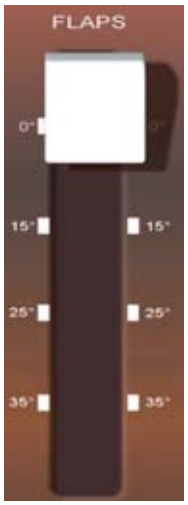
FLAPS position indicator
shows the flaps position

12. Flaps control lever

ATA 27



ATR 72 PEC



ATR 42 PEC

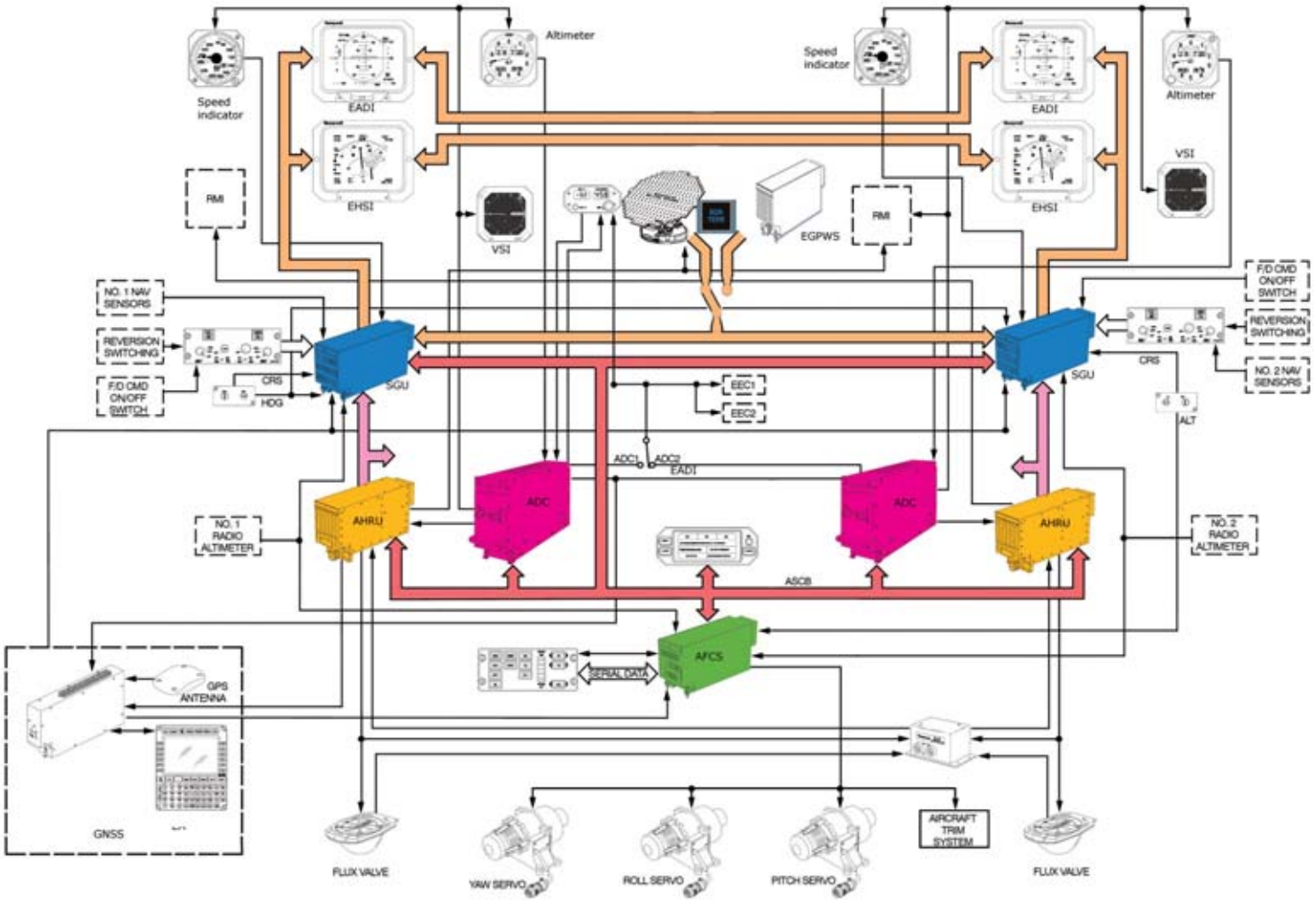
FLAPS control lever
controls the flaps operation. Distinct positions correspond to flaps 0°, 15°, 30° (72PEC) or 25°, 35° (42PEC)

K. Flight instruments

FCOM 1.10

1. Schematic

ATA 34, 22



The Avionics Standard Communication Bus (ASCB) system allows transmission of data in all directions between computers of the aircraft. The ASCB is controlled by the AFCS computer

Private line: When the ASCB is failed, the private line is used as a back up, to transmit data from the AHRU to the SGU.

Video Bus

AFCS (Auto Flight Control System) receives data from the two ADC, AHRS, SGU, the radio altimeter, the GNSS and from some sensors. It generates commands to the flight control actuators and to the FD bars. The AFCS is the ASCB controller too.

AHRU (Attitude and Heading Reference Unit) includes an Inertial measurement unit (INU) composed of three gyrometers and three accelerometers. The AHRU receives inputs from its associated flux valve and the TAS, fed by both ADC, is used to compute gyro erection

ADC (Air Data Computers) is supplied with static air pressure (static ports), total air pressure (pitot ports), total air temperature (TAT probe). With these inputs, the ADC computes pressure altitude, VS, IAS, TAS, TAT, SAT.

SGU (Symbols Generator Unit):
- collects all the data, coming
  * from the ASCB (AFCS, AHRU, ADC)
  * from navigation sources (VOR, ILS, DME, ADF, GNSS)
  * from the remote controller (CRS, HDG)
- converts the data in video format, for the EFIS (EADI, EHSI)
- transfers the video data, from the weather radar or the EGPWS to the EHSI

2. EADI

ATA 34

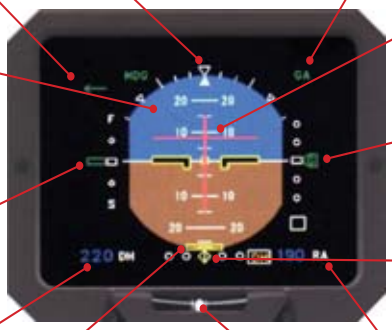
Lateral **ARM** and **CAPTURE** mode

ROLL ATTITUDE
scale 0 , 10, 20, 30, 45 and 60°

Vertical **ARM** and **CAPTURE** mode

Horizon and pitch scale
is white and has reference marks at 5, 10, 15, 20, 30, 40 and 60° nose up and 5, 10, 15, 20, 30, 45 and 60° nose down. Above 40° nose up and below 30° nose down, red arrows come into view

FLIGHT DIRECTOR
command bars (magenta)



GLIDESLOPE indication

FAST/SLOW indicator
shows the difference between speed bug and actual speed (±10 Kts)

LOCALIZER indication

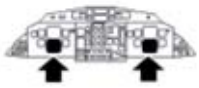
DH indication

RADIO ALTITUDE indication

Runway symbol
appears lower than 200 ft

SLIP indicator

3. EHSI



ATA 34

HDG BUG
selected by the remote HDG knob

NAV SOURCE annunciator

DISTANCE display
to the selected VOR/DME or ILS/DME station

POINTER (O)
indicates the bearing to a station by N°1 system (VOR 1 or ADF 1).

CRS pointer and deviation

POINTER (◇)
indicates the bearing to a station by N°2 system (VOR 2 or ADF 2)

GROUND SPEED/TIME TO GO
annunciator

4. EHSI with composite mode

ATA 34

HDG select display

Selected **COURSE POINTER**

Selected **HDG BUG**

HDG SCALE

5. EHSI - ARC MODE with terrain or weather radar information

ATA 34

TERRAIN

WEATHER RADAR

QUADRANTAL HEADING SCALE
ARC with quadrantal heading scale MODE on an arc showing 45° either side of actual heading

044 Digital heading display

SELECTED RANGE SCALE

6. Source failure alert

ATA 34

SGU FAILURE alert
A and B part failure and all information disappears from EADI and EHSI

SGU FAILURE alert
C part failure and a red cross appears on EADI and EHSI

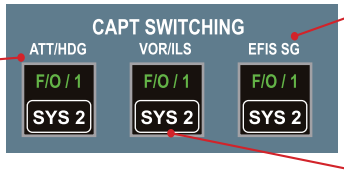
AHRS FAILURE
the associated information immediatly disappear from both CRTs. ATT FAIL message is displayed

AHRS FAILURE
the associated information immediatly disappear from both CRTs. HDG FAIL message is displayed

7. Sources switching panel

ATA 34

ATT/HDG pb
enables to use AHRS 2 information. When captain pb is depressed SYS 2 illuminates white on CAPT pb, CAPT 2 illuminates green on F/O pb



EFIS SG
enables to use SGU 2 information. When captain pb is depressed SYS 2 illuminates white on CAPT pb, CAPT 2 illuminates green on F/O pb

VOR/ILS pb
enables to use VOR/ILS 2 information. When captain pb is depressed SYS 2 illuminates white on CAPT pb, CAPT 2 illuminates green on F/O pb

8. EFIS control panel

ATA 34

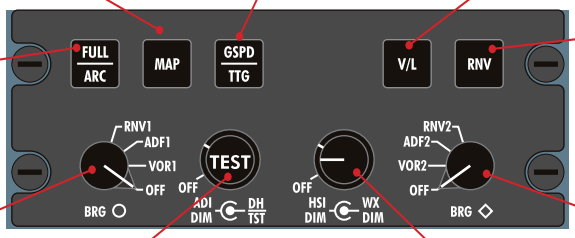
MAP pb
permits to select MAP selection with waypoints of the flight plan

GSPD/TTG pb
permits to select ground speed or time to go

V/L pb
to select the VOR/LOC mode

FULL/ARC pb
permits to select FULL or ARC mode on EHSI

RNV pb
to select the GPS mode



N°1 BRG (○)
selector to select blue bearing pointer to VOR 1 or to ADF 1 or to GPS active waypoints (RB NAV 1)

N°2 BRG (◇)
selector to select green bearing pointer to VOR 2 or to ADF 2 or to GPS active waypoints (RB NAV 2)

ADI knob
– outer knob (ADI DIM) to select ON/OFF and to set brightness
– Inner knob (DH TST) to set decision height from –10 to 990 ft + test if you push it
– TEST: to test EFIS System and the radioaltimeter (RA)

HSI knob
– outer knob (HSI DIM) to select ON/OFF and to set brightness
– inner knob (WX DIM) to set ON/OFF weather radar traces

9. Weather radar control

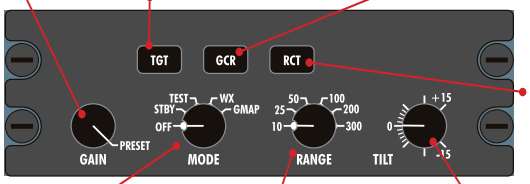
ATA 34

9.1. Primus 800

GAIN
setting to set receiving amplification

MODE selector
OFF radar is off
STBY radar is ON but no pulse is sent by antenna
TEST range at 100 NM, 3 arcs green, yellow and red
WX normal operating position, intensity of weather obstacles is displayed by different colors (black: no cloud; green: normal cloud; yellow: dense; red: severe storm)
G MAP enables to display ground obstacles (black, pale blue, yellow, magenta)

TGT pb
activates target alert



GCR pb
activates ground clutter reduction function to discriminate echoes usually coming from the ground

RCT pb
activates Rain Echo Attenuation Compensation technique function and permits display with more accurracy the weather situation behind storms

RANGE selector
to select the distance scale. 2 concentric arcs of circle are displayed

TILT control
to adjust radar antenna in pitch axis from 15° down to 15° up

9.2. Primus 660

The range pusbutton are used to select the operating range of the radar

GAIN
setting to set receiving amplification

MODE selector
OFF radar is off
STBY radar ins on but no pulse is sent by antenna
TEST range at 100 NM, 3 arcs green, yellow and red
WX normal operating position, intensity of weather obstacles is displayed by different colors (black: no cloud; green: normal cloud; yellow: dense; red: severe storm)
G MAP enables to display ground obstacles (black, pale blue, yellow, magenta)

RCT pb
activates Rain Echo Attenuation Compensation technique function and permits display with more accurracy the weather situation behind storms

TGT pb
activates target alert

TILT control
to adjust radar antenna in pitch axis from 15° down to 15° up

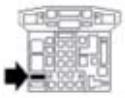
Turns the pitch and roll stability on and off. When selected off, an amber legend illuminates above the pushbutton

10. AHRS erect PB

ATA 34

AHRS erect pb
illuminates amber when the associated AHRS loses the TAS signal from the ADC.
If the aircraft is stabilized (unaccelareted level flight) a gyro fast erection may be performed by depressing the associated pb for 15 s.

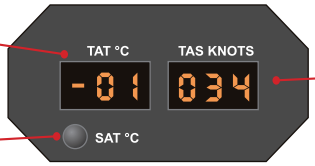
11. TAT/SAT indicator



ATA 34

TAT indicator
indicates total air temperature

SAT indicator push button
indicates static air temperature, when pushed



TAS indicator
indicates true air speed

12. CLOCK

ATA 34

CHRONO
depress once to start, once to stop, once to reset

TIME KNOB
Pull then rotate knob to set time

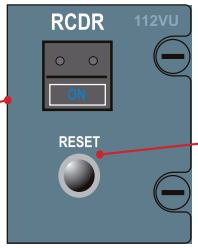
CLOCK
Hours and minutes pointer

REVOLVING BEZEL
Indicates elapsed time from start mark

13. RCDR panel

ATA 34

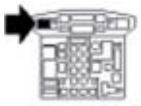
RCDR pb
when depressed, both cockpit voice recorder and digital flight data recorder are energized (manual mode). ON lt illuminates blue



RESET pb
when depressed, inhibits recording in the manual mode

14. STBY instruments

ATA 34

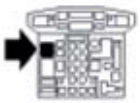


STANDBY COMPASS
Hidden in up position. Compass control should be place on DN for use. The compass rose is graduated in 10 degrees increments

STANDBY AIRSPEED INDICATOR
displays the airspeed as calculated from standby static and standby pitot pressures. Scale from 40 Kt to 320 Kt

STANDBY HORIZON
Attitude sphere marked every 5 degrees of pitch axis, to ±80 degrees. Roll angle is given by a scale marked at 10, 20, 30, 60, and 90 degrees
Setting knob when pulled, causes a rapid erection if the instrument is powered

STANDBY ALTIMETER
With baro set knob, altitude pointer and Hpa counter



15. Airspeed indicator

ATA 34

AIRSPEED INDICATOR
displays the airspeed. Scale from 60 Kt to 400 Kt.

VMO POINTER
in red and white strips indicates the max airspeed computed by the associated ADC which represents VMO/MMO. An aural warning (clacker) will be generated by the CCAS if overshoot

MOVABLE INDICES
(bugs) in four colors

OFF/RED FLAG
indicates a failure affecting the VMO channel or the airspeed indicator

SPEED SELECTOR
to set a desired speed during a given phase of flight and controls the reference on the EADI FAST/ SLOW scale.

16. Altimeter

ATA 34

ALTIMETER
With baro set knob in Hpa and IN HG

ALTITUDE ALERT
It illuminates amber when altitude alert is triggered (-+ 1000 ft or +- 250 ft)

ALTIMETER
With baro set knob in MB and IN HG

17. RMI

ATA 34

Selector switch
permit to switch VOR 1 or ADF 1 information which is represented on simple yellow needle.

RADIO MAGNETIC INDICATOR (RMI)
is coupled to the opposite AHRS with a compass rose, showing magnetic heading, two pointers.

Selector switch
permit to switch VOR 2 or ADF 2 information which is represented on double green needle.

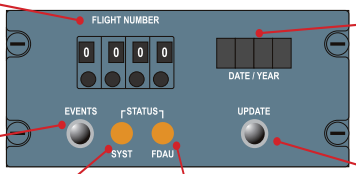
18. Flight data entry panel

ATA 34

FLIGHT NUMBER AND DATA ENTRY PANEL
panel enables through 4 thumwheels to insert different data: hour, minutes, month, day, year.

EVENTS pb
When momentarily depressed, the tape records are marked to identify a special event

STATUS SYST Lt
illuminates amber when
– the DRDR is failed
or – the DFDR or QAR (if installed) (quick access recorder) electrical power is lost
or – QAR (If installed) 80 % full



STATUS FDAU Lt
illuminates amber when the FDAU is failed

DATA DISPLAY
Date and time may be displayed and selected through the UPDATE pb and the data entry panel

UPDATE pb
first left thumbwheel of data entry panel must be on 9 position
– first sequence: hours and minutes
UPDATE pb depressed, the display flashes,
insert hour and minutes,
UPDATE pb depressed,
correction is taken into account and is displayed for 5 seconds
– second sequence: month and day
– third sequence: year

19. TCAS VERTICAL speed indicator

ATA 34

TEST switch
activates indicator self-test when depressed, indicator will display a test pattern

OPEN DIAMOND
shows other traffic. Range and bearing of other aircraft within surveillance range and selected range and altitude for display

GREEN ARC
recommandes vertical speed to resolve corrective resolution advisory

POINTER
(white) indicates present vertical speed. Pointer displayed when vertical speed is valid

SOLID CIRCLE
intruder. TA generated. Range and bearing relative to own aircraft

A/B Mode button
select display of traffic (relative to own aircraft altitude)
ABOVE: +9900 ft to –2700 ft
BELOW: +2700 ft to –9900 ft
In normal position, viewing of traffic from 2700 ft below to 2700 ft above

TRAFFIC DATA
(same color as associated traffic symbol): relative altitude of intruder aircraft. If altitude is not available, traffic data is not displayed

RANGE RING
(white) 2 miles radius range about own aircraft

RANGE (6 NM or 12NM)
selected forward range of traffic display

SOLID DIAMOND
traffic within ± 1200 ft and 6 NM of own aircraft

TRAFFIC ARROW
(same color as associated traffic symbol): climb or descent rate (>500 ft/min) of intruder aircraft

TRAFFIC DATA
Relative altitude of intruder aircraft

SOLID CUBE
traffic generates conflict. RA generated range and bearing relative to own aircraft

AIRCRAFT
own aircraft symbol

RNG
Range push button selects range of display. (6NM or 12NM)

RED ARC
do not enter range if vertical speed is outside of arc (preventive); Exit range if vertical speed is within arc (corrective resolution)

L. Fuel system

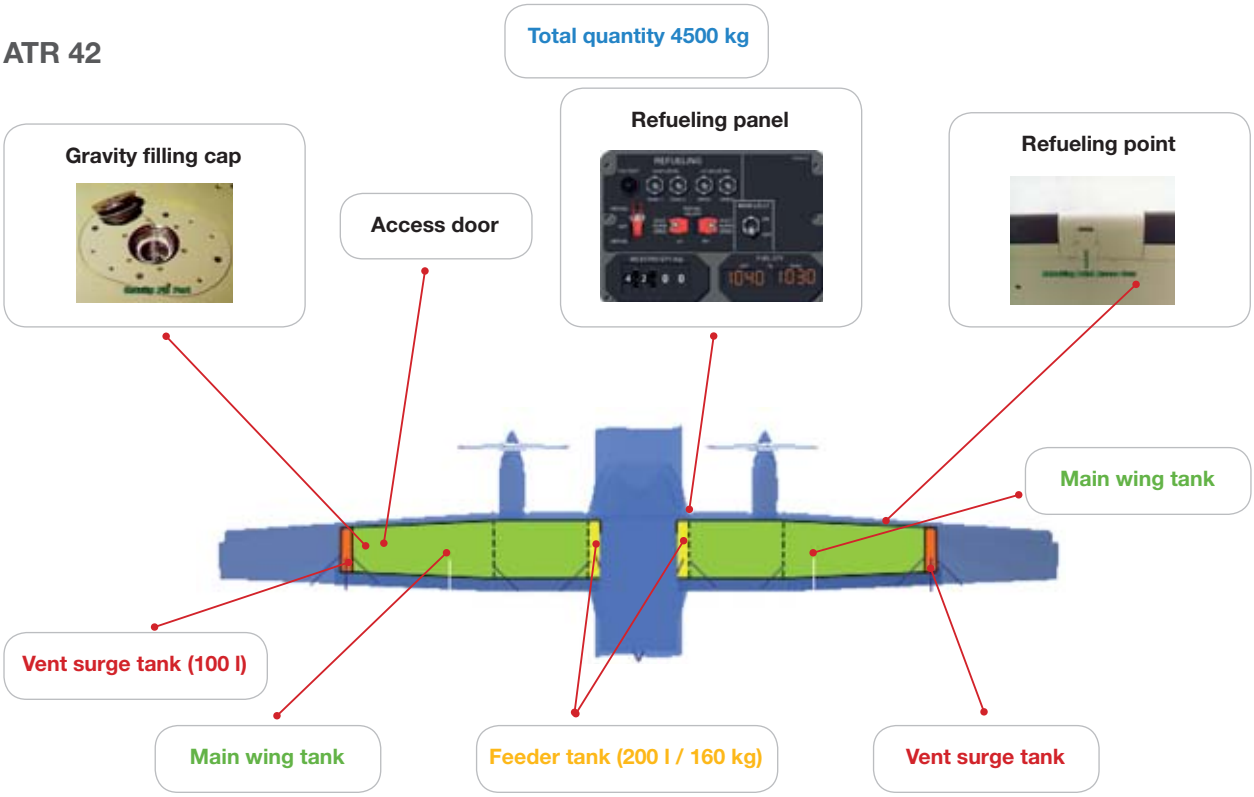
FCOM 1.11

1. Schematic

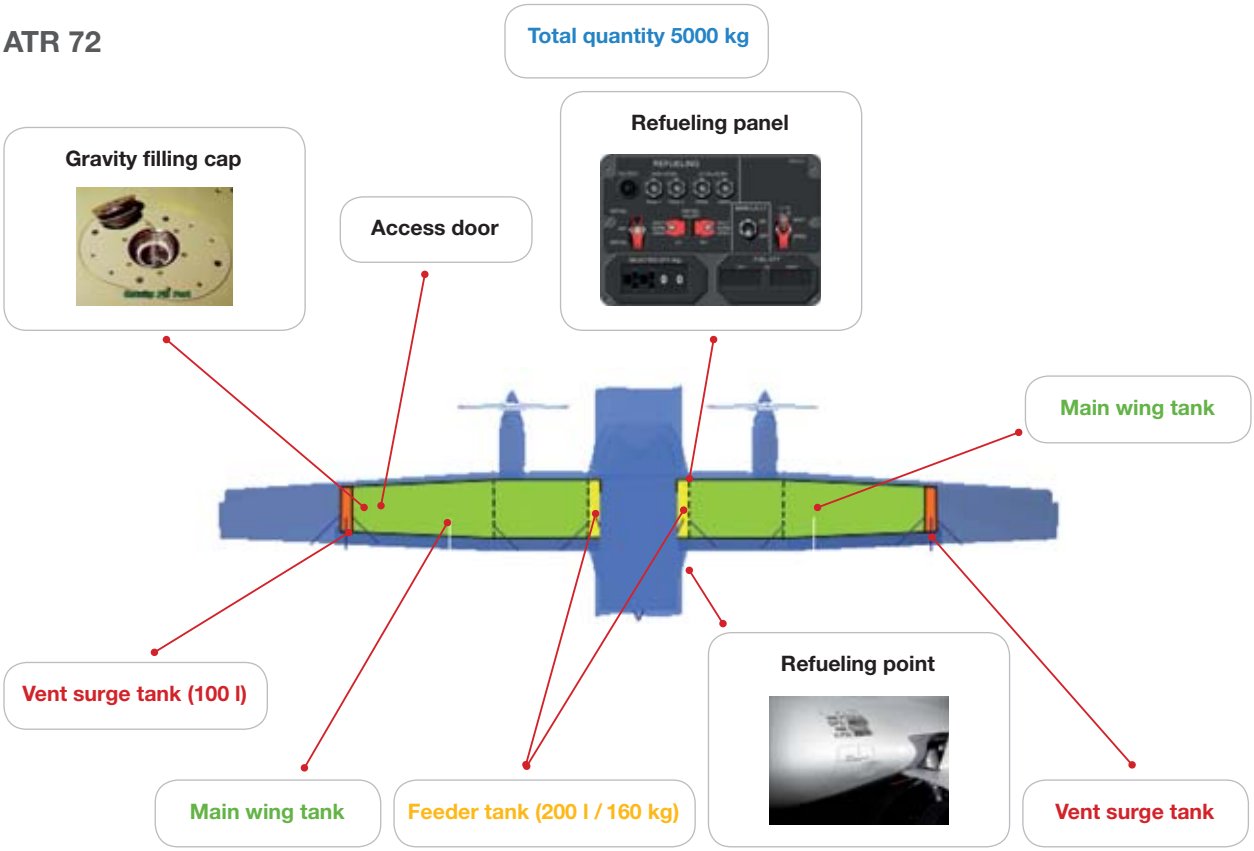
ATA 28

The fuel is stored in two tanks, one in each wing. Each tank is fitted with:
– a vent surge tank to ensure positive pressure and allows a thermal expansion without spillage
– a main wing tank
– a feeder tank, always full to protect the engine feed system against negative or lateral load factors

