SIMULATED MALFUNCTIONS LIST

DESCRIPTION

Simulateur	:	**B777-300 THALES**
Titre document	:	**Simulated malfunctions list**
Nom	:	**MALFUNCTIONS_LIST**
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Objet	:	**Simulated malfunctions description list**

	Nom	Entité	Date
Rédaction :	**Patrick Demeyère**	**OA.TM / SATM**	**25/07/2011**

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ATA 21

AIR CONDITIONING SMOKE / L & R

Cause

Air conditioning smoke will occur due to oil contamination in the selected engine bleed duct.

Effects

Smoke will issue from the flight deck air conditioning outlets if they are being supplied from the faulted bleed. If the right side is failed, the effects will not normally be seen in the flight deck because it is supplied from the left Pack if it is operating. If failed system is supplying the cabin, an Alert Call from the Cabin will be received on the Flight Deck.

ASCPC FAIL / L & R

Cause

ASCPC channel failure (ARINC 429 circuit card fail).

Effects

Air Supply Cabin Pressure Controller (ASCPC) channel fails.

Message

CABIN ALT AUTO L,R (S) S21025 S21026;

CABIN TEMP CONTROLLER FAIL / L & R

Cause

CTC motor driver circuit board fails in selected channel. Total power failure to both channels of the CTC.

Effects

Cabin Temperature Controller (CTC) fails.

Message

CABIN TEMP CTRL L,R (S) S21064 S21065;

CARGO HEAT CARD FAIL / Aft & Bulk

Cause

Failure of the appropriate ECS Miscellaneous (ECSM) control card input circuit.

Effects

Cargo compartment heating valves latch closed, with appropriate message display.

Message

CARGO HEAT AFT,BULK (A) C21001 C21002;ECS CARD L,R (S) S21009 S21011;

CPC DUAL FAILURE

Cause

Left ASCPC cabin pressure sensor (internal to ASCPC) and the right ASCPC ARINC 429 transmitter fails.

Effects

Loss of AUTO cabin pressure control.

Message

CABIN ALTITUDE AUTO (C) C21005;

EQUIP COOLING LOW FLOW DETECTOR FAIL

Cause

The EE bay low flow detector fails (open circuit).

Effects

EE bay low flow indication to ECS card, with appropriate message display and ground crew call horn. Pulling the appropriate CB will cause the message to clear.

Message

EQUIP COOLING (A) C21003;EQUIP FLOW DET (S) S21013;

EQUIP COOLING OVRD

Cause

Both equipment cooling supply fans fail (open windings).

Effects

The system automatically selects override mode. In flight there will be adequate cooling. On ground low flow will be detected with appropriate warning and messages.

Message

EQUIP COOLING OVRD (A) C21019;EQUIP COOLING FAN L/R (S) S21015 S21016;

FWD CARGO HEAT VALVE FAIL

Cause

Forward cargo heat valve fails in position (motor failure).

Effects

Forward cargo heat valve fails.

Message

CARGO HEAT VALVE FWD (S) S21018;

LWR PACK FLOW CONT VALVE FAIL CLOSED / L & R

Cause

High altitude (lower) flow control valve fails closed at Ozone Converter selector system.

Effects

Above 26000 ft in climb or 24000 ft in descent the lower flow control valve will be closed. Pack flow control will automatically switch to the low altitude (upper) flow control valve once the failure is detected.

Message

PACK FCV L,R (S) S21086 S21085;

OUTFLOW VALVE FAIL / Fwd & Aft

Cause

Left DC motor fails and right valve control unit channel (VCU) fails (internal circuit fails) in selected Outflow Valve.

Effects

Total failure of selected Outflow Valve.

Message

OUTFLOW VALVE FWD,AFT (A) C21018 C21017;

PACK MODE (ACM FAIL) / L & R

Cause

Air cycle machine (ACM) seizure.

Effects

Pack goes into bypass mode if criteria met (on ground, <35 deg F), otherwise the pack will shut down, with appropriate indications and messages.

Message

PACK MODE L,R (A) C21015 C21016;

PACK OVERHEAT / L & R

Cause

Ram air blocked due to bird ingestion.

Effects

Compressor outlet temperature exceeds 450 deg F for 10 secs. Pack shutdown due to overtemperature, with appropriate indications and messages.

Message

PACK L,R (A) C21013 C21014;PACK L,R (S) S21043 S21044;

RAPID DECOMPRESSION

Cause

Structural failure in airplane results in 30 square inch hole.

Effects

The cabin will depressurize rapidly and sound effects will be simulated. Pressurization system will attempt to control cabin pressure according to mode selected. Cabin altitude warnings and oxygen system will be activated as appropriate.

Message

CABIN ALTITUDE (W) C21004;

SLOW DECOMPRESSION

Cause

Structural failure in airplane.

Effects

The cabin will decompress at approximately 1000 ft/min. Pressurization system will attempt to control cabin pressure according to mode selected.

TRIM AIR PRSOV FAIL CLOSED / L & R

Cause

Trim air pressure regulating shutoff valve (PRSOV) fails closed due to torque motor seizure.