ATR 42

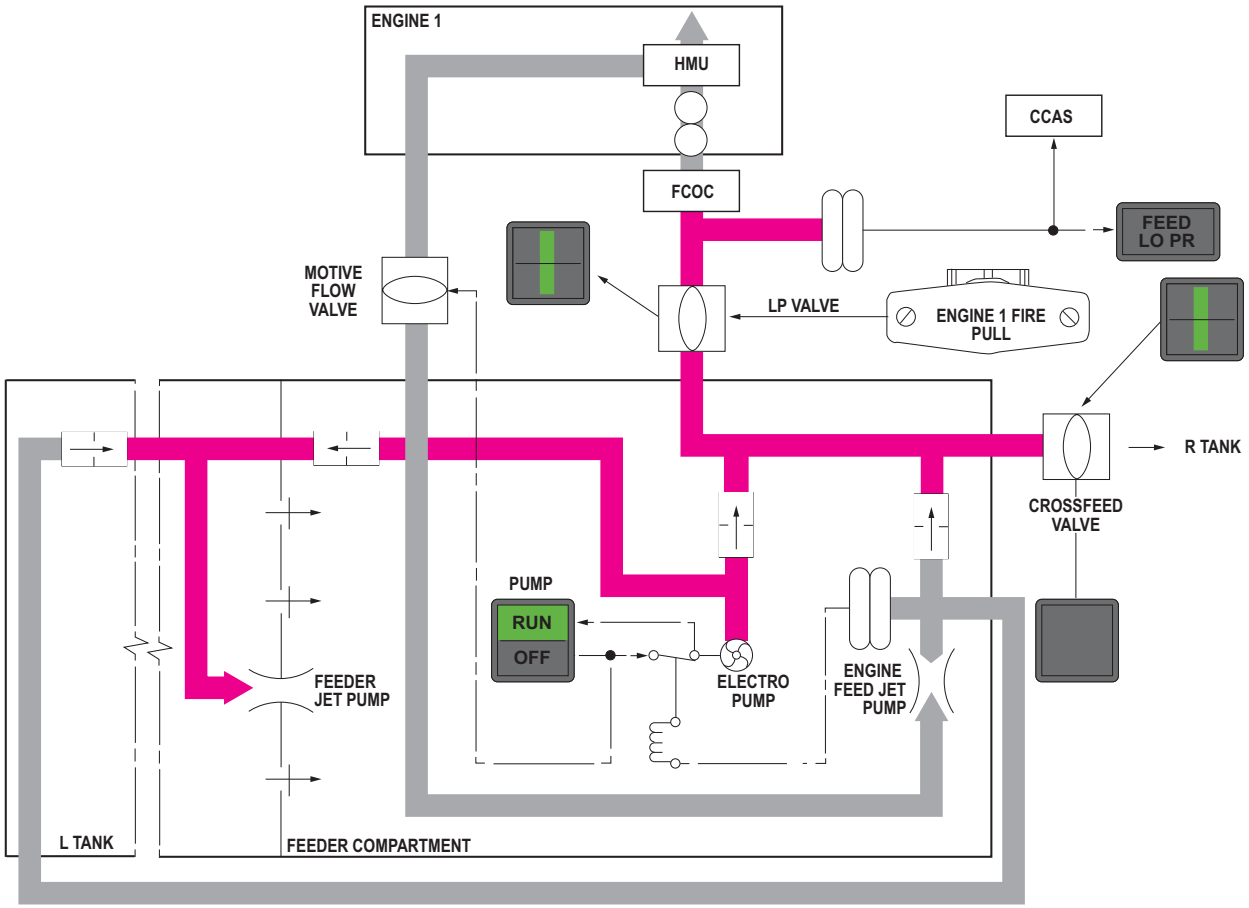


ATR 72



2. Starting procedure

ATA 28



ENGINE SHUT DOWN WITH ELECTRICAL PUMP RUNNING

Both fuel engine electrical pumps push buttons are pressed IN and green RUN lights illuminate.

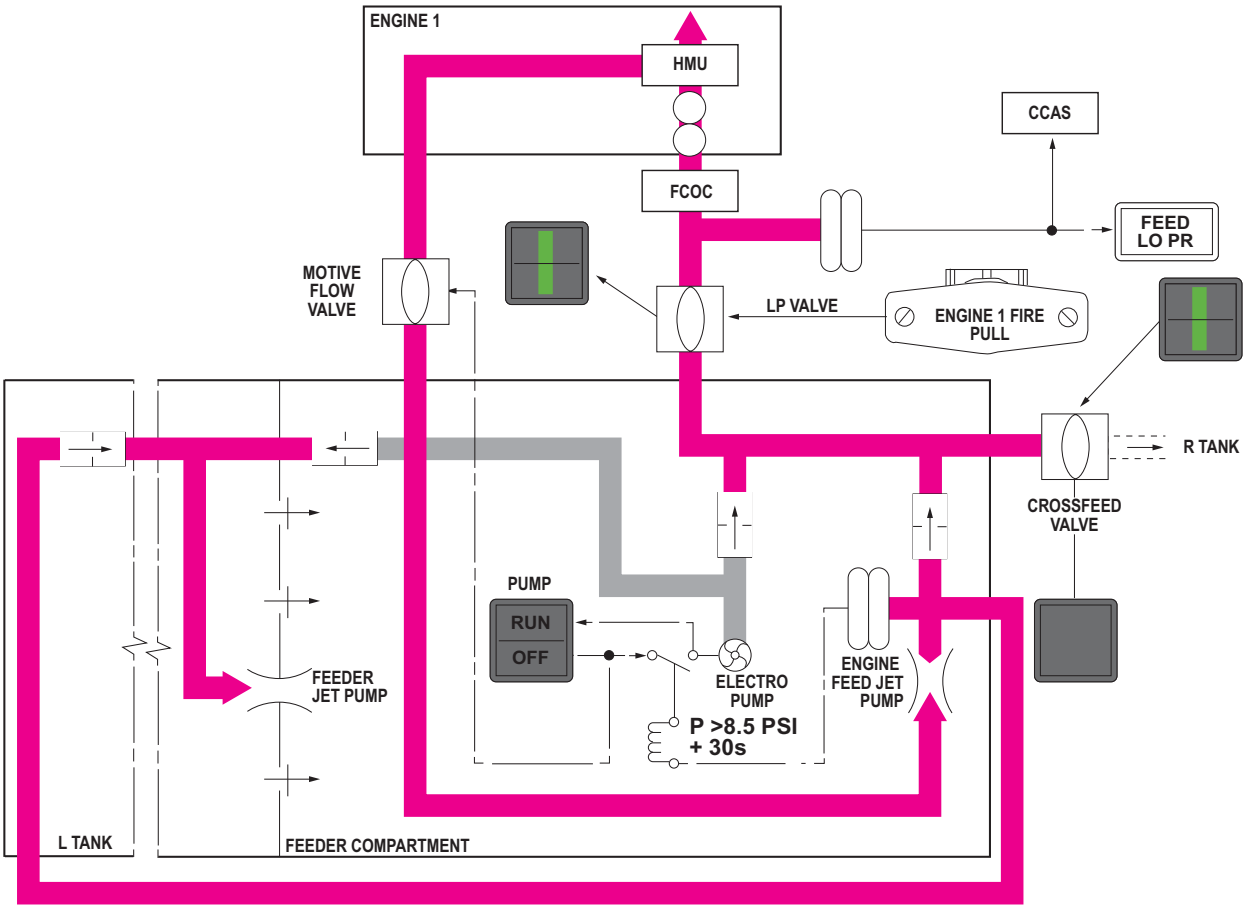
The electrical pumps are energized and begin to supply fuel to engines.

The FEED LO PR amber light extinguishes when the pressure is > 4 psi on the line.

At the same time, the feeder jet pump is activated by the electrical pump output pressure, to supply and maintain the feeder tank full.

3. Normal procedure

ATA 28



ENGINE RUNNING / NORMAL OPERATION OF THE FUEL SYSTEM

After engine starting, the flow, from return line of the HMU, opens the Motive Flow Valve, in order to supply the Engine Feed Jet Pump.

The Engine Feed Jet Pump begins to operate by driving fuel from the feeder tank.

At the same time, it supplies the Feeder Jet Pump.

When the Engine Feed Jet Pump outlet pressure reaches 8.5 PSI, the electrical pump is de-energized after 30s time delay.

In normal operation of the fuel system, the engine is only supplied by the Engine Feed Jet Pump and the electrical pump is de-energized.

Conditions to energize the electrical pump (See details on pages hereafter)

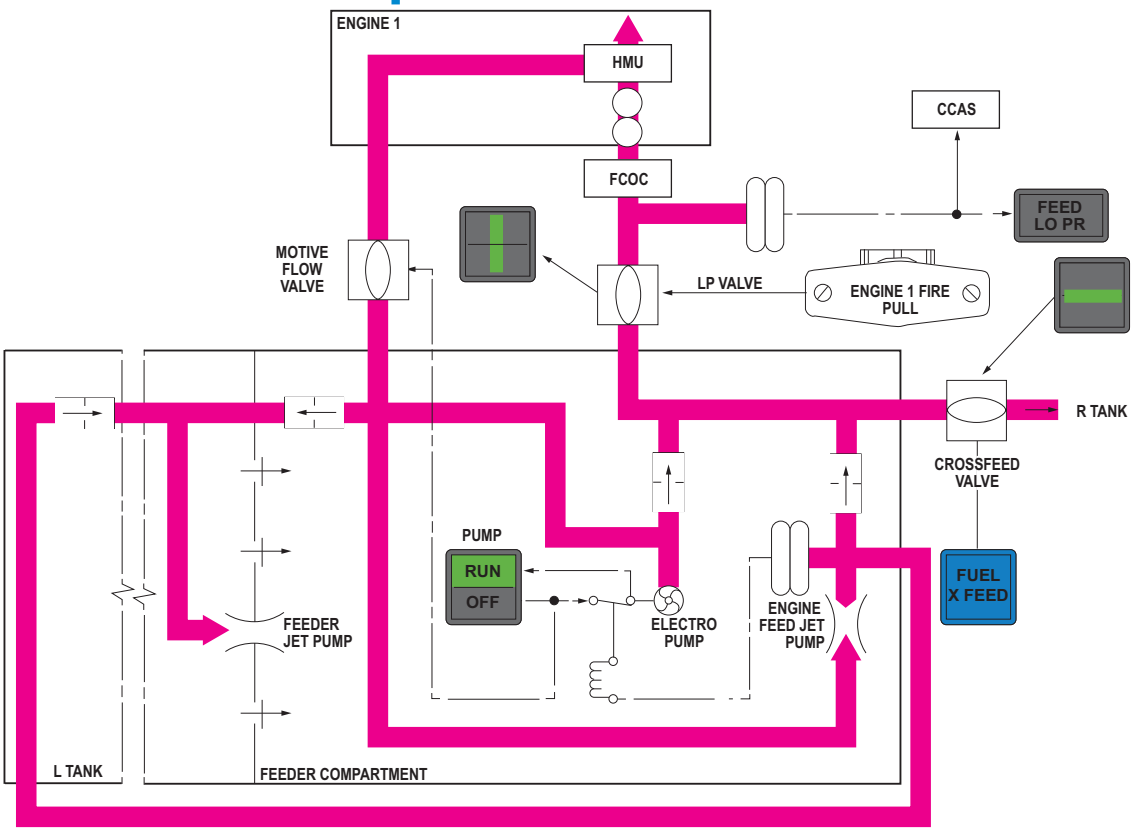
– Cross feed operation

– Engine Feed Jet Pump oulet pressure drops below 5 psi

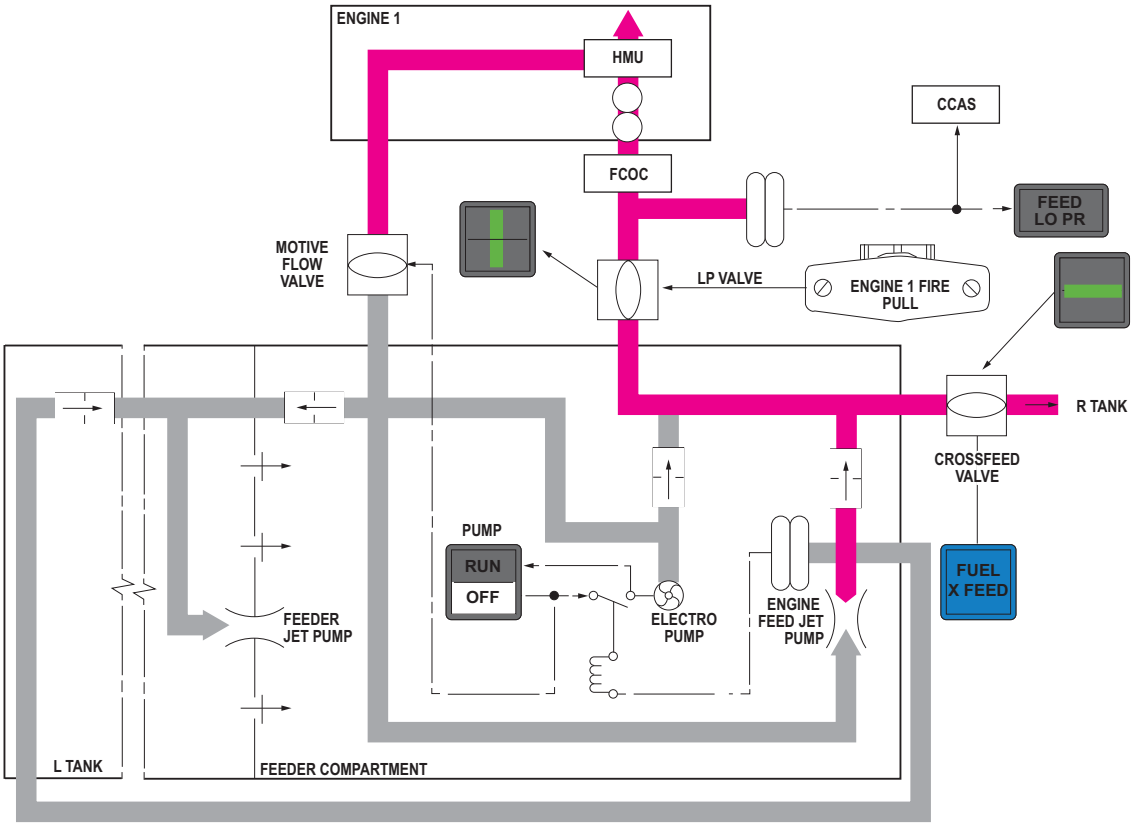
– Low Level

4. Cross feed procedure

ATA 28

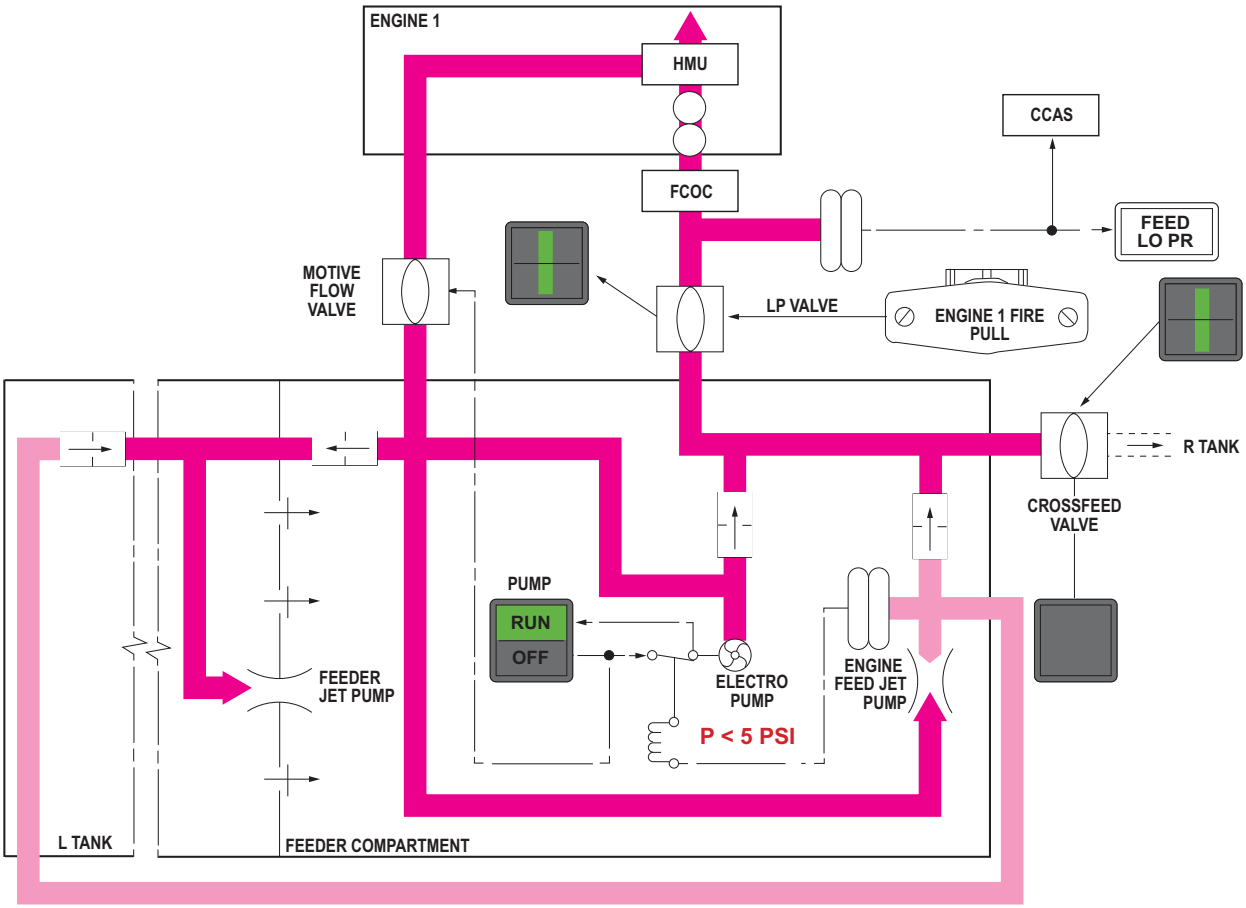


Cross feed valve could be used to supply an engine from the opposite tank.
The cross feed is not used to tranfer fuel from one tank to the other tank.
With the Xfeed valve push button pressed IN, the valve opens, green flow bar is horizontal. Both electrical pump are energized.



By selecting OFF the corresponding PUMP push button, the electrical pump is de-energized and the motive flow valve is supplied to close. The engine is fed through the opposite tank.