Effects

Loss of trim air supply. On ECS synoptic No flow bars on affected trim system. Trim PRSOV failed symbol. Zero trim air pressure on the air conditioning maintenance page.

Message

TRIM AIR L,R (A) C21012 C21011;

ATA 22

AFDC FAIL / L & C & R & MASTER

Cause

Selected Master autopilot flight director computer (AFDC) suffers a power circuitry failure.

Effects

If Master AFDC selected, Master AFDC fails causing a total autopilot disconnect during cruise. In approach the channel will be removed but the autopilot remains in CMD with the system degraded to fail passive (NO LAND 3).

Message

AFDC L,C,R (S) S22002 S22003 S22004;

ALT ACQUIRE FAIL

Cause

Mode Control Panel (MCP) selected altitude signal to AFDC fails.

Effects

Autopilot continues to climb/descend through the selected altitude.

AUTOPILOT CAUTION (ADIRU GYRO FAIL)

Cause

The AFDC incorrectly invalidates the Inertial Reference (heading) data.

Effects

ADIRU Mag/Track heading signal has been lost which will cause mode strikes and bar bias in heading mode.

Message

AUTOPILOT (C) C22003;

AUTOPILOT DISCONNECT (ADIRU/SAARU FAIL)

Cause

The AFDCs Fail to receive data from the ADIRU and the SAARU.

Effects

Loss of attitude reference causes A/P disconnect and F/D bias bar.

Message

AUTOPILOT DISC (W) C22004; NO AUTOLAND (C) NO AUTOLAND (S)

AUTOPILOT DISCONNECT (MASTER AFDC FAIL)

Cause

Master autopilot flight director computer (AFDC) suffers a power circuitry failure.

Effects

Master AFDC fails causing a total autopilot disconnect during cruise. In approach the channel will be removed, but the autopilot remain in CMD with the system degraded to fail passive (NO LAND 3).

Message

AUTOPILOT DISC (W) or NO LAND 3 (C) C22007 C22005;

AUTOTHROTTLE (MOTOR FAIL) / L & R

Cause

The 28 VDC power to the selected ASM fails.

Effects

Autothrottle servo motor loss of power causing one side to disconnect. Selection of both L and R malfunctions causes AUTOTHROTTLE SYS (S) and after 5 seconds, AUTOTHROTTLE DISC (C).

Message

AUTOTHROTTLE L,R (A) C22009 C22010; AUTOTHROTTLE DISC (C) AUTOTHROTTLE SERVO L/R (S)

AUTOTHROTTLE DISC (DUAL MOTORS FAIL)

Cause

Power lost to the left and right autothrottle servomotors due to broken wire(s).

Effects

Both autothrottle systems disconnect due to power loss. AUTOTHROTTLE DISC message asserted after 5 seconds.

Message

AUTOTHROTTLE DISC (C) C22008;

COLUMN DISC SWITCH FAIL

Cause

Column disc switch is inoperative.

Effects

Column disc switch fails to disengage autopilot.

LNAV MODE FAIL

Cause

LNAV arm engage logic fails, due to MCP LNAV switch failure and invalid FMCF LNAV inputs.

Effects

If LNAV is armed, MCP LNAV request has no effect (does not arm). If LNAV is already armed, LNAV never engages. If LNAV is already engaged, A/P no longer follows LNAV command and PFD indicates a roll mode failure.

Message

AUTOPILOT (C)

MODE CONTROL PANEL LANE FAIL

Cause

Mode Control Panel A lane power circuitry failure.

Effects

AFDC detects one MCP lane failure.

Message

MODE CTRL PANEL LANE (S) S22007;

NO AUTOLAND

Cause

Internal failure within the AFDC causes the EICAS annunciation to be incorrectly generated.

Effects

When approach mode is not engaged the NO AUTOLAND(A), EICAS annunciation is generated. When approach mode is engaged the NO AUTOLAND(C) EICAS annunciation is generated.

Message

NO AUTOLAND (C) or (A) C22002 C22001;

NO LAND 3 SINGLE BACK DRIVE ACTUATOR FAIL

Cause

The column backdrive actuator tachometer has failed.

Effects

Single backdrive actuator failure resulting in NO LAND 3 (Caution) message if in Approach or NO LAND 3 (Advisory) if in Cruise.

Message

NO LAND 3 (C) or (A) C22005 C22006;

TO/GA SWITCHES FAIL

Cause

Shorted wire between TO/GA switches and AFDC. AIMS not affected.

Effects

Operation of TO/GA switches has no effect.

VNAV MODE FAIL

Cause

VNAV arm engage logic fails, due to MCP VNAV switch failure and invalid FMCF VNAV inputs.

Effects

If VNAV is not armed, MCP VNAV request has no effect (does not arm). If VNAV is already armed, VNAV never engages. If VNAV is already engaged, A/P no longer follows VNAV command and PFD indicates a pitch mode failure.

Message

AUTOPILOT (C)

NO FLARE

Cause

Effects

Flare remains armed at 50 ft.

Message

ATA 23

CONTINUOUS RADIO TRANSMIT / Capt & F/O

Cause

Continuous radio transmission greater than 30 seconds due to (PTT) switch stuck in transmit position.

Effects

EICAS advisory message displayed.

Message

RADIO TRANSMIT (A) C23039;

RADIO TUNING PANEL FAIL / L & R & C

Cause

Radio Tuning Panel (RTP) total failure.

Effects

On side' radios need to be tuned from alternate RTP.

ATA 24

APU GENERATOR CB TRIP

Cause

Open phase in generator.

Effects

APU Generator CB opens with APU running.

Message

ELEC GEN OFF APU (A) C24017;

BACKUP CONVERTER FAIL

Cause

VSCF Converter power transistor in inverter fails.

Effects

Variable Speed Constant Frequency Converter failure.

Message

ELEC BACKUP SYS (A) C24001; ELEC BACKUP SYS (S)

BACKUP GENERATOR TRIP / L & R

Cause

Generator voltage regulator in VSCF converter failed resulting in undervoltage trip.

Effects

Backup Generator tripped off line.

Message

ELEC BACKUP GEN L,R (A) C24002 C24003; ELEC BACKUP GEN L,R (S)

BUS TIE FAILS TO CLOSE / L & R

Cause

Bus Tie Breaker close coil fails open circuit.

Effects

Bus Tie Breaker will not close.

Message

ELEC BUS ISLN L,R (A) C24005 C24006;

GEN FAIL / L & R

Cause
IDG Undervoltage.

Effects
Generator off line.

Message
ELEC GEN OFF L,R (A) ; ELEC GEN SYS L,R (S)

GND HANDLING RELAY FAILS CLOSED

Cause
Ground Handling Relay in ELMS P300 fails in closed position.

Effects
Ground Handling Bus is energized when it should be off.

Message
ELEC GND HDLG BUS (A), C24031;ELEC GND HDLG BUS (S), S24037;

HOT BATTERY BUS SHORT

Cause
Hot Battery Bus fault (short).

Effects
Battery discharges rapidly.

Message
MAIN BATTERY DISCH (A) C24024;

IDG DRIVE DISCONNECT / L & R

Cause
Overservice (>1.5 qt) causes IDG overheat and thermal disconnect.

Effects
IDG drive disconnect.

Message
ELEC GEN OFF L,R (A); ELEC GEN SYS L,R (S)

IDG OIL LEAK / L & R

Cause

Input shaft seal fails causing leak rate to deplete oil level.

Effects

Correspondent generator drive fault (low oil pressure).

Message

ELEC GEN DRIVE L,R (A) C24011 C24012;

MAIN AC BUS SHORT / L & R

Cause

The Main AC bus will have a short to ground.

Effects

The bus will not power after the generator breaker opens. Any attempts to close manually will cause bus tie breaker to trip immediately.

Message

ELEC AC BUS L,R C24015 C24016;

MAIN BATTERY RELAY FAILS OPEN

Cause

Main battery relay fails open (normal position is open).

Effects

Standby bus will not power.

Message

ELEC STANDBY SYS (A), C24028;ELEC STANDBY SYS (S), S24021;

RAT GEN FAIL

Cause

Sheared Shaft (to generator).

Effects

RAT Generator off line. First Officers Flight Instrument bus will not be powered if RAT GEN was the only source.

TRU FAIL / L & R & C1 & C2 & GH

Cause

Internal failure of TRU causes output to open circuit.

Effects

TRU output voltage zero.

Message

ELEC TRU L,R,C1,C2, (S) S24017 S24018 S24019 S24020;

ATA 25

CABIN ATTENDANT INITIATED GROUND EVAC

Cause

An emergency.

Effects

When the aircraft is on the ground, the Cockpit Emergency Evac Panel is remotely activated (flashing light and aural). Malfunction is inhibited until the aircraft is stationary.

ATA 26

AFT CARGO SMK DET FAN FAILS / F1 & F2

Cause

Aft cargo smoke detection FAN fails (burnt coil).

Effects

The selected fan fails to operate correctly when selected 'ON' by the controlling channel in the Aft CSDS. The failure is detected by the controlling channel and the other fan is immediately used instead.

Message

DET FAN @ CARGO AFT (S) S26029 S26030;

APU FIRE (EXTINGUISHABLE)

Cause

An actual fire occurs in the area of the APU turbine plenum.

Effects

APU fire is detected and annunciated. The fire will extinguish 30 seconds after the APU fire bottle has been discharged.

Message

FIRE APU (W) C26009;

APU FIRE (UNEXTINGUISHABLE)

Cause

An actual fire occurs in the area of the APU turbine plenum.

Effects

APU fire is detected and annunciated. The fire cannot be extinguished by any means.

Message

FIRE APU (W) C26009;

CARGO FIRE (EXTINGUISHABLE) / Fwd1 & Aft1

Cause

Localised Cargo smoke occurs in the selected zone. There is no associated component failure.