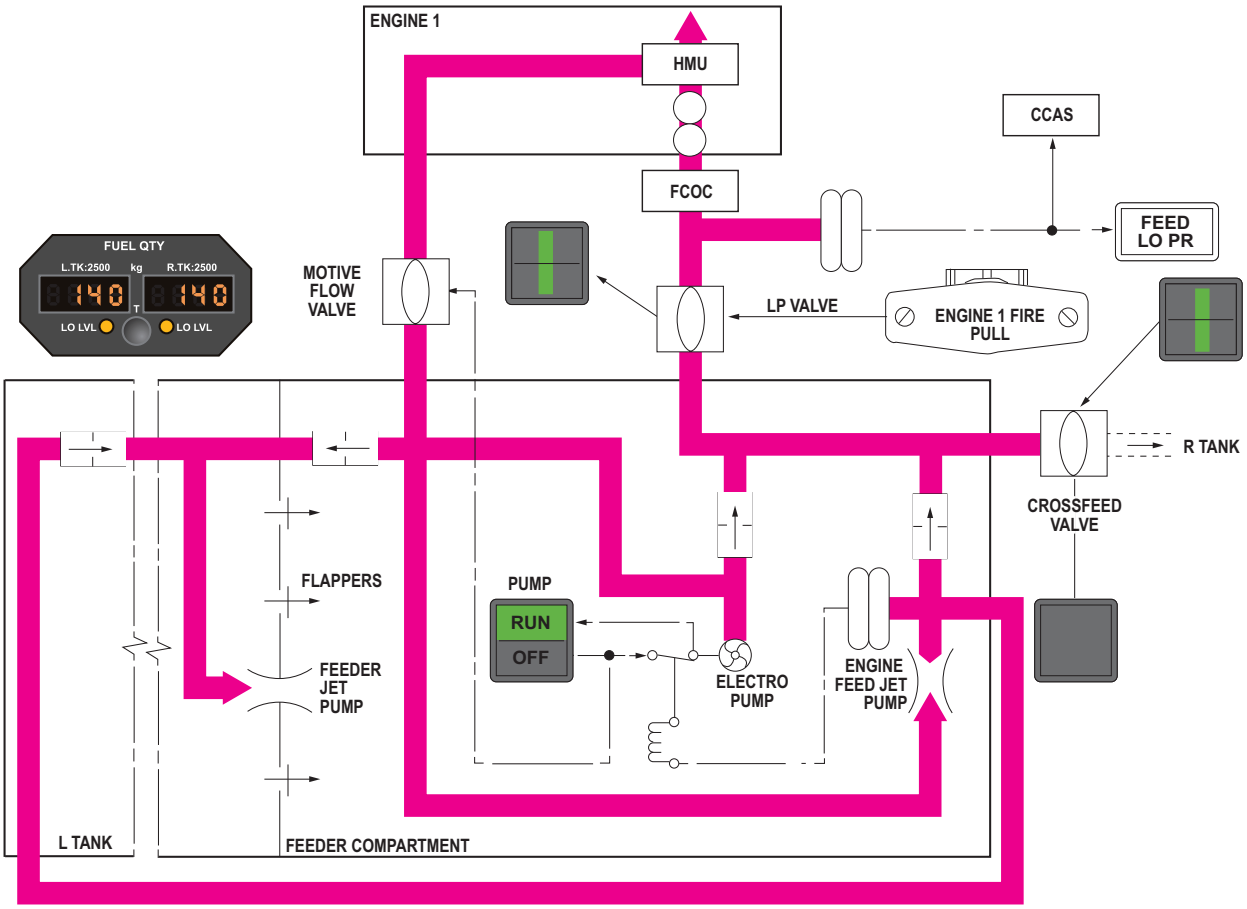
5. Engine feed jet pump low pressure ATA 28



In the event of engine feed jet pump failure, the pressure switch (< 5 psi)provides electrical pump running control which ensures fuel supply to the engine.
The electrical pump delivers the necessary flow rate for engine consumption.

6. Low level

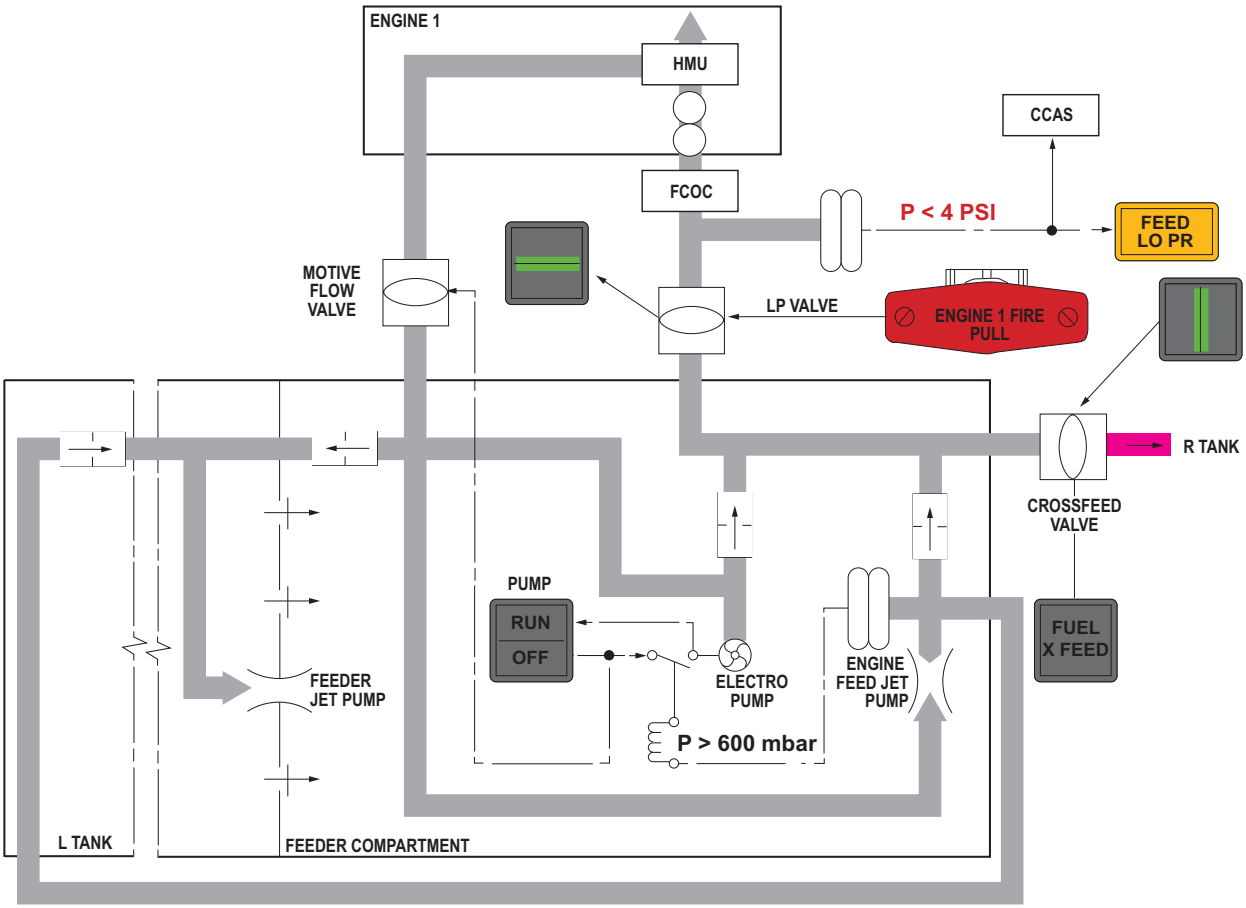
ATA 28



When the low level is triggered on one tank, its electrical pump is automatically activated.
Two cases of low level:
– LO LVL with fuel quantity indicator < 160 kg → Low level of the remaining fuel in the tank.
– LO LVL with fuel quantity indicator > 160 kg → Feeder tank not full due to a failure of the feeder jet pump. In this condition, the fuel is transfered from the main tank to the feeder tank through the flappers.

7. Engine fire procedure

ATA 28



In case of engine fire, when corresponding engine fire handle is pulled, it closes associated LP shut off valve.

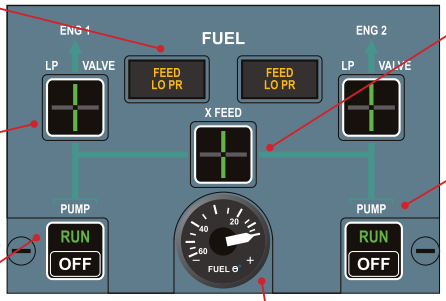
8. Fuel panel 

ATA 28

FEED LO PR
Delivery pressure < 4 PSI. Pump failure or fuel starvation. CAP.

FLOW BAR
Shows position of valve. No bar: valve fault or moving.

RUN
illuminates green when elec fuel pump is running.



FUEL TEMPERATURE in °C

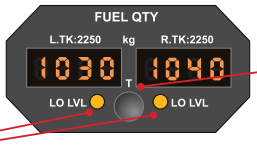
XFEED valve
Activates both elect fuel pumps.

PUMP
Control electrical pump power and jet pump motive flow valve.
Runs automatically if:
– jet pump press < 5 PSI or till reaching 8.5 PSI during engine start.
– XFEED in line
– fuel LO LVL
  * When the quantity is < 160 kg
or * When the quantity is > 160 kg, but the feeder tank is not full (Feeder jet pump failure)
– during fuel quantity test

9. Fuel QTY panel 

ATA 28

LO LVL Lt
– When the quantity is <160 kg or
– When the quantity is >160 kg, but the feeder tank is not full (Feeder jet pump failure)



TEST pb
When pushed in, displays all 8'S + LO LVL LTS + CAP + elect pumps energized. Refuel valves auto close.

10. XFEED advisory light 

ATA 28

FUEL X FEED
Illuminates as soon as the fuel crossfeed is selected on.

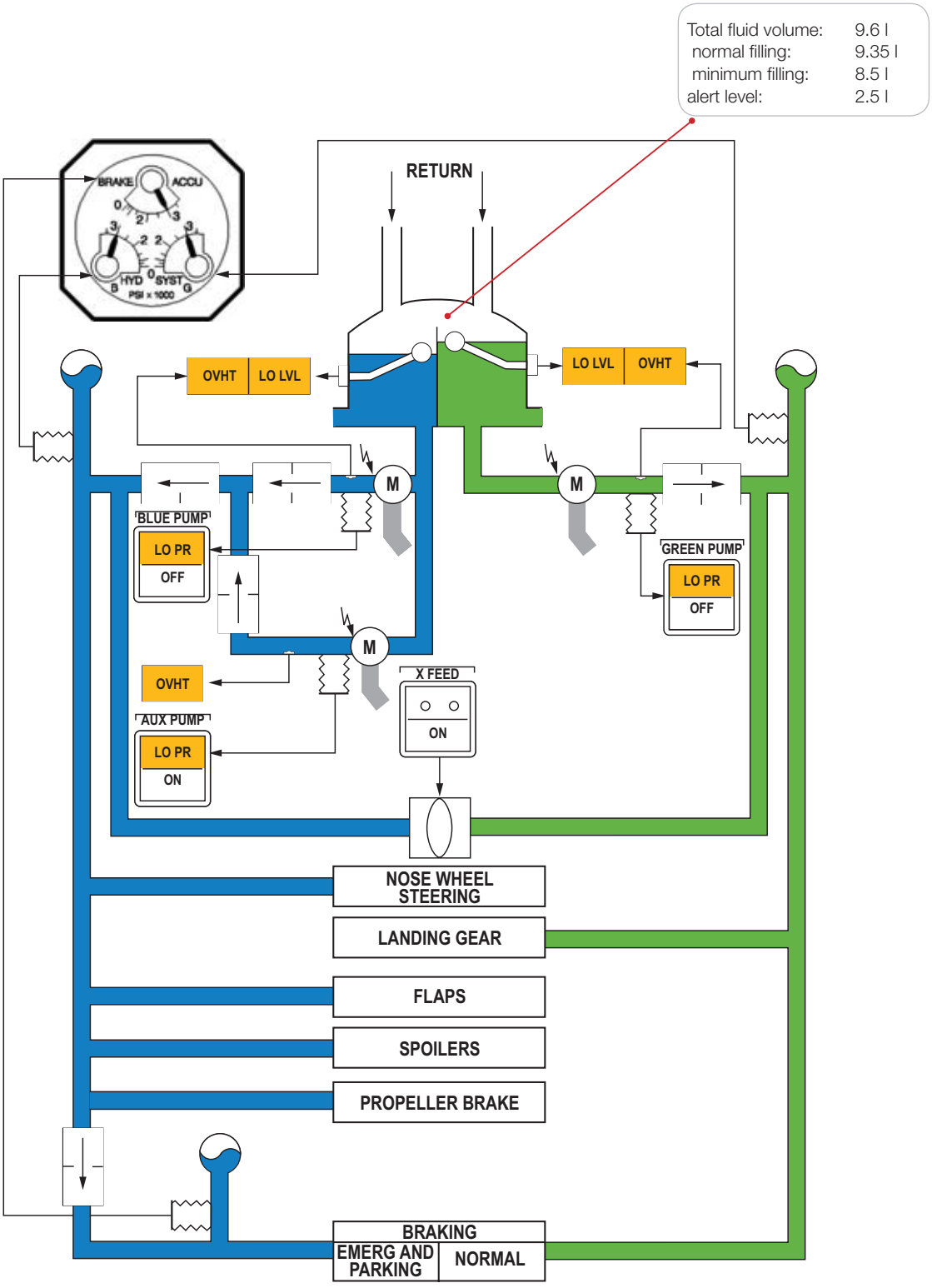
M. Hydraulic system

FCOM 1.12

1. Schematic

ATA 29

The aircraft has two hydraulic systems, designated blue and green. Each system is pressurized by an electric pump, supplied by ACW power. The blue system is also provided with and auxilliary pump, supplied by DC power (automatic or manual mode).



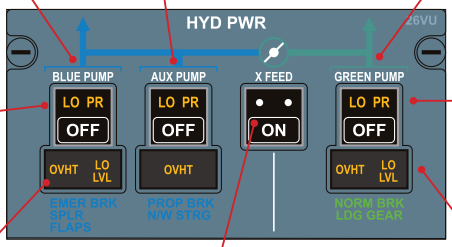
2. HYD PWR panel

ATA 29

Auxiliary pump
Automatic running conditions (simultaneoustly):
– AUX Pump pb depressed
– at least one engine running
– blue system press <1500 psi
– prop brake off
– gear lever down
(supply: DC BUS 2 or Hot main bat bus)

BLUE PUMP
Supplied by ACW, controlled by DC EMER BUS

GREEN PUMP
Supplied by ACW, controlled by DC BUS 2 or DC EMER BUS



LO PRESS
< 1500 psi. CAP (no auto off)

LO PR
pump delivery pressure less than 1500 psi. CAP. No auto off.

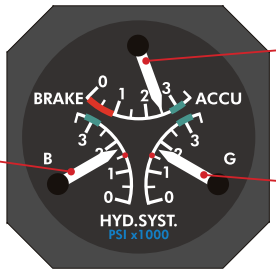
OVHT
drain > 121°C (250°F). CAP. (no auto off).

X FEED
Pb released Xfeed closed. if LO LVL auto closes. (DC STBY BUS).

LO LEVEL
associated compartment <2.5 l. **HYD** on CAP.

3. Pressure indicator

ATA 29



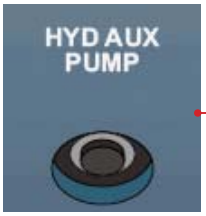
BRAKE ACCU
by blue system. for emer brakes max 6 applications. (DC STBY)

Blue HYD SYST
Blue system hydraulic pressure indicator.

Green HYD SYST
Green system hydraulic pressure indicator.

4. AUX pump pedestal switch

ATA 29



AUX PUMP pedestal switch
– energizes for 30", the auxiliary DC hydraulic pump with the HOT MAIN BAT BUS
– supplies power to the pressure indicators

NOTE: intensive use could discharge the main battery.

N. Ice and rain protection

FCOM 1.13

Aircraft ice protection is provided by a pneumatic and an electrical system adapted for the critical areas. Ice detector monitors ice accretion. It is connected to the CCAS.

1. Schematic

ATA 30

AILERON HORNS (ELECTRICAL)

WINGS BOOTS (PNEUMATIC)

ENGINE AIR INTAKE BOOTS (PNEUMATIC)

HORIZONTAL TAILPLANE BOOTS (PNEUMATIC) / RUDDER AND ELEVATOR HORNS (ELECTRICAL)

PROPELLER (ELECTRICAL)

WINSHIELD (ELECTRICAL)

SIDE WINDOWS (ELECTRICAL)

ICING EVIDENCE PROBE

PROBES (ELECTRICAL)

ICE DETECTOR

2. Probes and windshield HTG

ATA 30

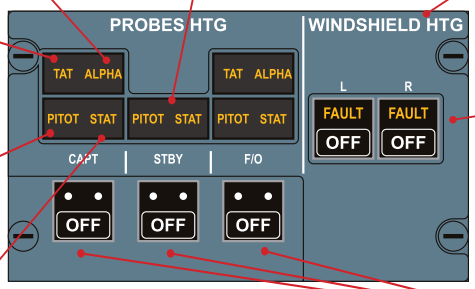
ALPHA
ACW supply. AMBER LT illuminates in case of FAIL or power loss. CAP

TAT
no heated. CAP. (ACW supply) heating inhibited on ground.

PITOT tube
not heated. CAP. (ACW bus 1 for CPT and ACW bus 2 for F/O).

STAT
Static port not heated (On ground only, not monitored in flight). CAP. (DC BUS)

PITOT STBY
not heated.
ACW BUS 1 or 115 AC STBY BUS as back up.

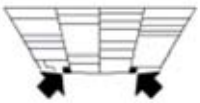


WINDSHIELD HTG
ACW supply. Outer surface +2°C. Inner +21°C

WINDSHIELD HTG FAULT
Power loss or failure. CAP.

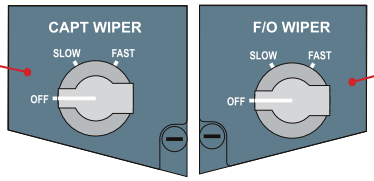
CAPT, STBY and F/O
Normal operation - ON (depressed) and OFF (released).

3. Rain protection



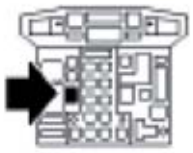
ATA 30

CAPT WIPER rotary selector
OFF: wiper stops at the end of travel (park) position.
SLOW: wiper operates at 80 cycles/min
FAST: wiper operates at 130 cycles/min



F/O WIPER rotary selector
OFF: wiper stops at the end of travel (park) position.
SLOW: wiper operates at 80 cycles/min
FAST: wiper operates at 130 cycles/min

4. Ice detector panel and icing AOA

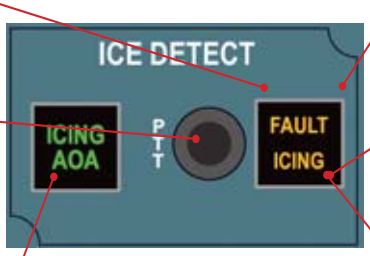


ATA 30

FAULT
detector failure or supply loss (ACW BUS 2). CAP.

PTT pb
press for 3":
– icing will flash if system works correctly.
– FAULT LT illuminates steady if ice detector failure is detected

ICING AOA Lt
(DC emer BUS).
Illuminates green as soon as 1 horn anti-icing on.
Stall alarm + stick shaker threshold lowered.
When light ON, the angle of attack for the stall warning is reduced.
It can be extinguished manually only by releasing ICING AOA P/B provided both horns anti-icing are selected OFF



ICE DET indicator Lt: ACW bus 2.

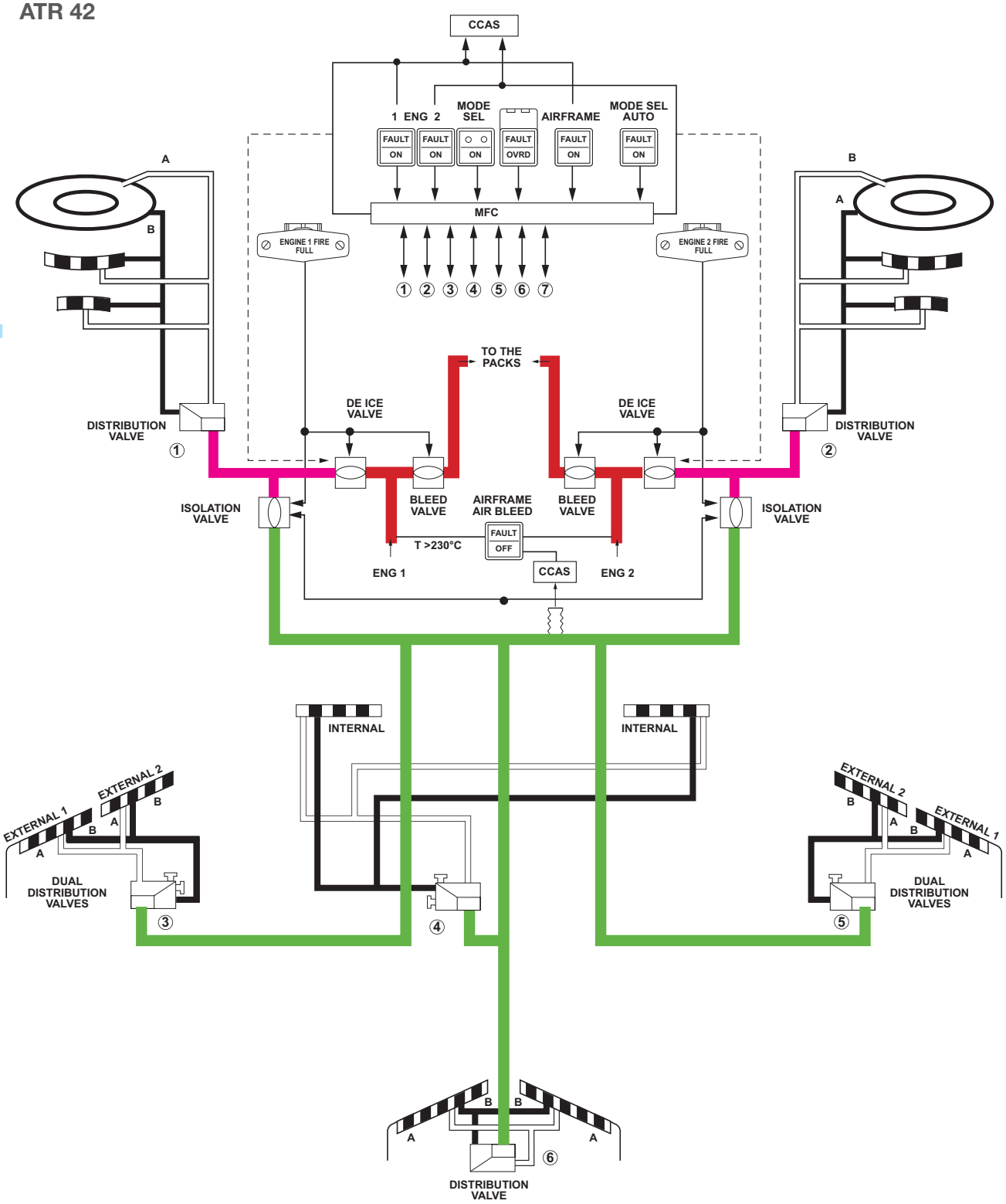
ICING
illuminates amber when ice accretion is detected provided both horns anti-icing and airframe de-icing are selected ON.