Effects

Cargo compartment smoke is detected and annunciated by the affected CSD. The smoke will remain present until 30 minutes after the two dump bottles have been discharged into the affected area.

Message

FIRE CARGO AFT, FWD (W) C26018 C26017;

CARGO FIRE DETECTOR FAIL / Fwd & Aft

Cause

Selected CSDS controller dual channel failure.

Effects

Cargo Smoke Detection System (CSDS) failure. Fwd CSD failure will also cause loss of Electronic Equipment Bay smoke detection capability (RSD).

Message

DET FIRE CARGO AFT, FWD (A) C26021 C26020; DET CHAN 1,2 CARGO FWD (S); DET CHAN 1,2 E/E SMOKE (S); DET CHAN 1,2 CARGO AFT (S);

ENGINE FIRE (1 BOTTLE) / L & R

Cause

An engine fire occurs due to a ruptured HP fuel line.

Effects

The Engine fire condition is detected and annunciated by the affected FODS card. The fire will extinguish and the cockpit indications will clear within two minutes of fuel cut-off and at least one fire bottle successfully discharged into the affected engine (actual time dependent on airspeed).

Message

FIRE ENG L,R (W) C26001 C26002;

ENGINE FIRE (2 BOTTLE) / L & R

Cause

An engine fire occurs due to a ruptured engine oil line.

Effects

The Engine fire condition is detected and annunciated by the affected FODS card. The fire will extinguish and the cockpit indications will clear within two minutes of fuel cut-off and two fire bottles successfully discharged into the affected engine (actual time dependent on airspeed).

Message

FIRE ENG L,R (W) C26001 C26002;

ENGINE FIRE (UNEXTINGUISHABLE) / L & R

Cause

An uncontrollable engine fire occurs due to a ruptured oil line.

Effects

The Engine fire condition is detected and annunciated by the affected FODS card. The fire cannot be extinguished by any means.

Message

FIRE ENG L,R (W) C26001 C26002;

ENGINE OVERHEAT (FUEL CUT-OFF) / L & R

Cause

An engine nacelle overheat condition occurs due to a small combustion chamber leak.

Effects

The average nacelle temperature exceeds the OVHT threshold for the engine type. The OVHT condition is detected by the applicable FODS and will disappear when the engine is shutdown.

Message

OVERHEAT ENG L,R (C) C26005 C26006;

ENGINE OVERHEAT (THROTTLE TO IDLE) / L & R

Cause

An engine nacelle overheat condition occurs due to a small air leak caused by seal deterioration.

Effects

The average nacelle temperature exceeds the OVHT threshold for the engine type. The OVHT condition is detected by the applicable FODS and will disappear when the engine EGT is less than the reset threshold.

Message

OVERHEAT ENG L,R (C) C26005 C26006;

ENGINE OVERHEAT DETECTION FAIL / L & R

Cause

FODS card software failure.

Effects

The selected FODS will not provide warnings even in a genuine overheat condition. The FIRE TEST FAIL and DET OVERHEAT messages will only be displayed during a pilot initiated Fire/Ovht Test.

Message

FIRE TEST FAIL (W) C26016;DET OVERHEAT ENG L,R (A) C26007 C26008;

FIRE DETECTOR O/P 2 FAIL / L Eng & R Eng & APU

Cause

System fails due to a single output (#2) driver failure.

Effects

The affected Fire Detection system will continue to work normally except that in the case of an actual fire, the systems connected to the #2 alarm signal will not operate as expected (Fire bell Master Warning Lt, FIRE Warning message and in the case of the APU, APU shutdown). The FIRE TEST FAIL message will only be displayed during a pilot initiated Fire/Ovht Test & the DET FIRE msg will remain displayed when the fault has been detected.

Message

FIRE TEST FAIL (W) C26016;DET FIRE ENG L,R,APU (A) C26003 C26004 C26010;

FIRE LOOP 2 FAULT (SHORT CIRCUIT) / L Eng & R Eng & APU

Cause

An indeterminate part of the selected detection loop is shorted.

Effects

The affected loop fault condition is immediately detected by the controlling FODS. The affected system is reconfigured to single loop operation. Nacelle temperature data from the affected loop is invalidated (Engine FODS only).

Message

FIRE TEST FAIL (W) C26016; FIRE LOOP 2 ENG L, ENG R, APU (S) S26003, S26004, S26014: and if used with equivalent loop 1 malf

LAVATORY SMOKE / 1F-1L

Cause

Lavatory smoke is detected by selected detector.

Effects

Lavatory smoke warning is annunciated.

Message

SMOKE LAVATORY (A) C26028;

WHEEL WELL FIRE (EXTINGUISHABLE) / L & R

Cause

Brake overheat with complications.

Effects

Rapid rise in brake temperature followed by wheel well fire indications. Malfunction clears sometime after the landing gear has been extended to cool.

Message

FIRE

WHEEL WELL FIRE (UNEXTINGUISHABLE) / L

Cause

Unspecified.

Effects

The wheel well fire condition is detected and annunciated by the appropriate DLODS subsystems.The malfunction cannot be cleared by any crew action.

Message

FIRE WHEEL WELL (W) C26029;

WHEEL WELL LOOP OPEN FAULT / 1 & 2

Cause

Selected fire detector loop fails (open circuit).

Effects

The wheel well loop status is detected by the DLODS card and the Status message displayed if both loops fail. Warning and Advisory messages are displayed only during pilot initiated Fire/Ovht Test if both loops are failed.

Message

FIRE TEST FAIL (W) C26016;DET FIRE WHEEL WELL (A) C26032;DET FIRE WHEEL WELL (S) S26049;

ATA 27

AILERON TRIM JAMMED

Cause

Aileron trim actuator failure.

Effects

Aileron trim not available.

AUTO SPEEDBRAKE FAIL

Cause

Speedbrake arm relay fails to the retracted position.

Effects

Speedbrake will not auto-extend.

Message

AUTO SPEEDBRAKE (A) C27019;

COLUMN STAB TRIM SWITCH FAIL / Capt & F/O

Cause

The selected Column trim switches fail in the open circuit position.

Effects

Trim functions not available from selected Column.

DUAL ACE FAIL / L1&L2 & L1&C & L1&R & L2&C & L2&R & R&C

Cause

The two selected ACE's power supplies fail.

Effects

Loss of Pilot control of PCU's connected to failed ACE's.

Message

FLIGHT CONTROLS (C) C27026;

FLAP ASYMMETRY / L Outbd & R Outbd & L Inbd & R Inbd

Cause

Flap surface fails in position.

Effects

Commanded flap movement will result in affected flap failing to deploy. The FSEUs will detect a flap asymmetry and shut down the flap PDU. Flap surfaces will no longer drive in primary or secondary modes.

Message

FLAPS DRIVE (C) C27005;

FLAP DRIVE FAIL / L & R

Cause

Affected wing flap torque tube disconnects from PDU.

Effects

Commanded flap movement will result in the shut down of the flap PDU by the FSEU in control. Flap surfaces will no longer drive in primary or secondary modes. Unaffected wing flaps will only move using alternate mode.

Message

FLAPS DRIVE (C) C27005;

FLAP PRIMARY DRIVE FAIL

Cause

Flaps bypass coil fails energized.

Effects

Flaps fail to drive in primary mode when commanded. FSEUs will transfer control of flaps automatically to secondary mode.

Message

FLAPS PRIMARY FAIL (C) C27003;

FLAP SECONDARY DRIVE FAIL

Cause

Flap Power Drive Unit (PDU) electric motor jams.

Effects

Flaps fail to drive in secondary mode.

Message

FLAPS SECONDARY FAIL (S) S27009;

FSEU CONTROL FAIL

Cause

Left slat resolver (control lane 1) and right flap resolver (control lane 2) both fail.

Effects

Both FSEU control lanes failed. Alternate mode is used to command flaps/slats. Boeing answer to AFA data query 27 Nov 2001: When the Malf is activated ,the Autopilot do not have a reliable source of flap position. Flap pos is needed for the operation of T/O, G/A ,APP,FL CHG, and LOC modes. If Airspeed is more than 275 kts (10 kts above flaps 1 placard speed), the autopilot will assume that the flaps are up . The above modes will operate normally despite the failures to the flap system. If Airspeed is below flaps 1 placard speed plus 10 kts, an attempt to use any of the above modes will result in an autopilot mode fail (if autopilot is engaged) or a flight director bar bias (if a flight director is on). Documentation : AFDS ICD D241W003 revK page A126 wordstring F69 word2 Bit 2 Flap angle PVB FLPANGLV One state is invalid data. Mnemonics involved: Flp_Pos_Vdy always = TRUE when malf is active , Flp_Pos_Force_Up always = TRUE if Airspeed > 260 & Malf active.

Message

FLAPS/SLAT CONTROL (C) C27001;

HORIZONTAL STABILIZER JAMMED

Cause

Stabilizer ballscrew actuator seizure.

Effects

Stabilizer trim not available in any mode.

INBOARD FLAP ACTUATOR FAIL / L & R

Cause

Inboard flap actuator fails in position.

Effects

Commanded flap movement will result in affected flap deploying skewed. The FSEUs will detect a flap skew and shut down the flap PDU. Flap surfaces will no longer drive in primary or secondary modes.

Message

FLAPS DRIVE (C) C27005;

OUTBOARD SLAT ACTUATOR FAIL / Slat 6 & Slat 9

Cause

Outboard slat actuator fails in position.

Effects

Commanded slat movement will result in affected slat failing to deploy. The FSEUs will detect a slat skew and shut down the slat PDU. Slat surfaces will no longer drive in primary or secondary modes.

Message

SLATS DRIVE (C) C27004;

PFCS NORMAL MODE FAIL

Cause

Air Data received by PFC is marked as invalid.

Effects

PFC reverts to Secondary mode. Handling qualities of the airplane (all surfaces affected) are degraded and envelope protection is not provided. Autopilot disconnects.