ICING
flashes amber when ice accretion is detected and horns anti-icing and/or airframe de-icing are not selected ON

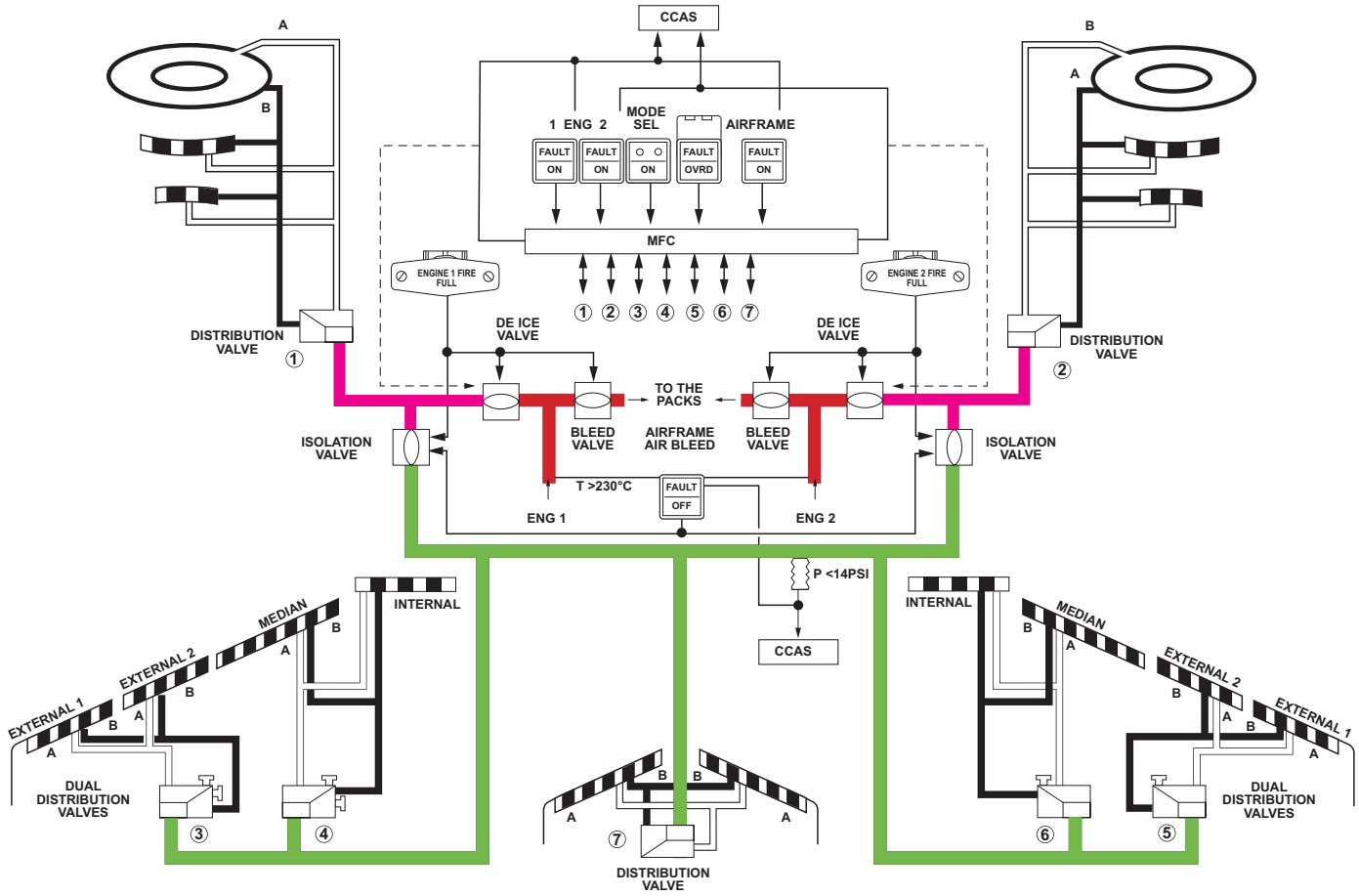
5. De-icing schematic

ATA 30

ATR 42



ATR 72


CCAS
1 ENG 2
MODE SEL
AIRFRAME
FAULT ON
FAULT ON
ON
FAULT OVRD
FAULT ON
MFC
ENGINE 1 FIRE FULL
ENGINE 2 FIRE FULL
1 2 3 4 5 6 7
DE ICE VALVE
DE ICE VALVE
TO THE PACKS
DISTRIBUTION VALVE
DISTRIBUTION VALVE
ISOLATION VALVE
ISOLATION VALVE
BLEED VALVE
AIRFRAME AIR BLEED
BLEED VALVE
T >230°C
FAULT OFF
ENG 1
ENG 2
P <14PSI
CCAS
INTERNAL
INTERNAL
MEDIAN
MEDIAN
EXTERNAL 1
EXTERNAL 2
EXTERNAL 2
EXTERNAL 1
DUAL DISTRIBUTION VALVES
DUAL DISTRIBUTION VALVES
DISTRIBUTION VALVE

6. Anti-icing & de-icing panel

ATA 30

PROP
ACW supply. Inhibited below NP 63%

FAULT
power loss on at least 1 blade.
ANTI-ICING on CAP

MODE SEL PROP
NORM: 10" on per 3 blades; then 10" o ff between cycles.
ON (HIGH POWER): 20" on per 3 blades.
No pause between cycles.

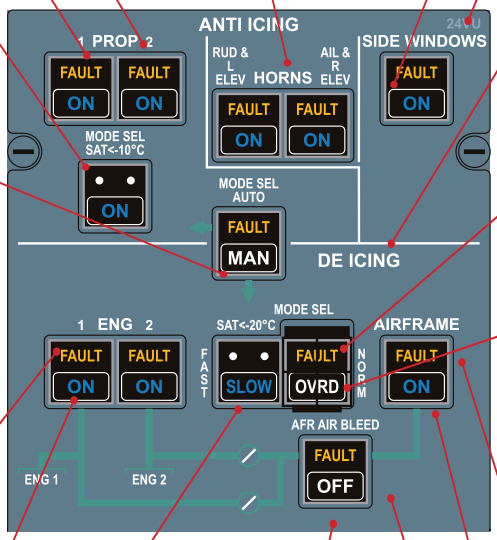
MODE SEL AUTO
Automatic selection of cycle depending on ADC1/2 to MFC1B/2B
FAULT when ADC or MFC fail: Fast mode is automatically selected for ENG and AIRFRAME DEICING and High Power for PROP ANTI-ICE.
MAN: manual selection of cycles depending on SAT

ENG
FAULT: distribution valve opened but no air pressure. OR valve closed and pressure. detected OR AFR AIR BLEED off and air temp above deice valve >230°C for more than 6".

ENG
ON: signal sent to MFC to start deice cycle on the engine air intake, deice valve opened even if AFR AIR BLEED off

MODE SEL ENG AND AIRFRAME
SLOW: 240"/cycle
FAST: 60"/cycle

HORNS
ACW supply. Inhibited on ground. Either horn activates AOA Lt



AFR AIR BLEED
FAULT: air dowstream deice valve < 14 psi more than 10" OR Air upstream of the deice valve > 230°C.

HORNS FAULT
Power loss. **ANTI-ICING** on CAP

SIDE WINDOWS
Defog only. **FAULT** for power loss. CAP. (DC BUS)

DE ICING
air is always available regardless of bleed pb.
NORM: 60" / cycle
SLOW: 240" / cycle

FAULT
both MFC modules have failed to control boots cycles. The monitoring is preformed by the stby controller

AFR AIR BLEED
OVRD: no MFC. Boots inflated by separate stantby controller (cycle 60")

AIR FRAME
FAULT: valve opened but no downstream press. Or valve closed and downstream press. Detected. CAP.

AIR FRAME
ON: signal sent to MFC to start deice cycle on the airframe

OFF: isol valves closed. Deice valves closed unless ENG 1 / 2 deice on.

7. De icing indicator (memo panel)

ATA 30

DE ICING LIGHT
– Illuminates when airframe deicing syst is ON
– Flashes when airframe deicing syst still selected ON 5 min after last ice accretion detection

0. Landing gear

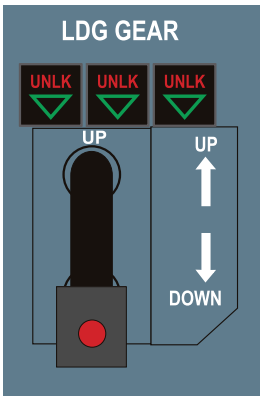
FCOM 1.14

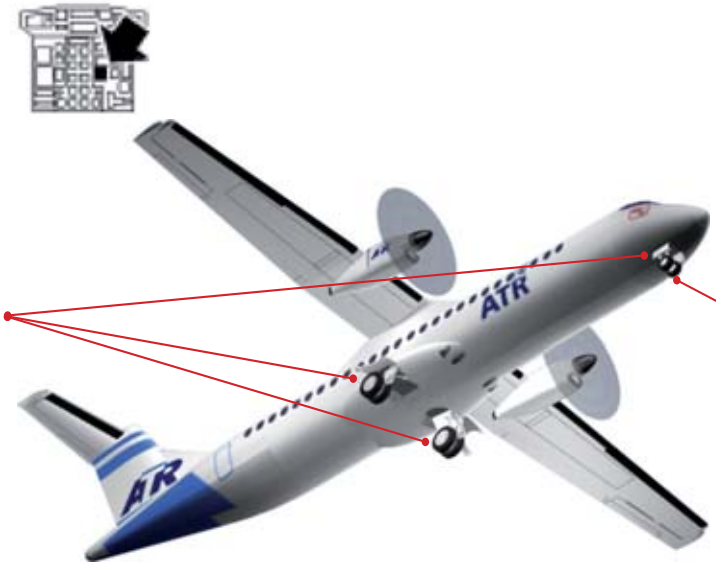
1. Landing gear description

ATA 32

The landing gear is hydraulically operated. In case of hydraulic failure, it may be extended by gravity.

LANDING GEAR CONTROL



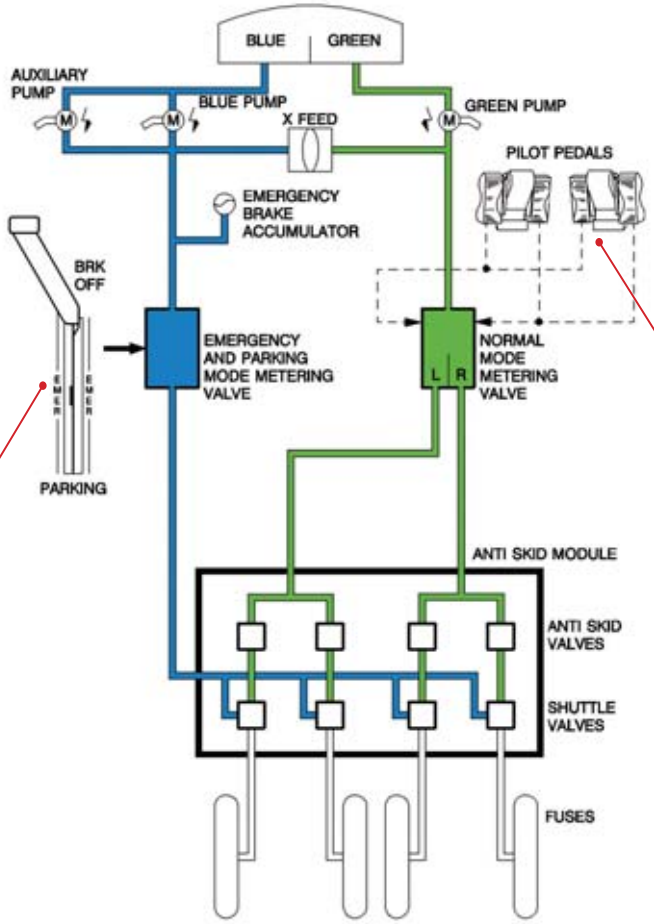


STEERING HANDWHEEL

2. Brakes schematic

ATA 32

EMERGENCY / PARKING BRAKE HANDLE



PILOT BRAKE PEDALS

3. LDG GEAR position indicators

ATA 32

System 2
UNLK gear not locked in selected position or (on GND) uplock box not opened.
Green Lt down lock engaged

System 1
UNLK gear not locked in selected position or (on GND) uplock box not opened.
Green Lt down lock engaged.

4. Landing gear handles

ATA 32

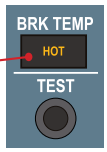
LDG GEAR EMERGENCY EXTENSION HANDLE
permits to unlock the landing gear

GEAR HANDLE RED LIGHT
any gear not sensed down and locked with some conditions.
CAP.

5. Brakes temperature and antiskid

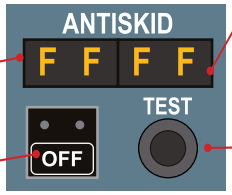
ATA 32

BRK TEMP
HOT Any brake T° > 160°C



F (FAULT)
wheel channel failure. CAP

OFF
Pb released, system deactivated



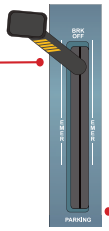
ANTISKID
Operative if speed > 10 kts.
Activates when speed > 23 kts + 50% diff between wheels (locked wheel protection).
Braking action inhibited at touchdown as long as wheel spin up speed < 35 kts or 5 sec. (touchdown protection).
CAUTION: THE TEST INHIBITS BRAKES

TEST pb
(inhibited if speed > 17 kts)
= MC + SC CAP 4F amber lt.
Test duration: 3 sec. in flight and 6 sec. on ground

6. Emergency parking brake handle

ATA 32

EMERGENCY BRAKE HANDLE
permits to apply a metered pressure.
The brake accumulator allows at least six braking applications without any antiskid operation if the blue hydraulic system is not available)



PARKING BRAKE
permits a full pressure on the brakes. When brake handle is not in the fully released position, amber PRKG BRK caution light illuminates on CAP and is taken into account by the T/O CONFIG.
(Springloaded to the off position)

7. Steering handwheel

ATA 32

N/W STEERING SW
activates or deactivates the nose wheel steering system (guarded type in the ON position)
OFF: unpressurizes the steering system (91° of deflection)

THE STEERING HAND WHEEL
controls the nose wheel angle up to 60° in either direction:
– clockwise: steering to the right
– counter clockwise: steering to the left

P. Navigation system

FCOM 1.15

1. Nav control box

ATA 34

NAV
POWER SELECTOR to energize the control box and associated VOR/ILS/DME receivers.
HLD: holding the DME on the current active frequency

XFR/MEM switch
XFR exchanges active and preset frequency
MEM to activate frequencies stored in the memory

ACT
Direct active tuning mode. to change directly the active frequency

2. Marker switch

ATA 34

MKR SW
is used to set marker sensibility

3. ADF control box

ATA 34

ADF
OFF: ADF deenergized
ANT: The antenna loop is disabled and the receiver is used as a conventional receiver the RMI pointer will park horizontally
ADF: The system operates in ADF mode and provides the bearing
TONE: A 1000 Hz sound indicates that ADF is correctly tune to the station

XFR/MEM switch
XFR exchanges active and preset frequency
MEM to activate frequencies stored in the memory

ACT
Direct active tuning mode. to change directly the active frequency

4. EGPWS alert modes

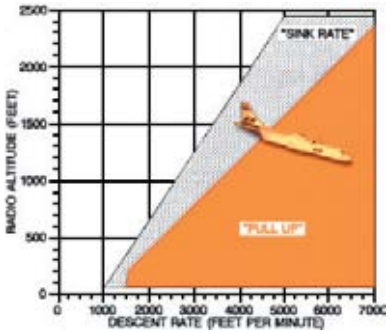
ATA 34

The Enhanced Gound Proximity Warning System provides visual and aural alerts in case of dangerous flight path conditions which would result inadvertent ground contact if maintained.

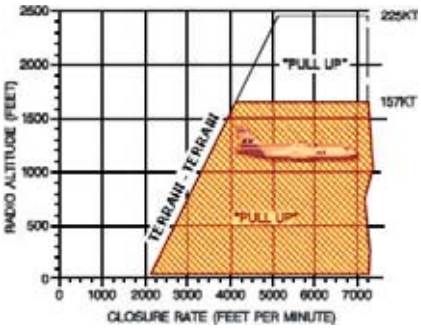
The EGPWS performs the following alert modes:
– Basic GPWS modes
  * Mode 1: excessive descent rate
  * Mode 2: excessive terrain closure rate
  * Mode 3: altitude loss after take-off
  * Mode 4: unsafe terrain clearance
  * Mode 5: below glideslope
  * Mode 6: altitude callouts
– Enhanced modes:
  * Terrain Clearance Floor (TCF)
  * Terrain Awareness & Display (TAD)

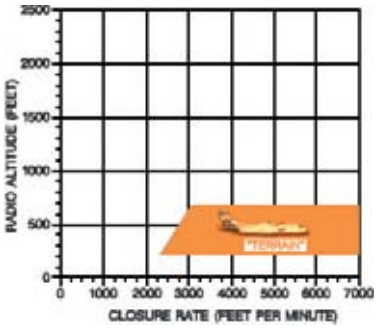
P. Navigation system

MODE 1
excessive descent rate

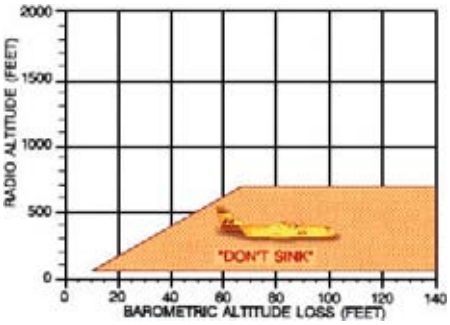


MODE 2
excessive terrain closure rate

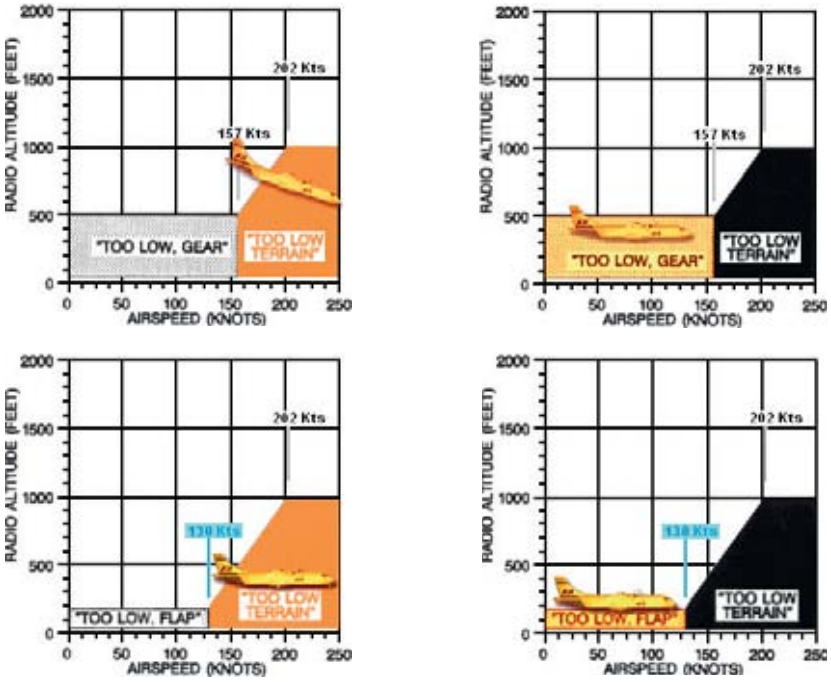


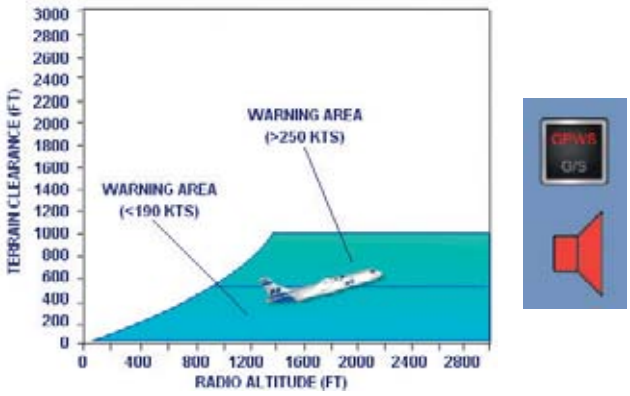


MODE 3
altitude loss after take-off

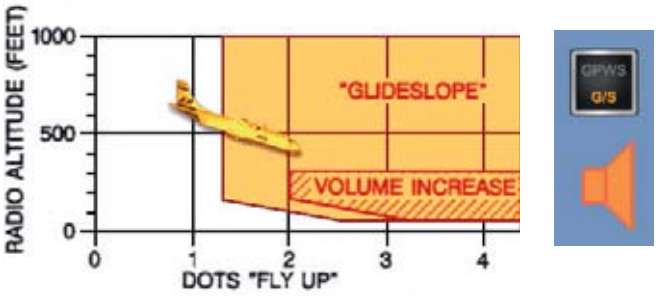


MODE 4
unsafe terrain clearance

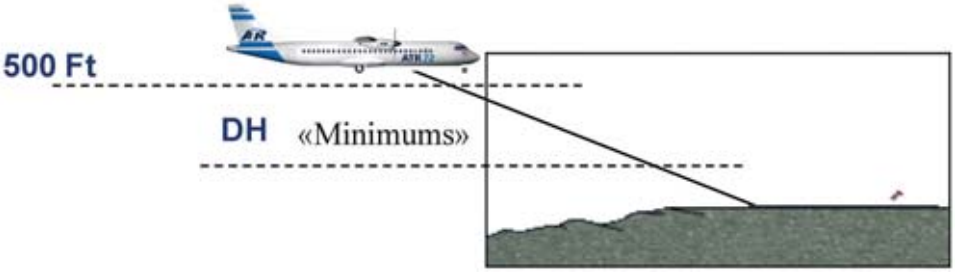




MODE 5
below glideslope

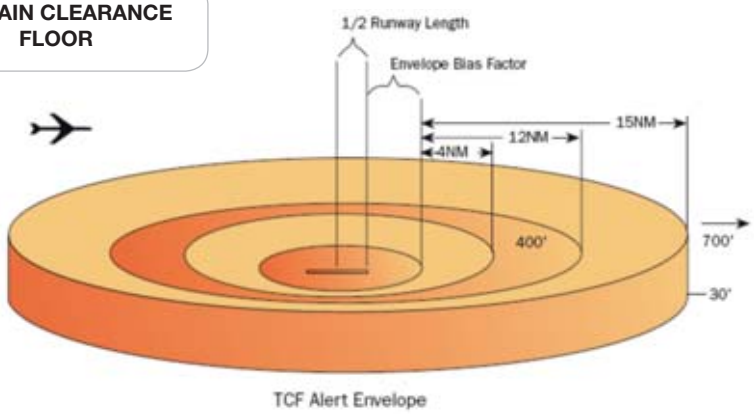


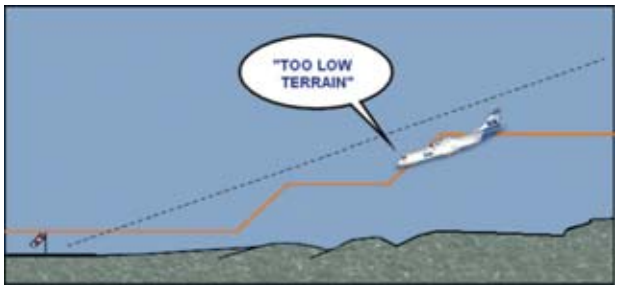
MODE 6
altitude callouts

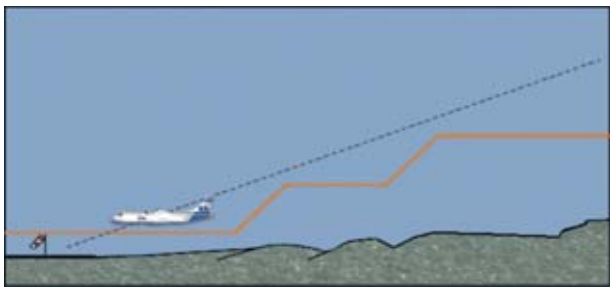


TERRAIN CLEARANCE FLOOR

The Terrain Clearance Floor (TCF) mode creates an increasing terrain clearance envelope around the airport runway directly related to the distance from the runway.