Message

FLIGHT CONTROL MODE (C) C27000; THRUST ASYM COMP (A) C27016; NO AUTOLAND (A) C22001; AUTO SPEEDBRAKE (A)

PITCH FEEL UNIT FAIL / L & R

Cause

Internal failure of Pitch Feel Unit. Effectively a broken spring.

Effects

Column feel forces reduced from normal high speed feel.

PRIMARY FLIGHT COMPUTER DISCONNECT

Cause

Primary Flight Computers Disconnect Sw fails to the DISC position

Effects

ACE's revert to direct mode.

Message

PRI FLIGHT COMPUTERS (C) C27025; THRUST ASYM COMP (A)

RUDDER TRIM JAMMED

Cause

Rudder trim actuator failure.

Effects

Rudder trim not available.

Message

FLIGHT CONTROL SYS (S) S27006;

RUDDER TRIM LVDT FAIL

Cause

Rudder trim actuator position transducer (LVDT) failure.

Effects

Thrust asymmetry compensation via rudder trim is not available.

Message

THRUST ASYM COMP (A) C27016;

SLAT PRIMARY DRIVE FAIL

Cause

Slat PDU hydraulic motor seizes.

Effects

Slats fail to drive in primary mode when commanded. FSEUs will transfer control of slats automatically to secondary mode.

Message

SLATS PRIMARY FAIL (C) C27002;

SLAT SECONDARY DRIVE FAIL

Cause

Slats electric motor clutch relay fails de-energized.

Effects

Slats fail to drive in secondary mode.

Message

SLATS SECONDARY FAIL (S) S27008;

STAB STCM FAIL / C & R

Cause

Leaky hydraulic seals in the arm and control valves of the selected STCM.

Effects

Uncommanded stabilizer motion which results in autoshutdown of selected STCM.

Message

STABILIZER C,R (A) C27021 C27022;

WHEEL FORCE TRANSDUCER FAIL

Cause

Wheel backdrive force transducer fails.

Effects

Bank angle protection inoperative.

Message

BANK ANGLE PROTECT (S) S27005;

TAC SWITCH FAIL

Cause

TAC switch failure

Effects

Thrust asymmetry compensation not available. “OFF” Light in TAC switch comes on
TAC Caution message displayed on EICAS TAC status message displayed.
Cycling the TAC switch has no effect.

Message:

ATA 28

APU FUEL SHUTOFF VALVE FAILS CLOSED

Cause

APU shutoff valve fails in closed position due to linkage failure.

Effects

APU shutoff valve fails in closed position once in that position. Valve EICAS error message occurs 10 seconds after valve selected away from failed position.

Message

FUEL VALVE APU (A) C28018;

APU ISOLATION VALVE FAILS IN POSITION

Cause

Internal failure in valve body causes jam in present position.

Effects

Valve fails in position.

Message

FUEL ISLN VALVE APU (S) S28022;

ENG FUEL SPAR VALVE FAILS IN POSITION / L & R

Cause

Motor freezes, causing valve to fail in position. CB 28611 / 28610 opens.

Effects

Loss of control of fuel spar valve. CB on P-11 panel opens.

Message

FUEL SPAR VALVE L,R (S) S28010 S28011;

ENGINE FUEL LEAK / L & R

Cause

Rupture of Engine Fuel Line upsteam of the Fuel Cut Off Valves.

Effects

Loss of Fuel at approximately 500 kg/min until the Fuel Cut Off Valve is closed.

FIRST FUEL CROSSFEED VALVE SELECTED FAILS IN POSITION

Cause

Selected crossfeed valve electric motor seizes with valve in position

Effects

Inability to move fuel crossfeed valve from frozen position. Valve EICAS error message occurs 10 seconds after valve selected away from failed position

Message

FUEL CROSSFEED FWD,AFT (A) C28004 C28005; FUEL CROSSFEED FWD,AFT (S)

FUEL IMBALANCE

Cause

Instructors request

Effects

If total fuel is greater than 2 tonnes a small amount of fuel is transferred. across to the opposite tank causing an imbalance.

Message

FUEL IMBALANCE

FUEL AUTO JETTISON

Cause

Loss of total fuel quantity indication causes loss of fuel auto jettison function.

Effects

Due to an FQIS internal failure the total fuel quantity indication is lost and hence the fuel auto jettison function is inhibited.

Message

FUEL AUTO JETTISON (C) C28030;

FUEL CROSSFEED VALVE FAILS IN POSITION / Fwd & Aft

Cause

Selected crossfeed valve electric motor seizes with valve in position.

Effects

Inability to move fuel crossfeed valve from frozen position. Valve EICAS error message occurs 10 seconds after valve selected away from failed position.

Message

FUEL CROSSFEED FWD,AFT (A) C28004 C28005; FUEL CROSSFEED FWD,AFT (S)

FUEL JETT NOZZLE VALVE FAILS IN POSITION / L & R

Cause

Selected nozzle valve failed in position due to linkage failure.

Effects

Inability to move fuel jettison nozzle valve from frozen position. Valve EICAS error message occurs 10 seconds after valve selected away from failed position.

Message

FUEL JETT NOZZLE L,R (A) C28009 C28010;

FUEL PUMP CENTER SIGNAL FAIL / L & R

Cause

A failure of the ELMS power switching module causes pump selection to be inhibited.

Effects

Selected center pump was not switched on by ELMS.

Message

FUEL PUMP CENTER L,R (A) C28016 C28017;

FUEL PUMP FAIL / L Fwd & R Fwd & L Aft & R Aft & L Ctr & R Ctr

Cause

Internal failure of the appropriate pump causes low output pressure.

Effects

Pump is producing low output pressure.

Message

FUEL PUMP L,R FWD,AFT,CENTER (A) C28020 C28022 C28019 C28021 C28016 C28017;

FUEL PUMP PRESSURE SWITCH FAILS OPEN / L Fwd & R Fwd

Cause

Selected pump pressure switch fails in open position.

Effects

With pressure switch failed open low pressure will be indicated regardless of associated pump performance or availability.

Message

FUEL PUMP L,R FWD (A) C28020 C28022 C28019 C28021 C28016 C28017;

FUEL QTY INDICATION SYSTEM CHANNEL FAIL / L & R

Cause

Selected channel bus coupler transmit driver 1 and 2 fails due to shorted driver FET.

Effects

Loss of fuel quantity indication system redundancy. One of the two channels is lost.

Message

FUEL QTY CHANNEL (S) S28002;

FUEL TANK LEAK / L & R & C

Cause

Fuel tank cell rupture causes fuel leak.

Effects

Fuel tank cell rupture causes an uncontrollable fuel leak of 1000 lbs/min (454 Kgs/min) from the selected tank.

JETTISON SYSTEM FAIL

Cause

Loss of jettison arm command inhibits control of jettison pumps and isolation valves.

Effects

Due to jettison arm command signal failing to a disarmed state the jettison pumps & isolation valves will fail to energise. If already energised then power to the pumps will be removed and the valves will be signalled to be closed. Fuel jettison will cease.

Message

FUEL JETTISON SYS (C) C28029;

ATA 29

ENG PRI PUMP XDCR FAIL / L & R

Cause

Primary pump pressure transducer failed open circuit resulting in zero current to the HYDIM card.

Effects

The HYDIM will loose pressure information related to the EDP. A Status Message will be displayed.

Message

HYD PRESS IND PRI L,R (S) S29031 S29032;

HYD AUTO CTRL FAIL / L & R & C

Cause

The HYDIM card fails. (For the center system both cards fail).

Effects

When the HYDIM fails all the auto control of demand pumps will be lost. All messages and indications will also be lost.

Message

HYD AUTO CONTROL L,R,C (A) C29035 C29036 C29034;

HYD DEMAND PUMP FAIL / L & R & C1 & C2

Cause

The demand pump drive shaft shears resulting in low output pressure.

Effects

Demand pump output pressure low. Demand pump is not available as a source of hydraulic pressure.

Message

HYD PRESS DEM L,R,C1,C2 (A) C29001 C29004 C29002 C29003;

HYD DEMAND PUMP OVHT / L & R & C1 & C2

Cause

Plugged case drain filter results in restricted case drain flow.

Effects

Pump overheats, with related message being generated.

Message

HYD OVERHEAT DEM L,R,C1,C2 (A) C29019 C29022 C29020 C29021;

HYD PRIMARY PUMP FAIL / L & R & C1 & C2

Cause

The primary pump drive shaft shears resulting in low output pressure.

Effects

Primary pump output pressure low. Primary pump is not available as a source of hydraulic pressure.

Message

HYD PRESS PRI L,R,C1,C2 (A) C29005 C29008 C29006 C29007;

HYD PRIMARY PUMP OVHT / L & R & C1 & C2

Cause

Plugged case drain filter and results in restricted case drain flow.

Effects

Pump overheats, with related message being generated.

Message

HYD OVERHEAT PRI L,R,C1,C2 (A) C29015 C29018 C29016 C29017;

HYD QTY LOW / L & R & C

Cause

External leak in the pressure line from the primary pump (prior to the NRV) results in low fluid quantity, and ultimately loss of the primary pump.

Effects

Low reservoir fluid quantity and if the malfunction is not cancelled, then loss of the pump will occur once the fluid level falls below the standpipe level.The pump supplied by the reserve fluid will remain operational.

Message

HYD QTY LOW L,R,C (A) C29014 C29012 C29013;

HYD SYSTEM LEAK / L & R & C

Cause

Pressure tubing in hydraulic common line breaks with resulting initial leakage rate of greater than 60 GPM.

Effects

External leak, resulting in loss of system pressure. Low quantity messages will appear once reservoir contents fall below the appropriate level.

Message

HYD PRESS SYS L,R,C (C) C29011 C29009 C29010;HYD QTY LOW L,R,C (A) C29014 C29012 C29013;

HYDRAULIC SYSTEM OVERHEAT / L & R & C

Cause

The effectiveness of the oil to fuel heat exchanger is reduced resulting in increased hydraulic reservoir temperature.