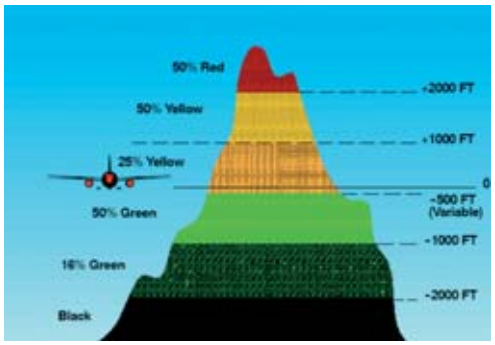


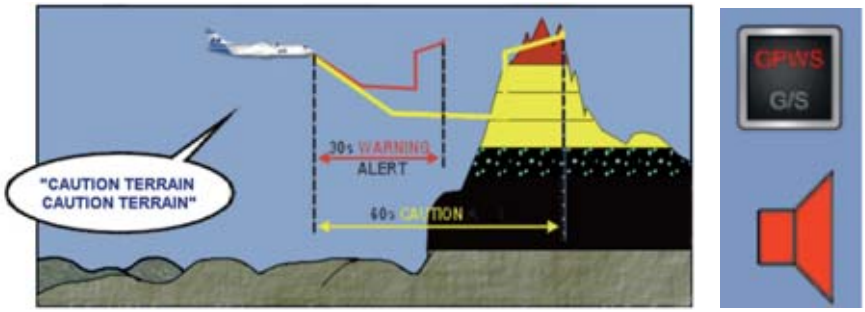


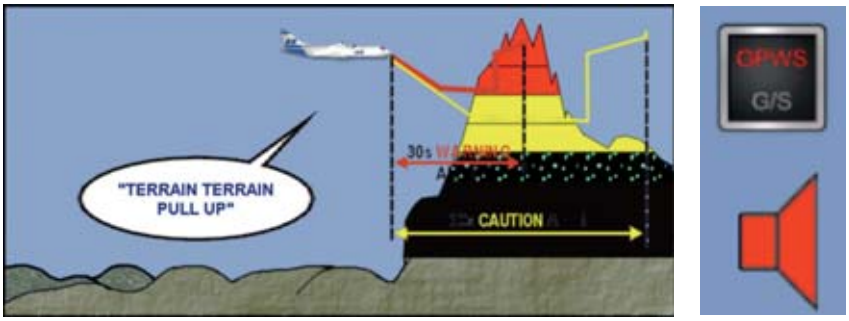


TERRAIN AWARENESS & DISPLAY

This function use the aircraft geographic position from the GPS, aircraft altitude and a worldwide terrain database to predict potential conflict between the aircraft flight path and the terrain, and to provide aural alert and graphic displays of the conflicting terrain.



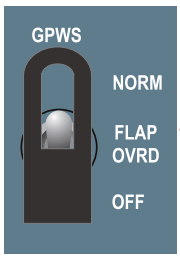




5. EGPWS pb  ATA 34

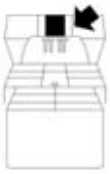
GPWS
illuminates red as long as any mode 1-2-3-4 alert is activated, accompanied by the voice alert for the particular mode

6. EGPWS selector  ATA 34

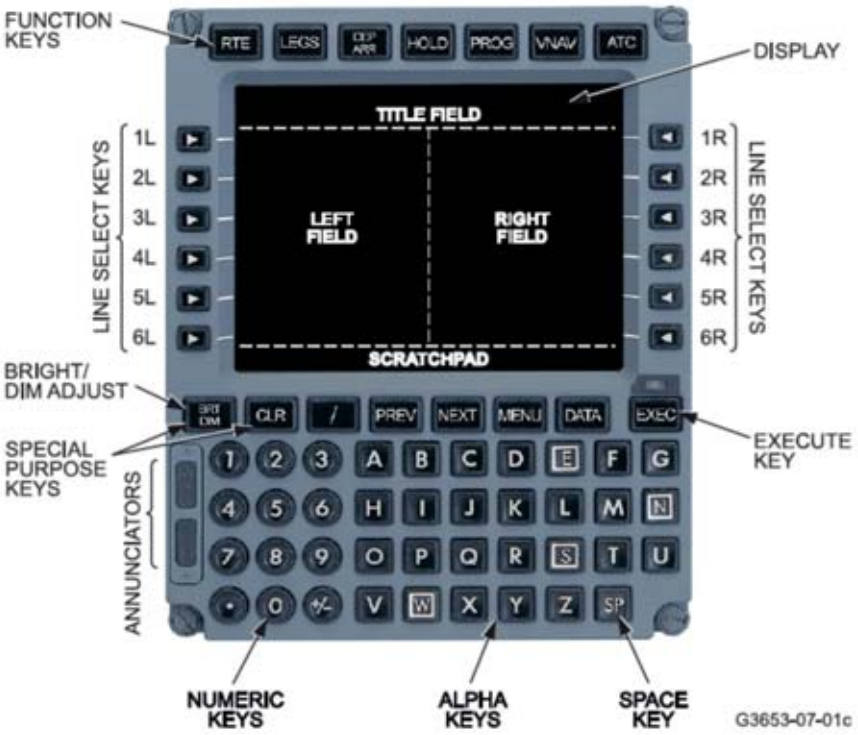


EGPWS selector
is guarded in the norm position.
FLAP OVRD mode 4 alert caused by flap extension is inhibited to avoid nuisance in case of flapless landing

7. Global navigation satellite system (GNSS)



ATA 34



The Global Navigation Management System (GNSS) receives and processes Global Positioning System (GPS) Signals.
The GNSS provides en route and terminal area guidance, autopilot coupling, roll steering and vertical deviation (non-coupled), along defined flight plan, selected on the MCDU

1. Selection of a flight plan and vertical navigation profile
2. Selection on MAP and RNV P/B on the EFIS control panel
3. Selection of the NAV mode on autopilot control panel

Q. Power plant

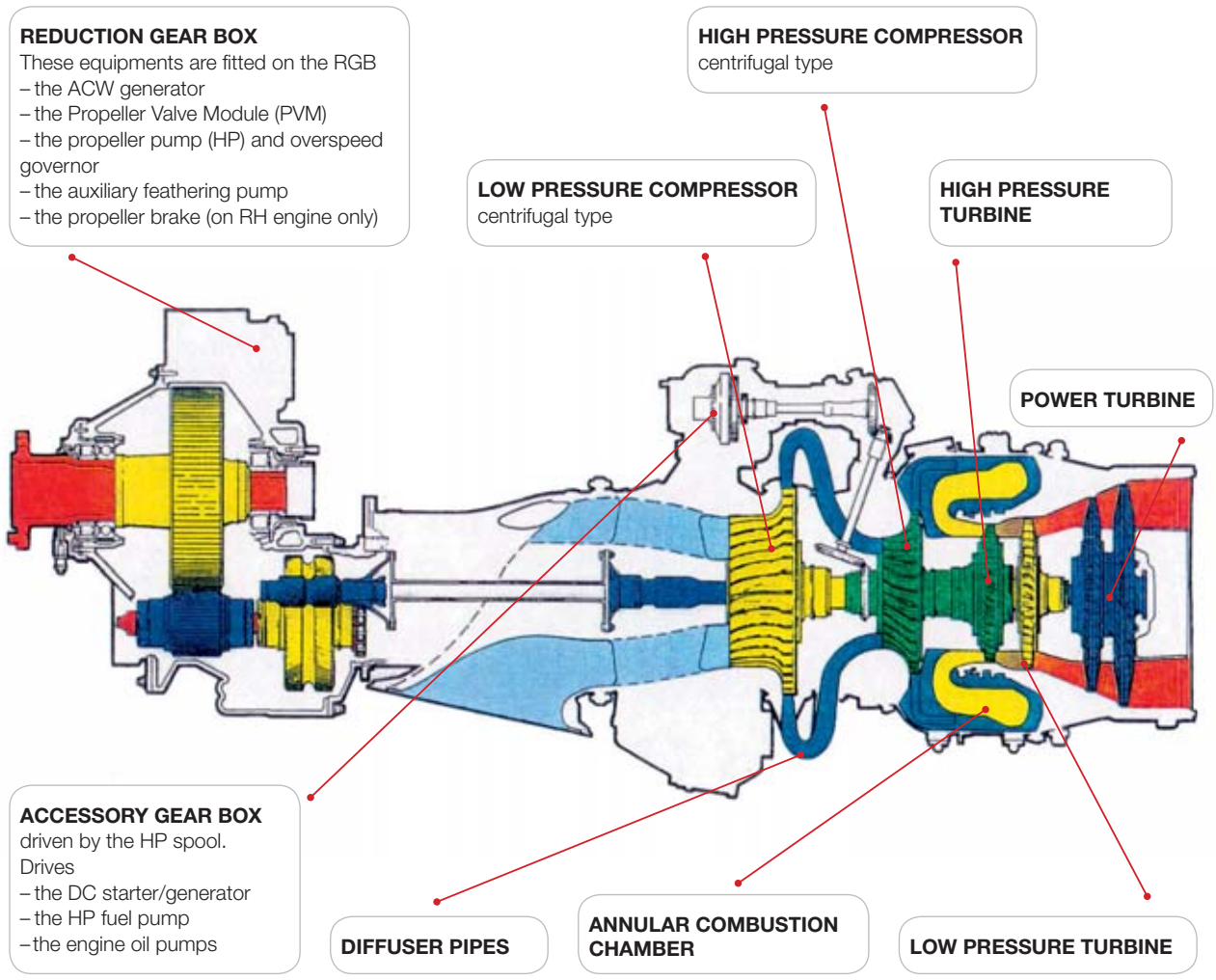
FCOM 1.16

1. Engine schematic

ATA 61/72

Aircraft fitted with
– two Pratt &Whitney, PW 127 F (72-212A), E (42-500) or M (42-500/72-212A)
– two, six blades propellers (Hamilton)

It is a free turbines engine, composed of 3 concentric shafts of spools:
– The shaft of the HP spool composed of the HP turbine and the HP compressor (rotation speed of the HP spool: NH). The HP spool drives the accessory gear box (AGB)
– The shaft of the LP spool composed of the LP turbine and the LP compressor
– The Power shaft composed of 2 power turbines (Free turbines). This 2 power turbines drive the propeller through the reduction gear box (RGB) (rotation speed of the propeller NP)



6 blades propeller

2. Power and propeller controls ATA 61/72

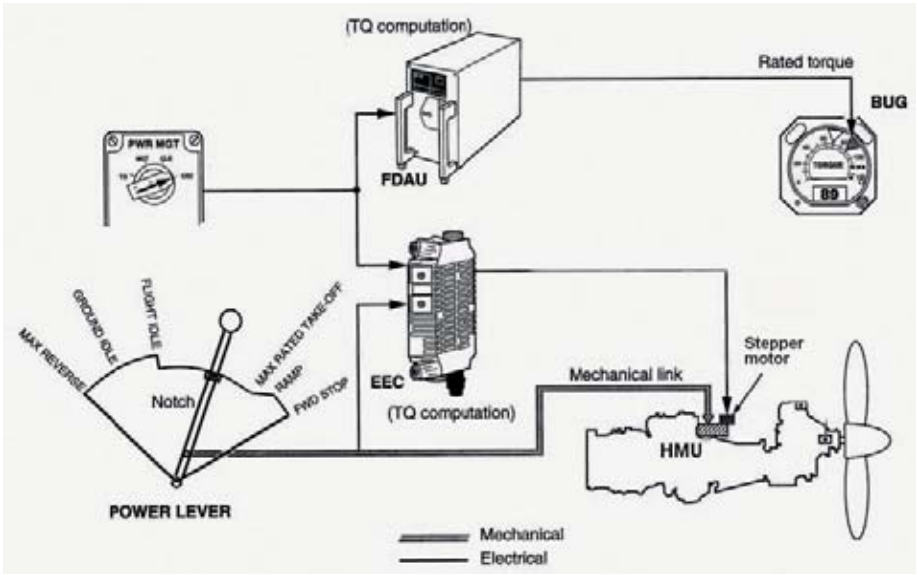
The different powers of the engine are: (SHP: Shaft Horse Power)

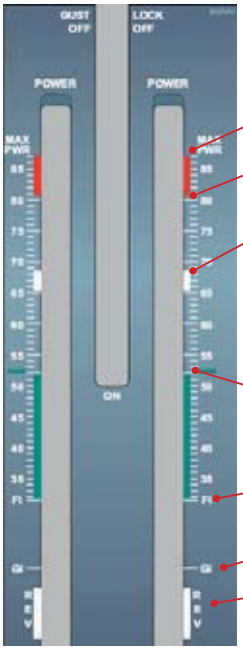
	72-212A	42-500
– RTO (Reserve Take Off) (maximum power) Used in case of an engine flame out during take off (up trim) or in case of go around (ramp)	2750 SHP	2400 SHP
– MCT (Maximum continuous)	2500 SHP	2400 SHP
– TO (Take Off 0,9 RTO)	2475 SHP	2160 SHP
– Climb	2192 SHP	2160 SHP
– Cruise	2132 SHP	2132 SHP

Power (PWR) = Torque (TQ) x NP
For the same power: If TQ increases, NP decreases
If TQ decreases, NP increases

Power setting is characterized by constant power lever (PL) and condition lever (CL) positions. The power adapted to the flight phase is selected by the pilot through a power management selector (PWR MGT).

– With input coming from the PWR MGT and the position of the PL, the EEC (Engine Electronic Control) control the fuel flow to the engine.





MAX PWR (Full stop): Maximum Power → TQ up to115% (On emergency only)

GO around position (Beginning of the ramp): RTO → TQ up to100%

NOTCH position:
PWR MGT in – TO: → NP 100% and 0,9 RTO → TQ up to 90%
– MCT → NP 100% and TQ up to 90,9% (72-212A)
→ NP 100% and TQ up to 100% (42-500)
– CLB → NP 82% and TQ up to 97% (72-212A)
→ NP 82% and TQ up to 109,7% (42-500)
– CRZ → NP 82% and TQ up to 94,5% (72-212A)
→ NP 82% and TQ up to 108,3% (42-500)

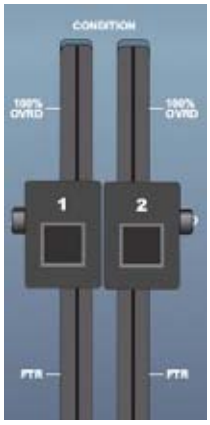
Reversion in manual mode when EEC FAULT (green band <52°)

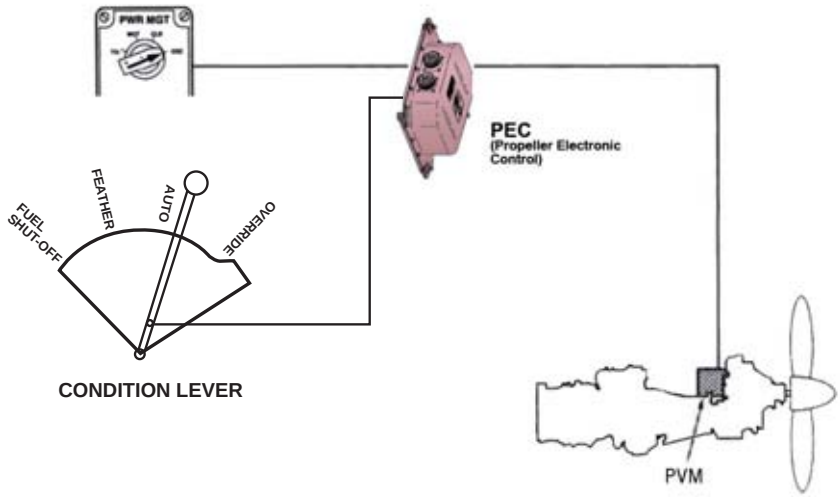
Flight Idle position

Ground Idle position

Reverse position

– With the input coming from the PWR MGT and the position of the CL, the PEC (Propeller Engine Control) control the NP (propeller speed) by changing the blades angle.





Regardless of the PWR MGT position, NP is at 100%

AUTO position:
→ Blade angle governing mode. The NP is regulated by the PEC (Blade angle change). PWR MGT in:
– TO → NP = 100%
– MCT → NP = 100%
– CLB → NP = 82%
– CRZ → NP = 82%

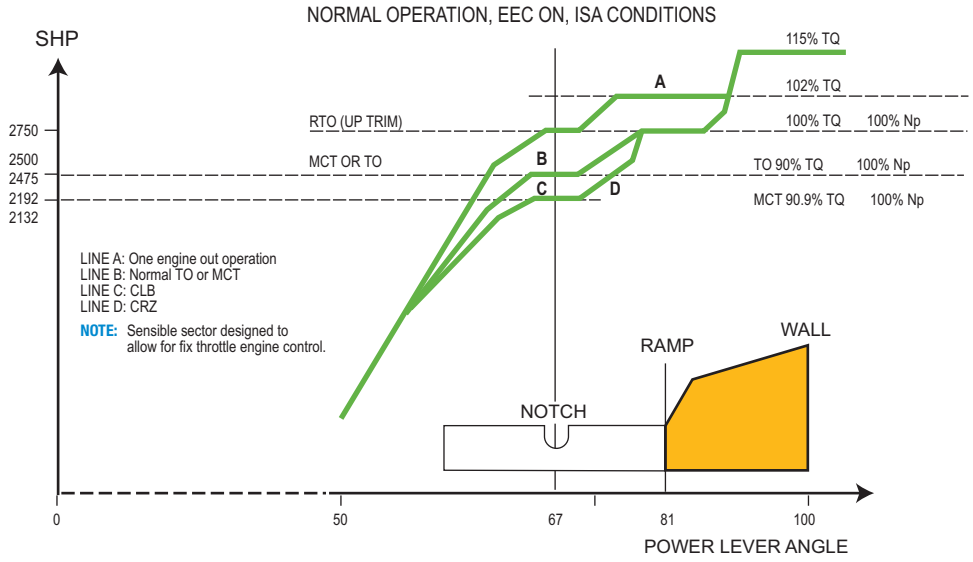
→ Fuel governing mode. The NP is regulated by the EEC (Fuel Flow change) ground operation in low power.
The NP is maintained at 70.8% to have the ACW available.
(The ACW generator is on line when NP > 66%)

FTR (Feather position). The fuel governing mode is cancelled
(No ACW generator)

Fuel Shut Off position: Close the shut off valve on the HMU

– The PWR MGT has four positions: TO, MCT, CLB, CRZ
– Considering that CLs are in AUTO and the PLs are at this position marked by the notch, the control system delivers max rated power corresponding to the mode selected (the max rated power is delivered only when the engine is not thermodynamically limited)

ATR 72-212A

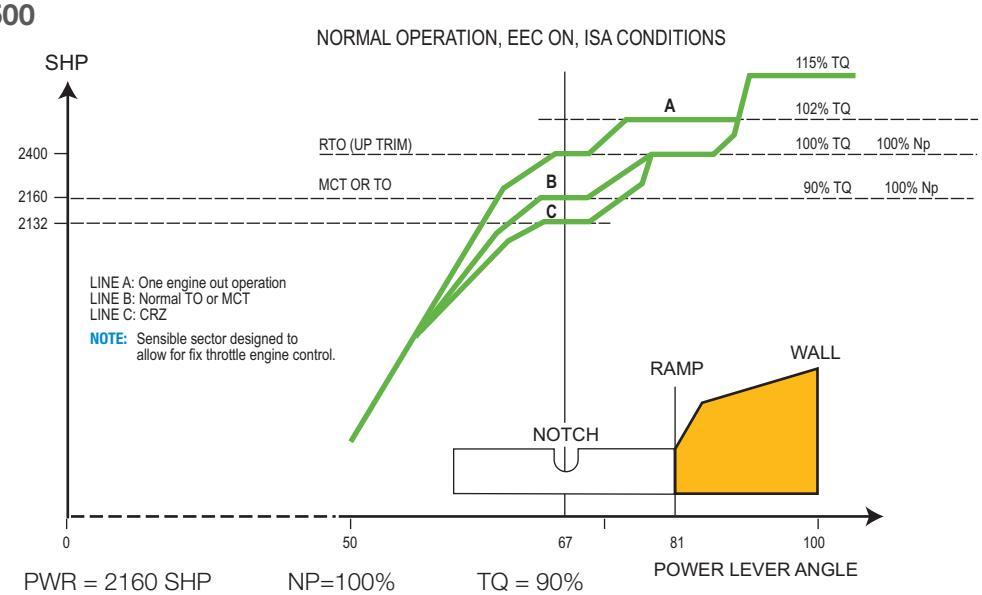


– TO	PWR = 2475 SHP	NP=100%	TQ = 90%
– MCT	PWR = 2500 SHP	NP=100%	TQ = 90,9%
– CLB	PWR = 2192 SHP	NP=82%	TO = 97%
– CRZ	PWR = 2132 SHP	NP=82%	TO = 94,5%

The RTO (Reserve Take-Off) is obtained in case of up trim (one engine out during take off) or with the PL to the ramp

– RTO	PWR = 2750 SHP	NP=100%	TQ = 100%

ATR 42-500



– TO	PWR = 2160 SHP	NP=100%	TQ = 90%
– MCT	PWR = 2400 SHP	NP=100%	TQ = 100%
– CLB	PWR = 2160 SHP	NP=82%	TO = 109,7%
– CRZ	PWR = 2132 SHP	NP=82%	TO = 108,3%

The RTO (Reserve Take-Off) is obtained in case of up trim (one engine out during take off) or with the PL to the ramp

– RTO	PWR = 2400 SHP	NP=100%	TQ = 100%

3. Engine indicators

ATA 61/72

INTERNAL BUG
computed by FDAU; shows RTO MGT on T/O, otherwise max TQ depending on PWR MGT selection

TORQUE ind. (DC EMER)
2 probes located on the reduction gear box shafts sends signal to the AFU (Auto Feathering Unit) and to the EEC (Engine Electronic Control) which supply the torque indicator.
The AFU controls the pointer and the EEC controls the digital display

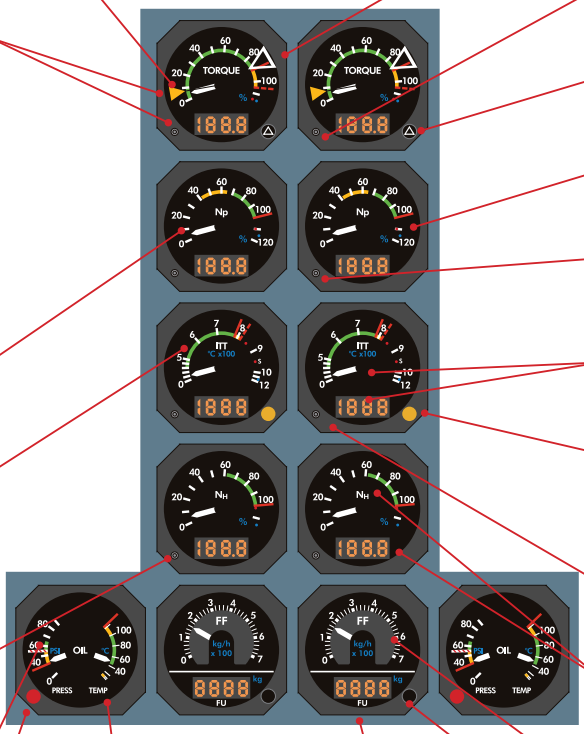
NP ind.
DC ESS from 0 to 120%

ITT ind.
(DC ESS) from 0 to 1200°C
Red point: 20" max
Red point + S: 5"max on start
H: limite for hotel mode operation

TEST
115 % (blue dot)

OIL PRESS ind.
(Main DC BUS) from 0 to 90 PSI

OIL LOW PRESS Lt
<40 PSI. A separate press sw activates CCAS below 40 PSI



OIL TEMP
(Main DC BUS) from 0 to 130°C

FUEL USED readout
(Main DC BUS)

TORQUE ind.
white TQ bug manually selected

TEST
115 % (blue dot)

KNOB
to set white TQ bug

NP ind.
NP actual display

TEST
115 % (blue dot).

ITT ind.
ITT actual display

ALERT
When ITT > 800°C or 715°C in hotel mode Lt CAP

TEST
1150°C (blue dot)

NH /NL ind
(DC ESS) NH actual display from 0 to 120%

FUEL FLOW Ind.
(Main DC BUS)

FU reset knob
FU reset to 0 when pulled

4. ENG START panel

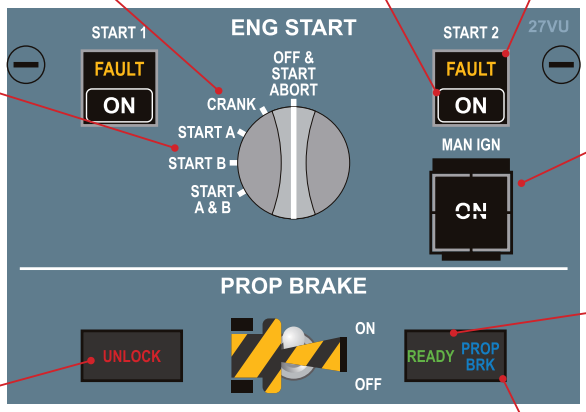
ATA 61/72

CRANK
dry motoring (no ignition)

START A OR B
on ground, only exciter A or B is suplied (except for the position A&B)
In flight regardless of start selection (A, B or A+B) both exciters are energized

UNLOCK
PROP BRAKE not fully locked or not fully released.
After 15 sec: CAP alarm. Also used to check lock/unlock time:
– 5 sec. to unlock
– 10 sec. to lock

ON
starter engaged. At 45% NH, light goes off and the starter is disconnected



42/72 PEC

FAULT
Illuminates when:
– remains ON with NH >45%
or – GCU failure during start
or – starter failure
or – ENG 2 only: ENG START selector on start position + PROP BRK ON + GUST lock not engaged

ON
Continuous ignition (both A & B). Memo panel light.

READY
engagement or disengag. conditions are met:
– A/C on ground
– gust lock engaged
– CL on FTH or FUEL S/O
– blue hyd press available on the prop brake input >2100psi
– Fire handle not pulled

PROP BRK
Brake fully locked same indication on the memo panel

5. ENG control panel

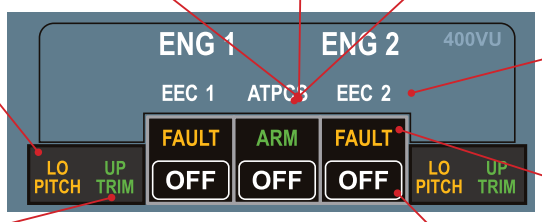
ATA 61/72

ARMING CONDITIONS
PWR MGT sel on TO
+ATPCS pb in
+both PL > 49°
+both TQ > 46%
= (arm green LT illuminated)

LO PITCH
blade angle < FI (8°) CAP in flight only

UP TRIM
signal sent to respective eng during ATPCS sequence.
Eng power = RTO

ATPCS
– ARM on ground = uptrim + auto FTR (2.15" delay)
– ARM in flight (In case of go around) = auto FTR only



42/72 PEC

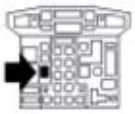
TRIGGER
one TQ below 18%
Cancel: PWR MGT out of TO or ATPCS pb OFF or at least one PL retarded below 49° or both TQ <46%

EEC
acts on stepper motor to regulate Fuel Flow

FAULT flashing
EEC failure. The fuel flow is frozen to maintain the power
FAULT steady: EEC failure, HMU base law = reversion
When FAULT flashing, never deselect the EEC.
Retard first, the PL in the green sector (FAULT become steady: PL < 52°)

OFF
HMU base law = reversion

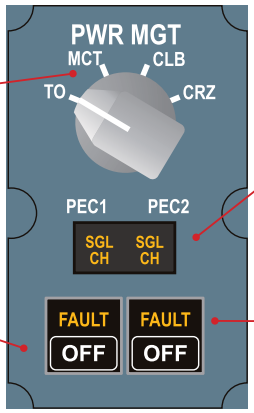
6. PWR MGT panel



ATA 61/72

PWR MGT
2 co-axial sw. (LH: bottom / RH: TOP) providing FDAU, PEC and EEC with basic power requirements

OFF
PEC is deactivated and NP is limited at 102,5% if power is sufficient



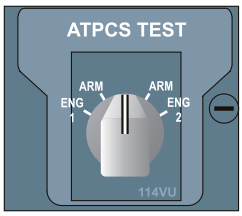
42/72 PEC

SGL CH
illuminates when one channel is lost (2" for self test when advancing CL from FTR to AUTO)

FAULT
illuminates when both PEC channels are lost. CAP

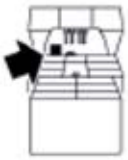
7. ATPCS test panel

ATA 61/72



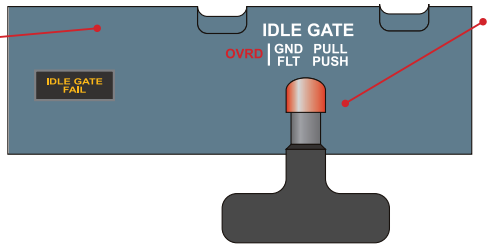
ATPCS
selector allows to check the correct functionning of the ATPCS.
This rotary selector is spring loaded to neutral position

8. Idle gate



ATA 61/72

IDLE GATE FAIL
light illuminates amber and the CCAS is activated when the gate does not engage automatically in flight or does not retract at landing



IDLE GATE LEVER
enables manual override in case of failure of the automatic logic or no DC power.
In flight: push
On groung: pull. A red band appears

Annexes

Annexes

Annex 1. Cockpit panels

SQUIB TEST
Elect test of squibs.

FAULT
resistance/capacitance.
Inhibits fire signals until turned off.
LOOP in CAP (DC EMER)

SQUIB
armed when T handle pulled.
Discharges bottle.
(DC EMER / HOT MAIN BAT).

DISCH
bottle depressurized.
Opposite agent DISCH Lt will also illuminate on other fire panel.

TLU FAULT
system disagree / two ADC failures / ADC datas incoherence / TLU position synchro failure. T/O or T/O Config Test and TLU not LO SPD

TLU manual operation
Above 195 kts (42) / 185 kts (72): HI SPD
Below 190 kts (42) / 180 kts (72): LOW SPD

SPLR
activates when >2.5° aileron travel. Lt ON=Spoiler not fully retracted (BLUE HYD PWR).

Light on when **SW TEST** depressed and all door microsws opened. (Passengers and service doors opened)

At least 1 microsw is opened. (DC BUS 2)

Tests continuity of microsw. System (on ground, doors opened).

Fuel delivery pressure below 4 PSI. Pump failure or fuel starvation. CAP.

Shows position of valve.
No bar = valve fault or moving.

RUN
Illuminates green when elec fuel pump is running.

OFF
disconnect the elect pump and force to close the motive flow valve

Feeder Tk Fuel Temp Ind LH only (DC BUS 1)
(Range –60°C/0°C)

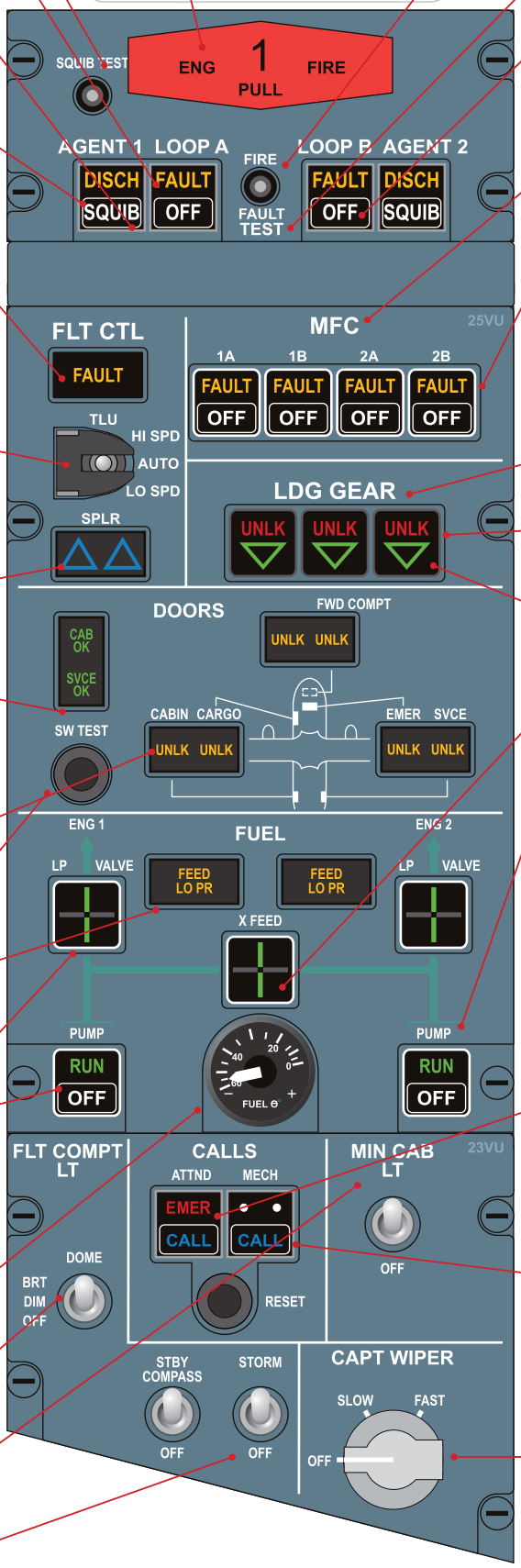
Both domes (DC BUS 1) F/O only in basic mode (DC EMER).

Use in basic mode to limit Lts in cabin.
Light on the RH side only.

Two fluorescent lights under glareshield.

ENGINE FIRE HANDLE
Pulled: on the respective engine

Prop	Feather
Fuel	LP valve closed
Air	Bleed valve closed
Deice	Deice & shutoff valve closed
Elect	DC & ACW gen. disconnected
Squibs	Armed (Lts illuminated)
Hydraulic	Hyd prop brake (eng 2 only)



Fire test
MW+CRC+ ENG 1 FIRE on CAP
+Fire handle illuminated
+FUEL S/O Lt on CL (if out of Fuel S/O position)

Fault test
MC+SC+ loop on CAP
FAULT Lts on A/B Loop pb.

OFF
Takes respective loop out of parallel circuit. Allows other loop to activate fire signal.

The opening of the cargo door control panel cover. Self Test of MFC 1A/2A.

FAULT
Malfunction or electrical supply fault: AUTO disengagement – CAP
Most amber LTS / some red LTS are lost on **CAP** if dual fault of 1B & 2B.

Gear position secondary system as sensed by MFC 2.

UNLK
gear not in selected position or uplock not opened (on Gnd)

Green Lt
down lock engaged

Controls XFEED valve. Activates both elect fuel pumps.

Controls elect pump power supply and jet pump motive flow valve.
Runs automatically if:
Jet pump press <5 PSI
or Xfeed in line
or Fuel LO LVL
– <160 kg
– >160 kg (with feeder tank not full)
or During Fuel Quantity test

To call cabin from cockpit (SC)
To be called by cabin attendant: blue Lt and door bell.
Cancelled when pressing RESET pb.

To call mechanic= HORN is activated .
To be called by mechanic: Blue LT and Door Bell.
Cancelled when depressing RESET Pb

Do not use above 160 kts.
ESS BUS.

UNDV
DC STBY <19.5V. No CAP.

OVRD
Transfert of STBY buses from HOT MAIN to HOT EMER BAT BUS.

INV FAULT
Inv failure or supply loss Auto-Xfer of all AC buses to remaining inverter. CAP.

Emergency supply indicators (Amber arrows) (Respective battery discharging).

ON
Pb pressed IN (ON illuminated WHITE). TRU is connected to ACW BUS 2 – ARROW illuminates amber when supply of DC EMER BUS, DC STBY BUS, INV 1 (AC STBY BUS) and DC ESS BUSS from TRU is effective.

FAULT
Battery charger failure detected by MFC. CAP.

Contactor Auto opens (MFC) if: thermal runaway / Bus voltage <25V / start sequence / Bat sw on OVRD.

Respective bus not supplied. CAP.

SHED
One of the DC SVCE / UTLY 1 and 2 busses is shed (BPCU). CAP.
OFF: all the DC SVCE BUS/ UTLY 1 and 2 busses are shed

Opposite generator has not come on line to assist start at 10% NH (on ground only).

Generator FAULT LT Extinguishes above 61.5% NH if GEN is operating normally.

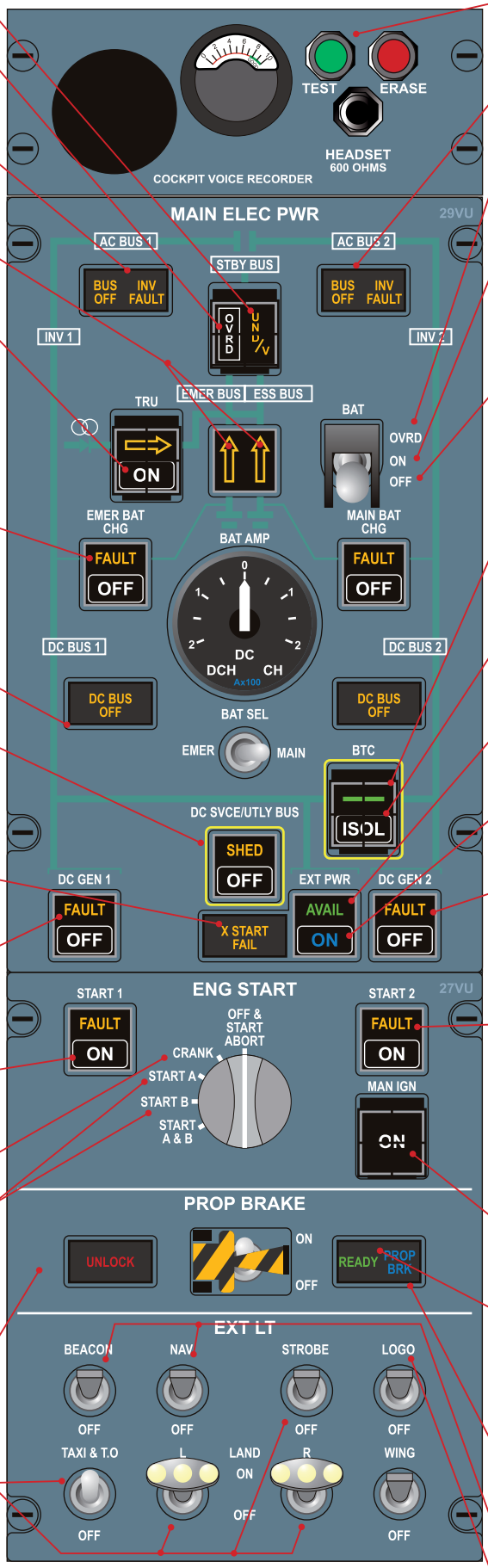
ON
started engaged. At 45% NH, light out, starter disengages automatically.

CRANK
dry monitoring (no ignition).

START
selects a start sequence.
In flight regardless of start selection (A, B, A+B) both exciters are energized.

Prop Brake not fully locked or not fully released. After 15 sec = **CAP**.

Supplied by ACW.



On external power, pedestal PB must be on to power CVR test

Associated bus deenergized. **CAP**.

OVRD
insures basic mode operation by overriding all other protections.

ON
Basic mode: STBY Busses supplied by HOT MAIN BAT BUS.
EXT or GEN power: DC STBY BUS transfered to HOT EMER BAT BUS; AC STBY BUS to DC BUS 1.

OFF
ESS BUS, DC STBY BUS + INV 1 are isolated from HOT MAIN BAT BUS.
DC EMER BUS is isolated from HOT EMER BAT BUS.

Allows BPCU to control BTC operation (Bus Tie Contactor). Ext power, Hotel mode or single gen operation. BTC is closed (green flow bar).

ISOL
BTC opened (released out). BTR (Bus Tie Relay) locked open (Tie between AC Busses)

AVAIL
GPU has been checked by BPCU for over/under voltage, over current and polarity.

AVAIL +ON
The GPU supplies the electrical system. GPU has priority on both generators.

FAULT
Protection triggered by GCU. Auto reset if underspeed: in other cases manual reset. BTC auto closes.

FAULT
illuminates when:
starter remains ON with NH>45%
or GCU failure during start
or starter failure
or ENG2 only PROP BRK ON+Gust lock not engaged (Starting not inhibited).

ON
Continuous ignition (both A & B). Memo panel light.

READY
engagement or disengagement cond. Are met:
– A/C on ground
– gust lock engaged
– CL on FTH of FUEL S/O
– blue hyd press > 2100 PSI
– fire handle not pulled

PROP BRK
Prop brake fully locked. Memo panel light.

Supplied by DC SVCE BUS (Back up DC BUS 1).

Supplied by DC BUS 2.

Annexes

Main BLUE PUMP
Supplied by ACW, controlled by DC EMER BUS.

AUX PUMP
Running conditions:
– AUX PUMP pb depressed
– at least one engine running
– blue system press < 1500 psi
– prop brake off
– gear lever down
(supply: DC BUS 2 or HOT MAIN BAT BUS)

OVHT
Temp >121°C (250°F). **CAP** (no auto off)

Associated bus not supplied

AVAIL
GPU has been checked by BPCU

AVAIL + **ON**
GPU supplied ACW system. GPU has always the priority on both GEN

AUTO reset in case of under/over speed: manual reset otherwise. ACW SVCE BUS auto shed if one GEN is out.

ALPHA
ACW supply
Amber LT illuminates in case of Failure or Pwr loss. **CAP**.

TAT
no heated. **CAP** (ACW supply). Heating inhibited on ground.

PITOT
tube not heated. **CAP** (ACW BUS for CPT & F/O).

PITOT STBY
not heated (CAP).
ACW bus 1 or 115 AC STBY BUS as back up.

ON
ACW supply (inhibited when NP <63%).

FAULT
power loss on at least 1 Blade. **CAP**.

NORM
10 sec on per 3 blades; then 10 sec off between cycles.

ON

HIGH POWER
20 sec on per 3 blades. No pause between cycles (ON LT illuminates BLUE).

MODE SEL AUTO
Automatic selection of cycle depending on ADC1/2 input to MFC1B/2B.

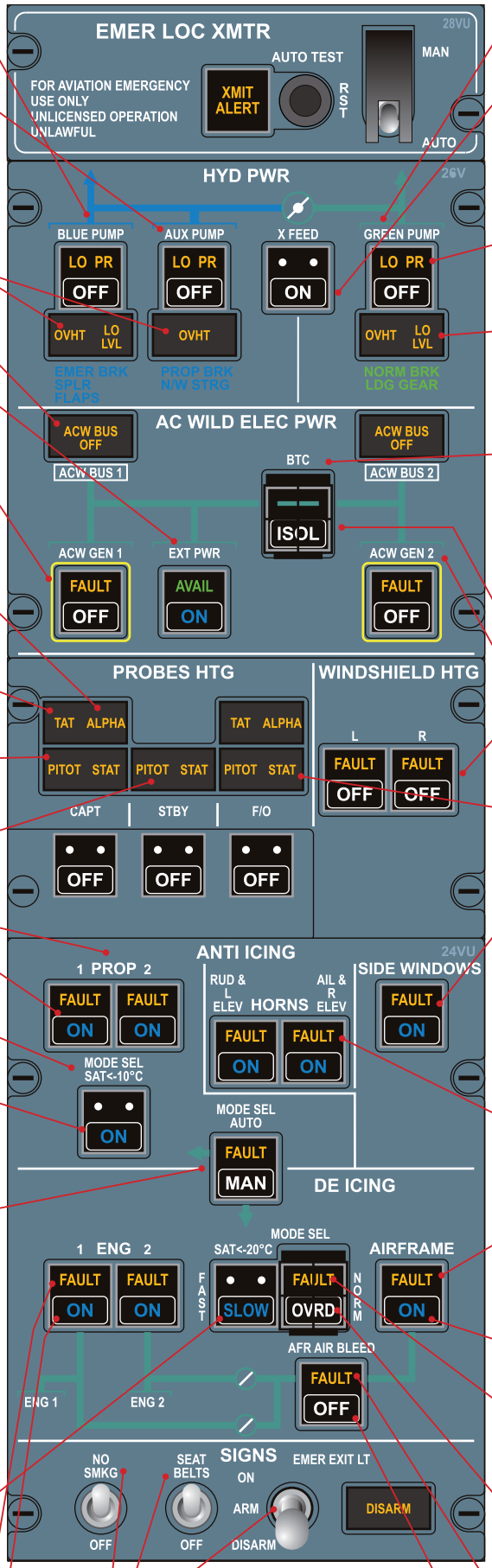
FAULT
when ADC or MFC fail
Fast mode is automatically selected for ENG and AIRFRAME DEICING and High Power for Prop Anti-ice.

MAN
mode enables manual selection of cycles depending on SAT (MAN illuminated WHITE).

DEICE air is always available regardless of bleed pb.
FAST: 60 sec / cycle
SLOW: 240 sec / cycle (SLOW illuminates BLUE)

FAULT
distribution valve opened but no air press.
OR valve closed and press. Detected
OR air temp upstream of the deice valve >230°C for more than 6 sec.

ON
deice valve opened even if AFR AIRBLEED off.



Main GREEN PUMP
Supplied by DC ESS BUS.

XFEED
PB released. Xfeed closed
PB pressed: ON LT illuminated WHITE, Xfeed valve selected OPEN. (Except in case of LO LVL where the Xfeed is locked closed)

LO PR
pump delivery pressure less than 1500 psi. CAP. No auto off.

LO LEVEL
associated compartment <2,5 lt **CAP**. Xfeed opening inhibited.

BTC
Allows BPCU to control BTC operation.
Ext Pwr or simple GEN operation: BTC is closed (Green Flow BAR).
Auto closure when either ACW GEN drops off line.

ISOL
BTC opened (Pb released out).

Min Np for ACW= 66%.

FAULT
Power loss or failure; **CAP**.

STAT
Static source not heated or failed. **CAP** on ground only (DC BUS). (no alarm in flight)

ON
Defog only.

FAULT
for power loss or failure; **CAP** (DC BUS).

ON
ACW supplied. Horns heating inhibited on ground; either horn activates AOA Lt.

FAULT
Power loss. **CAP**.

FAULT
valve opened but no downstream press. OR valve closed and downstream press. Detected. **CAP**.

ON
signal sent to MFC to start deice cycle on the airframe.

FAULT
both MFC modules controlling boots have failed resulting in an incorrect inflation sequencing.

OVRD
no MFC. Boots inflated by a separate standby controller. Fast cycle only (cycle 60°).

FAULT
Air downstream deice valve <14 psi more than 10 sec. Air upstream deice valve >230°. **CAP**.

OFF
isol valves closed. Deice valves closed unless ENG 1/2 deice on.

Blue Lts on MEMO panel when ON (DC BUS2).

ON
emergency exit lights illuminated.
Supply: 6V Bat packs.

ARM
– lights on if DC STBY BUS <18V
– lights off if DC STBY >20V
– or in case of dual DC GEN loss

DISARM
system desactivated

Tests all three smoke detections (elec. fwd. aft smoke Red alarms in CAP).

Stops extract fan, only on ground (FAULT on EXHAUST MODE).
To restart extract fan it is necessary to reset EXHAUST MODE Pb

PB in: Crew supply only.

If below 1400 psi, use table.

NORM
– On ground, ENG 1 off: extract fan on. Ovbd valve full open, U/F valve closed.
– On ground, ENG 1 on: extract fan on. Ovbd valve closed, U/F valve opened.

FAULT
Fan failure / overheat (fan inhibited for 120s after every eng start. AIR light in CAP).

OVBD
Extract fan off. OVBD valve partially opened (in fight only). U/F valve closed.

Duct temperature limited to 88°C. (191°F) by pneumatic temp limiter.

NORM: 22 psi
HIGH: 30 psi
regulated by pack valve

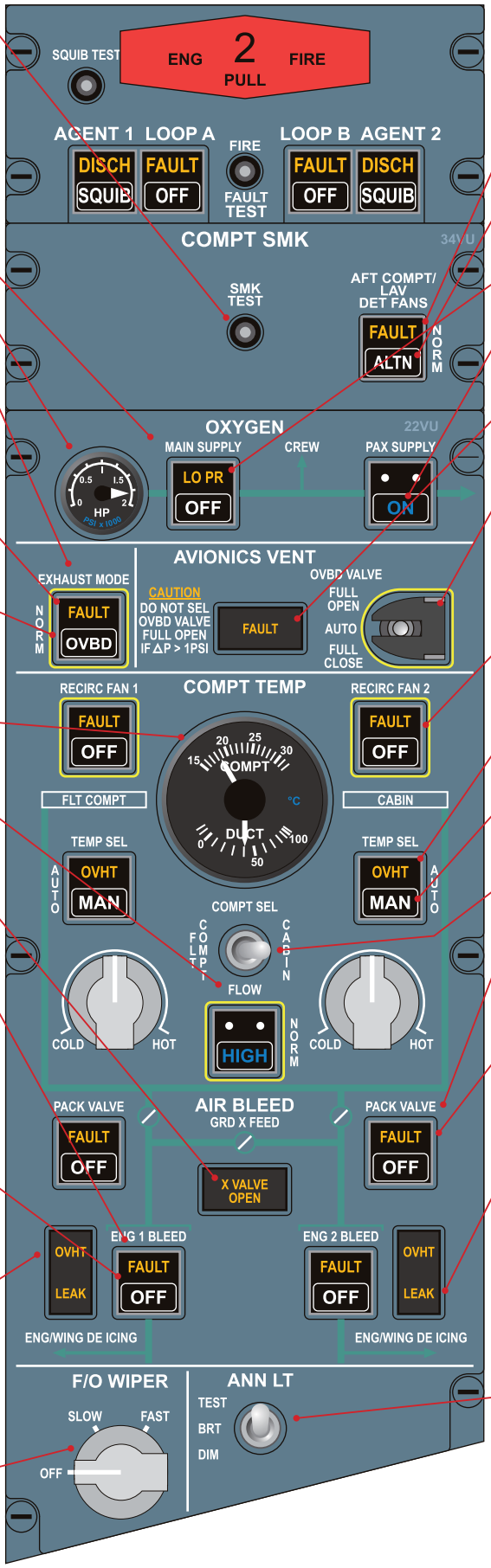
Spring loaded closed. Ground only. Auto opens when only 1 Bleed valve is opened.

Controls both Bleed and HP valves. Spring loaded closed. Must have air & elec to open. Auto Bleed valve closes when Ovht, Leak, Overpressure (> 80 psi), Fire T pulled, when UPTRIM is triggered or prop brk on (left one only). Inhibited during eng start.

FAULT
Bleed valve disagreement with selected position (case of Ovht, Overpressure or Leak). **CAP**. Associated valves auto closed.

OVHT
either bleed duct temp thermal switch above 274°C. CAP. Associated valves auto closed.
May be reset after cooling.

Do not use above 160 knots. DC BUS 2.



FAULT
fan inop. CAP.

ALTN
activates altn fan.

LO PR
supply below 50 psi.

ON
25% of Pax are supplied.

FAULT
Ovbd Valve in disagreement with Ovbd Valve SW position.

AUTO except for emergency. In emergency, the full open position is possible only if the Delta P is < 1 psi

Assists pack air flow.

FAULT
Fan low speed or motor overheat. **CAP**. No auto deselected.

OVHT
Duct overheat > 92°C. CAP. Pack valve will not auto close.

MAN
Compt temp knob controls directly temp control valve.

Selects the zone where T° check is desired.

PACK VALVE
Spring loaded closed. Must have air pressure and select power to open (6 sec delay on RH pack for pax comfort).

FAULT
pack valve disagreement with PB or Ovht downstream of pack comp (>204°C). CAP. Valve auto closed.

LEAK
activates when temperature detected by bleed loop exceeds 156°C. **CAP**.
Auto closure after 1 sec of following valves: Bleed, HP, PACK and GND XFeed. DO NOT RESET BLEED.

Tests all lights except LO LVL, ITT and FDEP (DC BUS 2).

Fuel Oty. TAT/TAS. Ldg Elev indicators show all 8 sec.

Annexes

STBY HORIZON (DC EMER)
Red and black flag: elec supply loss or gyro speed insufficient.

STBY IAS and ALT Ind
both supplied by Stby pitot and static source: completly independent from CPT / F0 systems.

PWR MGT
2 co-axial sw, (LH: Bottom/ RH: Top) providing FDAU, PEC, PIU and EEC with basic power requirements.

SGL CH
illuminates when one channel is lost (2 sec on, for self test when advancing CL from FTR to AUTO).

FAULT: illuminates when both PEC channels are lost **CAP**.
OFF: PEC is deactivated and Np is limited at 102.5% by the overspeed governor if power is sufficient.

TEST pb
when pushed in, displays all 8's + LO LVL LTs, + **CAP** + elect Pumps energized. Refuel panel disabled during test and refuel valves auto close.

LO LVL Lt
– When the quantity is <160kg or
– When the quantity is >160kg, but the feeder tank is not full (Feeder jet pump failure)
Elec pump auto runs. **CAP**.

TAS Ind
from selected ADC indicates TAS from 68 to 600 kts; if ADC not valid it displays (---).

TAT Ind
from selected ADC Indicates TAT; If ADC not valid , it displays (---).

SAT pb
shows SAT when depressed and held.

FAULT
detector failure or supply loss (ACW BUS 2). **CAP**. (FAULT LT supplied by DC EMER).

ICING steady
ice accretion is detected and both horns anti icing + airframe deicing are selected ON. MC + SC.

ICING flashing
ice accretion is detected and either horn and/or airframe selected OFF. MC + SC.

PTT pb
press for 3 sec.
– icing will flash if system works correctly.
– FAULT LT illuminate steady if ice detector failure is detected.

ICING AOA Lt
illuminates green as soon as 1 horn anti-icing ON. Stall alarm (stick shaker threshold lowered). It can be extinguished manually only by releasing ICING AOA Pb (DC EMER) provided both Horns anti-icing selected OFF.

Arming conditions:
PWR MGT sel on TO
+ATPCS pb in
+ both PL >49°
+ both TQ > 53%(42)
both TQ > 46% (72)
ARM green LT on.

UPTRIM
signal sent to respective eng during ATPCS sequence.
Eng power = RTO.

LO PITCH
blade angle < 8° (below FI) CAP in flight only.

ATPCS
– ARM on ground = uptrim + auto FTR (2.15" delay)
– ARM in flight (In case of go around) = auto FTR only.

ATPCS
Trigger
one TQ <18% (42)
one TQ <18% (72).
Cancel
PWR MGT out of TO
or ATPCS pb OFF
or at least one PL retarded <49°
or both TQ <53%.

EEC
acts on stepper motor, to regulate Fuel Flow.

FAULT flashing
EEC Failure. The fuel flow is frozen to maintain the power. (Do not deselect EEC when flashing)
The PL has to be retarded to the green sector before deselection of the EEC

FAULT steady
EEC Failure. HMU base law = reversion. Fault become steady when the PL is retarded in the green band.

OFF
HMU base law = reversion.

TORQUE Ind (DC EMER)
2 probes sending info:
– to pointer (via AFU).
– to digital counter (via EEC).

Internal bug
computed by FDAU; shows RTO when PWR MGT on TO, otherwise max TQ depending on PWR MGT selection.

NP Ind
(DC ESS)

LIMITS
From 0 to 120%.

TEST
115% (blue dot).

ITT Ind
(DC ESS)
From 0 to 1200°C.
Red point: 840° (20 sec max)
Red point+S: 950° (5 sec max on START).

TORQUE Ind
White TQ bug manually selected.
Knob enables setting of white TQ bug.

LIMITS
From 0 to 137% (42)/0 to 109.5% (72).
Actual TQ display.
Dashes (- - - -) for an Handling Bleed Valve failure (anti surging system of the engine)

TEST
115% (blue dot)

ALERT Lt
> 800°C (or > 715°C on ENG2 in hotel mode). CAP.

TEST
1150° (blue dot)

FUEL CLOG
Fuel press loss in corresponding HP pump fuel filter (DC BUS 1/2)
ΔPSI >25 PSI: CAP
Filter blocked and by-passed when ΔPSI >45.

NH-NL Ind
(DC ESS)
Thin pointer: NL (104.2% max)
Wide pointer and digital display: NH (102.7% mar)

TEST
115% (blue dot)

FUEL TEMP Ind
sensor before HP pump (DC BUS 1/2).
From –54 to +57°C.

OIL PRESS
(DC BUS 1/2).
From 0 to 90 psi

OIL LOW PRESS Lt
< 40 PSI. A separate press sw activates CCAS below 40 PSI

OIL TEMP (DC BUS 1/2)
From 0 to 130°C

FUEL FLOW Ind
(DC BUS 1/2)

FU reset knob
FU reset to 0 when pulled.

FUEL USED Readout
(DC BUS 1/2)

Annexes

Gear position sensed by system I (MFC 1A)

UNLOCK
gear not locked in handle selected position (on ground, up lock box not open)

Green Lt
gear downlock engaged

Green Hyd Press Ind.

BRK ACCU Press in blue system
For Emer brakes max.
6 applications. DC STBY

Blue Hyd Press Ind

ANTISKID
Operational if speed >10kts.
Activates when Spd >23kts
+50% diff between wheels.
Braking action inhibited at touchdown as long as wheel spin ud spd <35 kts or for 5 sec

FAULT
wheel channel failure. CAP

OFF
Pb released, system desactivated

TEST pb
inhibited if speed >17 kts
MC + SC + CAP + 4F amber Lt
Test duration:
3 sec in fight
6 sec on ground

CAUTION: THE TEST INHIBITS BRAKES!

HOT
Any brake >160°C (42).
>150° (72). CAP

LO-SPD
ON <190 kts(42), 180 kts(72) = TLU released allow full rudder travel
OFF >195 kts (42), 185 kts (72)
Not ON <190 kts (42),
180 kts (72) = maximum Xwind 15 kts.

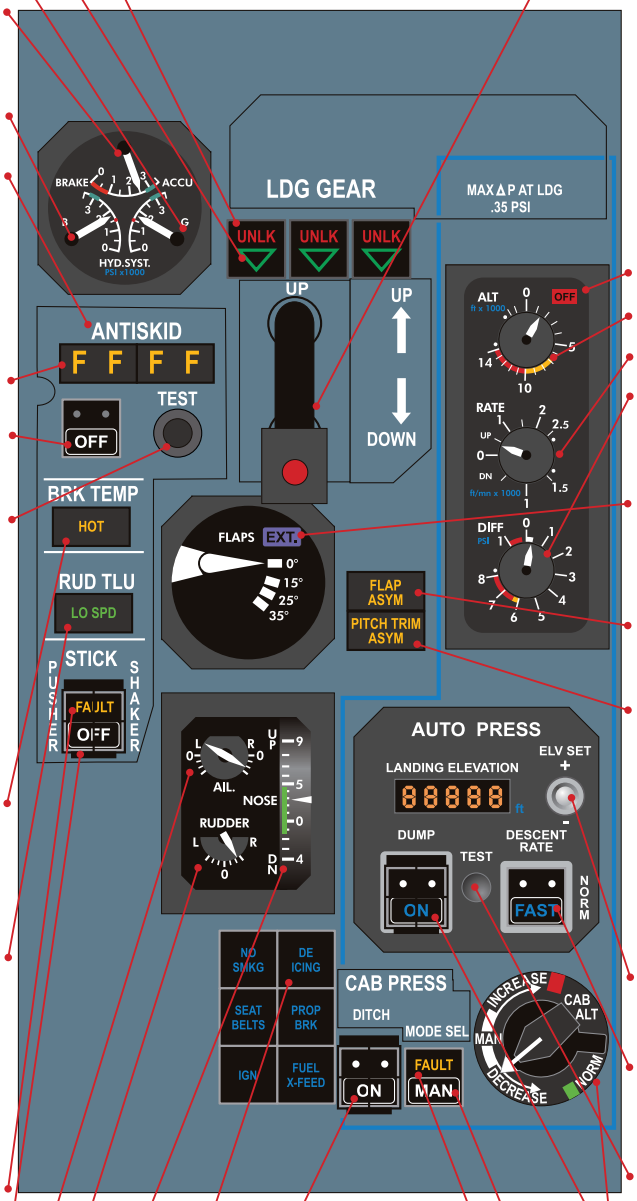
FAULT
stick shaker or pusher failure.

OFF
turns off both shaker and pusher

ROLL
shows LH aileron trim controlled tab travel.
All Motor pwr = DC EMER

YAW
shows units of trim motor displacement

PITCH
shows right trim actuator controlled tab travel. If not in green arc at TO, CONFIG in CAP



ON
both outflow valves forced to be fully closed

DE ICING Lt
a) Illuminates when airframe deicing syst is ON.
b) Flashes when airframe deicing syst still selected ON 5 min after last ice accretion detection

Gear handle red Lt
any gear not sensed down and locked with the further conditions
a) Any gear not down and locked + flaps normal landing configuration + Zra <500 ft + PL at low power (impossible to cancel)
b) Any gear not down and locked +1 PL at low power + Zra < 500 ft and 150 sec after gear retraction (can be cancelled).

NOTE: Any gear not down must be sensed by each MFCs

OFF FLAG
loss elec power

Cabin alt: based on 29.92 (1013,2 Hpa)

Cabin rate of climb

DIFF. Press
max +6.35/–0,5

EXT (BLUE)
flap hyd. valve commanding flap extension is opened.
If EXT appears when flaps are extended = hyd circuit leak

FLAP ASYM
> 6.7° CAP. Flaps frozen in actual position

PITCH TRIM ASYM
pitch tab desynchronization. CAP

AUTO PRESS (DC BUS 1)
+550 up to FL 200
+620 above FL 200

Memorizes departure field elev up to 3500 ft

ELV SET
Select switch to set landing elevation

FAST
descent rate increased from –400 to –500 ft/mn
To be used if VS>-1500 fpm

TEST
displays alternatively 18800 and –8800, FAULT appears on MAN pb
(Test inhibited in FLT)

DUMP

ON (guarded)
both outflow valves fully open in AUTO mode only

NORM
AUTO mode selection

MAN
digital controller out of operation. No more digits in landing elevation display

FAULT
digital controller failure. CAP

Weather radar control panel
Control the weather radar but the EGPWS too (for the power supply and the range)
If OFF, the **GPWS** is triggered on CAP

CAPT EFIS CONTROL PANEL

MCDU (Multifunction Control Display Unit)
Access to the GNSS, MPC and ACARS (Data Link)
When ACARS is installed, the aircraft is fitted with 2 MCDU

F/O EFIS CONTROL PANEL

COCKPIT DOOR CONTROL PANEL

Gust lock
AIL LOCK triggered whenever one of the locking actuators is in disagreement with the gust lock lever position (lock or unlock position)

EMER & PARKING BRAKE

POWER LEVER (PL)

CONDITION LEVER (CL)

FLAPS

GA push button
when depressed the GA FD mode is selected with:
– **HDG HOLD** lateral mode with the wings level
– **GA** vertical mode

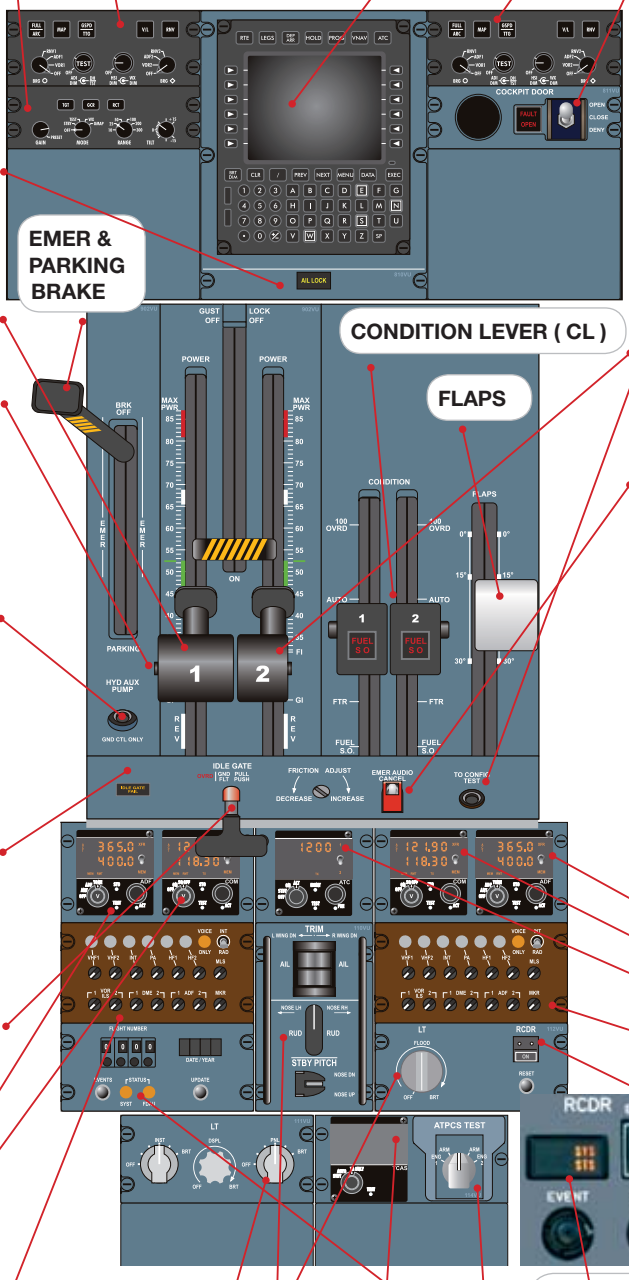
HYD AUX PUMP CONTROL
(HOT MAIN BAT BUS)
– Aux pump stopped 30" after p/b released (MFC supplied)
– Aux pump stopped after p/b released (MFC not supplied)

IDLE GATE
IDLE GATE FAIL
activated when the gate does not engage automatically in flight or does not extend automatically on ground

In this case the idle gate lever enables manual override in case of failure of the automatic logic
– In flight: push
– On ground pull (an amber band appears)

TO CONFIG TEST pb:
Check if the TO configuration is correct for take off:
– PWR MGT TO
– Flaps 15°
– Pitch trim in the green band
– TLU LO SPD
– no AIL LOCK light
The same test is performed when advancing the PL with this additional requirement:
– Parking Brake released

EMER AUDIO CANCEL
This SW cancel an undue aural alert.
Cancelled aural warning will be reactivated:
– at next A/C energization
– after MFC 1B/2B reset
– after pressing RCL pb
– following TO config test
The alert here after are rearmed as soon as the triggering condition disappears
– landing gear
– VMO, VFE, VLE
– Stall warning
– Pitch trim whooler
– AP disconnect



ADF 2
VHF 2
ATC 1/2

F/O AUDIO CONTROL PANEL

Manual recording on DFDR or CVR (when supplied by GPU)
Manual recording stopped with the reset P/B

MPC option without FDEP

VHF1
ADF1

CAPT AUDIO CONTROL PANEL

Panel & flood light control

TCAS control panel

STATUS Light
STATUS FDAU light
Illuminates amber when the FDAU is failed
STATUS SYST light
Illuminates amber when DFDR fail or the DFDR electrical supply is lost

FDEP (Flight Data Entry Panel)
Can not be fitted on aircraft equipped with the MPC. In that condition the flight number has to be entered through the MCDU

Aileron, rudder & stby pitch trims

ATPCS test (static or dynamic)

Annexes

EGPWS (or TAWS if T2CAS equipped)

GPWS switch and associated lights:

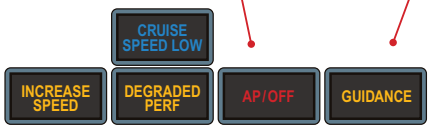
ON: All basic GPWS modes are operative
FLAP OVRD: In reduced flap landing, to inhib the mode 4 alert
OFF: All basic GPWS modes inhibited.
OFF: light come on
FAULT: GPWS FAULT —> some or all GPWS basic modes are lost

FAULT: TERR FAULT —> some or all enhanced modes are lost
OFF: All enhanced (TCF&TAD) modes inhibited

STICK PUSHER
Illuminates when stick pusher is operating

AP OFF
Both lights illuminate or flash red when autopilot. associated to the cavalry charge aural alert

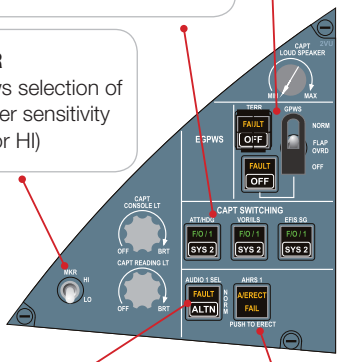
GUIDANCE
in CAT II, when an Excess deviation is detected



GPWS
If any mode 1-2-3-4-TCF-TAD alert of the EGPWS (or TAWS) is activated
G/S: If mode 5 is activated

SWITCHING PANEL
When facing to a failure on the Attitude/ heading or VOR/ILS or SGU, it permits to recover the information from the other side.
Priority is always given to the captain

MKR
Allows selection of marker sensitivity (LO or HI)



AUDIO 1/ 2 SEL
FAULT: When the associated RCAU part is failed.
ALTN: Affected crew station is connected directly to:
– VHF1 if CAPT station is affected.
– VHF2 if F/O station is affected.

A/ERECT FAIL
Associated AHRS loses the TAS signal from the ADC. The AHRS is operating in basic attitude mode.
Aircraft stabilized, gyro fast erection when pushing on the P/B for 15s

DSP SEL P/B
RDR: Weather Radar display on EFIS
TERR: Terrain display on EFIS
Even if RDR is selected, in case of terrain warning an automatic pop out permit to have the terrain display on EFIS

ADC SWITCH
To feed either from ADC1 or ADC2
– EEC1/2
– TAT/SAT/TAS indicator
– GNSS
– FDAU
FAULT: some or all the systems here above, are fed by the ADC 1 when the ADC 2 is selected (relays defect)
Never faulty if selected to ADC 1

MASTER WARNING
MASTER CAUTION

APM alert lights:
CRUISE SPEED LOW
cruise only. An abnormal drag increase induces a speed decrease >10kt
DEGRADED PERF
cruise and climb. An abnormal drag increase induces a speed decrease or a loss of rate of climb
INCREASE SPEED
After degraded perf. Drag abnormally high and IAS lower than RED BUG + 10 kt

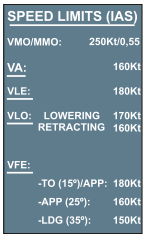
APM Weight rotary selector
Before take off (Both engines running), it should be set to minimum weight then to take off nearest weight. Only taken into account if the selector has been changed. No effect for any change in flight.
If no selection, an internal calculation computed at the beginning of the flight, is used.
APM FAULT
Failure in the APM function computation
APM Test PTT
performed daily

LOUDSPEAKERS VOLUME KNOBS
Individual knob for each loudspeaker

CONSOLE LT knob
Control the lights of the associated lateral console

READING LT knob
Control the respective spot light

72-212A



42-500

Annexes

LATERAL MODE

	VOR	ARMED MODE
VOR*	VOR*	CAPTURED MODE
	VOR	TRACKED MODE

VERTICAL MODE

	ALT	ARMED MODE
ALT*	ALT*	CAPTURED MODE
	ALT	TRACKED MODE

ALT knob controls the preselected altitude on ADU

NAV 1

NAV 2

FD bars SW to set ON/OFF

CRS 1 knob selects Course on CAPT EHSI

Pitch wheel to adjust
– VS or
– IAS or
– Pitch attitude in basic mode

CRS 2 knob selects Course on F/O EHSI

STBY COMPASS
Hidden in up position. Compass Control should be place on DN For use. The compass rose is graduated in 10 degrees increments

HDG knob selects **HDG bug** on both EHSI

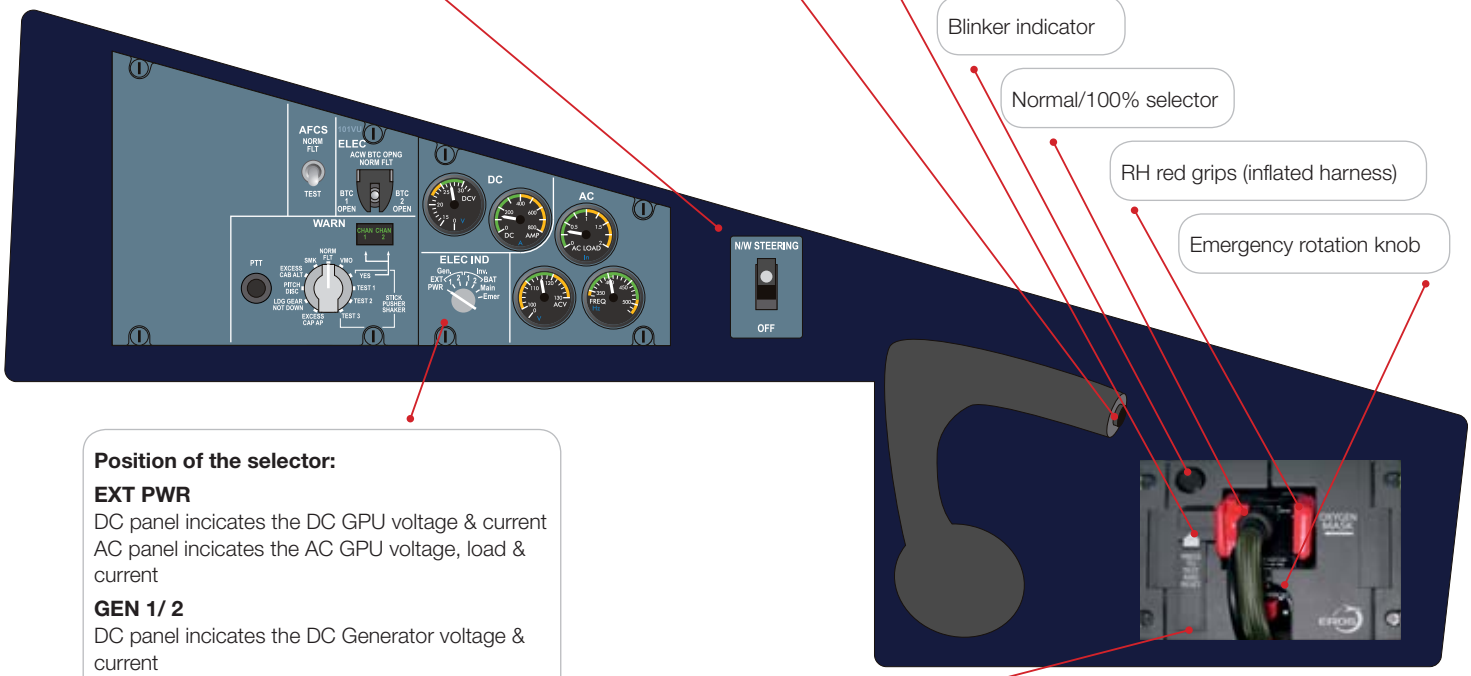
– **AP** pb engages autopilot and yaw damper and disengages only autopilot

– **YD** pb engages yaw damper and disengages yaw damper and autopilot if engaged

– **CPL** pb permit to couple AP/FD On CAPT or F/O side
In **CAT 2** (ILS selected on NAV 1&2)
– 1200 ft RA: Dual coupling < >
– 800 ft RA: CAT 2 invalid if still in single coupling
– 500 ft RA: ILS excess dev activated
– 100 ft RA: GS excess dev deactivated

N/W STEERING
ON: The steering solenoid valve is electrically armed. The steering is available with an angle up to 60° in either direction
OFF: The steering system is unpressurized. Should be OFF for towing and push back
The steering is disconnected with an angle up to 91° in either direction

Nose wheel steering Push To Talk
When depressed, BOOM SET or OXY mike is connected for transmission over the selected communication facility



Position of the selector:

EXT PWR
DC panel incicates the DC GPU voltage & current
AC panel incicates the AC GPU voltage, load & current

GEN 1/ 2
DC panel incicates the DC Generator voltage & current
AC panel incicates the ACW Generator voltage, load & current

INV 1/ 2
No indication on DC panel
AC panel incicates the AC Inverter voltage, load & current

MAIN and EMER BAT
DC panel incicates the DC Main & Emer Battery voltage & current
No indication on AC panel

PRELIMINARY COCKPIT PREPARATION: OXYGEN MASK TEST

INT/RAD SELECTOR (On AUDIO CONTROL PA .....SET TO INT
PRESS TO TEST AND RESET PB..... DEPRESS AND HOLD

NOTE: Hose and mask charged with oxygen. Observe blinker momentarily turns yellow and must turn dark if there is no leak

PRESS TO TEST AND RESET PB..... HOLD
RED GRIPS ON EACH SIDE OF THE HOSE.....PRESS

NOTE: Oxygen pressure inflates the harness. Observe blinker momentarily turns yellow and must turn dark

PRESS TO TEST AND RESET PB..... HOLD
EMERGENCY KNOB ..... SELECT

NOTE: Emergency flow is tested. Observe blinker momentarily turns yellow during oxygen flow and must turn dark when the knob is released.

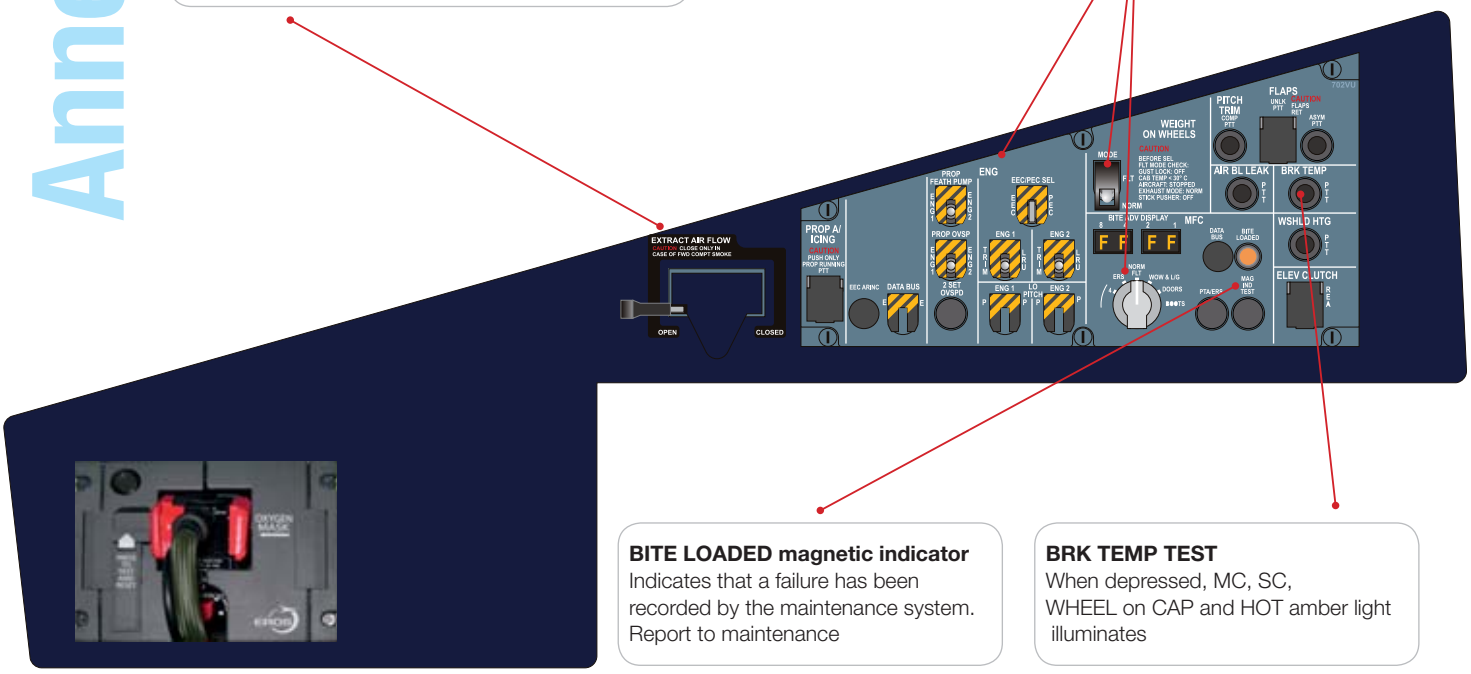
NOTE: In this 3 cases, check that oxygen flow sounds though loudspeakers

OXY LO PR LIGHT..... CHECK EXTINGUISHED
N/100% Selector ..... SET to 100%

Annexes

FLIGHT DECK VENTILATION ISOLATION EXTRACT AIR FLOW
CAUTION: Close only in case of FWD COMPT smoke
Enables, in case of smoke in the forward cargo compartment, to isolate the flight deck ventilation preventing smoke to enter the flight compartment

MAIN PNL
Before the flight, check that all the switch and selector are in the normal position.
If not, the MAINT PNL is illuminated on the CAP



BITE LOADED magnetic indicator
Indicates that a failure has been recorded by the maintenance system.
Report to maintenance

BRK TEMP TEST
When depressed, MC, SC, WHEEL on CAP and HOT amber light illuminates

Annex 2. Abbreviations

A

AAS	Anti-icing Advisory System
AC	Alternating Current
ACARS	ARINC Communication Addressing and Reporting System
AC BTC	AC Bus Tie Contactor
AC BTR	AC Bus Tie Relay
ACW	Alternating Current Wild Frequency
ADC	Air Data Computer
ADF	Automatic Direction Finding
ADI	Attitude Director Indicator
ADS	Air Data System
ADU	Advisory Display Unit
A/EREC	Auto Erection
AFCS	Automatic Flight Control System
A/FEATH	Auto Feathering
AFT	Rear Part
AFU	Auto Feather Unit
AGB	Accessory Gear Box
AHRS	Attitude and Heading Reference System
AHRU	Attitude and Heading Reference Unit
AIL	Aileron
ALT	Altitude
ALTM	Altimeter
ALTN	Alternate
AMP	Ampere
AOA	Angle of Attack
AP	Auto-Pilot
APP	Approach
APU	Auxiliary Power Unit
ARM	Armed
ASCB	Avionics Standard Communication Bus
ASI	Air Speed indicator
ASYM	Asymmetry
ATC	Air Traffic Control
ATPCS	Automatic Take off Power Control System
ATT	Attitude
ATTND	Attendant
AUTO	Automatic
AUX	Auxiliary
AVAIL	Available

B

BARO	Barometric
BAT	Battery
BC	Back Course
BITE	Built in Test Equipment
BPCU	Bus Power Control Unit
BPU	Battery Protection Unit
BRG	Bearing
BRK	Brake
B-RNAV	Basic Area Navigation
BRT	Bright
BTC	Bus Tie Contactor
BTR	Bus Tie Relay

C

CAB	Cabin
CAP	Crew Alerting Panel
CAPT	Captain
CAT	Category
C/B	Circuit Breaker
CCAS	Centralized Crew Alerting System
CDI	Course Deviation Indicator
CHAN	Channel
CHC	Charge Contactor
CL	Condition Lever
CLA	Condition Lever Angle
CLB	Climb
CLR	Clear
CMPTR	Computer
COM	Communication
COMPT	Compartment
CONFIG	Configuration
CPL	Auto Pilot Coupling
CRC	Continuous Repetitive Chime
CRS	Course
CRT	Cathodic Ray Tube
CRZ	Cruise
CTL	Control
CVR	Cockpit Voice Recorder

D

DADC	Digital Air Data Computer
DC	Direct Current
DELTA P	Differential Pressure
DEV	Deviation
DFDR	Digital Flight Data Recorder
DGR	Degraded
DH	Decision Height
DIFF	Differential
DISCH	Discharge
DIM	Light Dimmer
DIST	Distance
DME	Distance Measuring Equipment
DN	Down
DSPL	Display

E

EADI	Electronic Attitude Director Indicator
ECU	Electronic Control Unit
EEC	Engine Electronic Control
EFIS	Electronic Flight Instrument System
EHSI	Electronic Horizontal Situation Indicator
EHV	Electro Hydraulic Valve
ELEC	Electrical

Annexes

ELV	Elevation
EMER	Emergency
ENG	Engine
EQPT	Equipment
ESS	Essential
ETOPS	Extended Twin Operations
EXT	Exterior, External

F

F	Farenheit
FAIL	Failed, Failure
FCOC	Fuel Cooled Oil Cooler
FD	Flight Director
FDAU	Flight Data Acquisition Unit
FDEP	Flight Data Entry Panel
FEATH, FTR	Feathered, Feathering
FF	Fuel Flow
FGC	Flight Guidance Computer
FGS	Flight Guidance System
FI	Flight Idle
FLT	Flight
FMA	Flight Modes Annunciators
FMS	Flight Monitoring System
F/O	First Officer
FOS	Flight Operations Software
FQI	Fuel Quantity Indication
FT	Foot, Feet
FU	Fuel Used
FWD	Forward

G

GA	Go Around
GCU	Generator Control Unit
GEN	Generator
GI	Ground Idle
GND	Ground
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GPU	Ground Power Unit
(E)GPWS	(Enhanced) Ground Proximity Warning System
GRD	Ground
G/S	Glide Slope
GSPD	Ground Speed

H

HBV	Handling Bleed Valve
HDG	Heading
HF	High Frequency
HI	High
HLD	Hold
HMU	Hydromechanical Unit
HP	High Pressure
HSI	Horizontal Situation Indicator
HTG	Heating
HYD	Hydraulic

I

IAS	Indicated Air Speed
IDT	Ident
IGN	Ignition
ILS	Instrument Landing System
IND	Indicator
IN/HG	Inches of Mercury
INHI	Inhibit
INOP	Inoperative
INST	Instrument
INT	Interphone
INV	Inverter
ISOL	Isolation
ITT	Inter Turbine Temperature

JK

KHZ	Kilo-Hertz
KT	Knot

L

LAT	Lateral
LAV	Lavatory
LB	Pound
LDG	Landing
L/G	Landing Gear
LH	Left Hand
LNAV	Lateral Navigation
LO	Low
LOC	Localizer
LO-PR	Low Pressure
LP	Low Pressure
LT	Light
LVL	Level

M

MAX	Maximum
MB	Millibar
MC	Master Caution
MCDU	Multifunction Control Display Unit
MCT	Maximum Continous
MECH	Mechanic
MFC	Multi Function Computer
MFCU	Mechanical Fuel Control Unit
MGT	Management
MHZ	Megahertz
MIC	Microphone
MIN	Minimum
MISC	Miscellaneous
MKR	Marker
MLW	Maximum Landing Weight
MM	Millimeter
MMO	Maximum Operating Mach
MOD	Modification
MSG	Messages
MSN	Manufacturer Serial Number
MTOW	Maximum lake off Weight
MW	Master Warning
MZFW	Maximum Zero Fuel Weight

N

NAC	Nacelle
NAV	Navigation
NDB	Non Directional Beacon

NEG	Negative
NH	High Pressure Spool Rotation Speed
NIL	Nothing, No Object
NL	Low Pressure Spool Rotation Speed
NM	Nautical Mile
NORM	Normal
NP	Propeller Rotation Speed
NPU	Navigation Processor Unit
N/W	Nose Wheel
NWS	Nose Wheel Steering

O

OAT	Outside Air Temperature
OBS	Omni Bearing Selector
OVBD	Overboard
OVERTEMP	Overtemperature
OVHT	Overheat
OVRD	Override
OXY	Oxygen

P

PA	Passenger Address
PB	Push Button
PEC	Propeller Electronic Control
PIU	Propeller Interface Unit
PL	Power Lever
PLA	Power Lever Angle
PNL	Panel
POS	Position
P-RNAV	Precision Area Navigation
PRESS	Pressurization, Pressure
PRIM	Primary
PRKG	Parking
PROP	Propeller
PSI	Pound per Square Inch
PSU	Pax Service Unit
PT	Point
PT (TCAS)	Proximity traffic
PTT	Push To Talk, Push To Test
PTW	Pitch Thumb Wheel
PVM	Propeller Valve Module
PWR	Power

Q

QAR	Quick Access Recorder
QT	Quart
QTY	Quantity

R

RA (TCAS)	Resolution Advisory
RA	Radio Altitude
RAD/ALT	Radio Altitude
RAD/INT	Radio/Interphone
RCAU	Remote Control Audio Unit
RCDR	Recorder
RCL	Recall
RCU	Releasable Centering Unit
RECIRC	Recirculation
REV	Reverse
RGA	Reserve Go-Around
RGB	Reduction Gear Box
RH	Right Hand
RLY	Relay
RMI	Radio Magnetic Indicator
RNP	Required Navigation Performance
RPM	Revolution Per Minute
RTO	Reserve Take-Off
RUD	Rudder

S

SAT	Static Air Temperature
SBY	Stand By
SC	Single Chime, Starter Contactor
SEL	Selector
SGL	Single
SGU	Symbol Generator Unit
SMK	Smoke
SMKG	Smoking
S/O (SO)	Shut Off
SOV	Shut Off Valve
SPD	Speed
SPLR	Spoiler
SPLY	Supply
STBY	Stand By
STRG	Steering
SVCE	Service
SW	Switch
SYS	System

T

TA (TCAS)	TRAFFIC Advisory
TAD	Terrain Awareness Display
TAS	True Air Speed
TAT	Total Air Temperature
TAWS	Terrain Awareness Waring System
TCF	Terrain Clearance Floor
TCS	Touch Control Steering
TEMP	Temperature
TGT	Target
TK	Tank
TLU	Travel Limiting Unit
T/O (TO)	Take off
TOW	Take off weight
TQ	Torque
TRU	Transformer Rectifier Unit
TTG	Time To Go

U

U/F	Underfloor
UHF	Ultra High Frequency
UNCPL	Uncouple
UNDV	Undervoltage
UNLK	Unlock
UTLY	Utility

V

VC	Calibrated Airspeed
VENT	Ventilation

VERT	Vertical
VHF	Very High Frequency
VMO	Maximum Operating Speed
VNAV	Vertical Navigation
VOR	VHF OMNI Directional Range
VSI	Vertical Speed Indicator

W

WARN	Warning
WOW	Weight On Wheel
XFEED	Cross feed
XFR	Transfer

XY

YD	Yaw Damper

Z

ZA	Aircraft Altitude
ZCTH	Theoretical Cabin Altitude
ZFW	Zero Fuel Weight
ZP	Pressure Altitude
ZRA	Radio Altimeter Altitude

Dear Readers,

Every effort has been made to ensure document quality.
However please do not hesitate to share your comments and information with us by using the following address: **flight-ops-support@atr.fr**

Yours faithfully,

Your ATR Training and Flight Operations support team.

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