Effects

If the temperature rises far enough the warning message will occur.

RAT PUMP FAIL

Cause

The RAT pump fails.

Effects

No pressure will be produced by the RAT pump. The RAT PRESS light will not illuminate.

RESERVOIR LOW PRESSURE / L & R & C

Cause

A fault in the reservoir pressurisation module causes a low pressure in the reservoir.

Effects

Low reservoir pressure warning is given after the appropriate delay.

Message

HYD RSVR PRESS L,R,C (S) S29003 S29001 S29002;

ATA 30

AOA HEAT FAIL / L & R

Cause

Plug disconnect at the selected AOA heater assembly.

Effects

No heating power applied to the affected AOA Case or Vane heaters. AOA probe may ice up in icing conditions. Failure status is annunciated to the AIMS via the controlling ADM.

Message

AOA VANE L,R (S) S34013 S34020;

ENG ANTI-ICE DUCT LEAK / L & R

Cause

Engine fan case overheat due to EAI duct leak.

Effects

Engine Anti-Ice (EAI) duct leak detected. ANTI-ICE LEAK ENG L or R message will be displayed. The failed side anti-ice system will shut down. After approximately two minutes the leak message will be replaced with ANTI-ICE LOSS ENG L or R.

Message

ANTI-ICE LEAK ENG L,R (C) C30017 C30018;ANTI-ICE LOSS ENG L,R (A) C30019 C30020;

ENG ANTI-ICE VALVE FAIL CLOSED / L & R

Cause

Engine Anti-Ice (EAI) valve fails closed due to a mechanical failure.

Effects

Loss of engine anti-ice capability.

Message

ANTI-ICE ENG L,R (A) C30011 C30012;

FWD WINDOW HEAT PRIMARY SENSOR FAIL / L & R

Cause

Forward window heat primary sensor fails (open circuit).

Effects

Loss of anti-ice capability. The Backup circuit is automatically available to provide anti-fog protection.

Message

WINDOW HEAT L,R FWD (A) C30005 C30006; WINDOW HEAT L,R FWD (S)

ICE DETECTORS FAIL

Cause

Both Ice Detectors internal electronics fail.

Effects

Dual Ice Detector failure.

Message

ICE DETECTORS (A) C30009;

PITOT HEAT FAIL / L & R & C

Cause

ELMS panel AIR HEAT CTL relay fails (L=P110-K30312, R=P210-K30314 C=P210-K30316). Note: The L,R relays also control the L,R AOA heaters, so for these selections, AOA messages will also be displayed.

Effects

Loss of anti-ice capability to the selected pitot probe while the aircraft is in flight. Heating power on ground is normal according to ADM command.

Message

HEAT PITOT L,R,C (A) C30023, C30024, C30021; HEAT PITOT L,R,C (S)

TAT HEAT FAIL / L

Cause

Wiring failure between the selected TAT probe heater and the POWER MANAGEMENT panel. Note: Right malf only available if aircraft is fitted with R TAT probe.

Effects

When commanded 'ON' by the ELMS, no heating power is applied to the TAT probe. The ELMS detects the correct operation of the control relay and the low current condition and annunciates this status to the AIMS. Affected probe may ice up in icing conditions.

Message

HEAT TAT (S)

WING ANTI-ICE FAIL

Cause

WAI control card detects valve driver circuit failure.

Effects

Loss of wing anti-ice (WAI) capability to both wings.

Message

ANTI-ICE WING (A) C30004;

ATA 31

CURSOR CONTROL FAIL / L & R

Cause

Left or right cursor control power fails.

Effects

Cursor control power fails.

Message

CURSOR CONTROL L,R (S) S31056 S31057;

DISPLAY SELECT PANEL FAIL

Cause

Internal earth line fault in EICAS DSP.

Effects

Failure of all switches on EICAS DSP. Control of EICAS displays can be manually switched between DSP and MCDU at any time, from the MCDU Main Menu.

Message

DISPLAY SELECT PNL (A) C31033;

EFIS CONTROL PANEL FAIL / L & R

Cause

EFIS Control Panel power fails (broken wire).

Effects

EFIS Control Panel fails. Backup control may be established on the Capt or F/O CDU.

Message

EFIS CONTROL PNL L,R (A) C31023 C31024;

EICAS DISPLAY UNIT FAIL

Cause

EICAS DU power fail.

Effects

Centre upper DU blanks. Capt or F/O may display EICAS information on their inboard DU (ND) using their INBOARD DSPL switch.

GROUND MANOEUVRE CAMERA FAILURE / N & LMG & RMG

Cause

Power supply fail

Effects

The selected camera image on the relevant DUs is replaced by a VIDEO FAILED message

GROUND MANOEUVRE CAMERA LIGHT FAILURE / N & LL & LR & RL & RR

Cause

Blown lamp

Effects

Degraded illumination of the failed Landing Gear for the GMCS images

MULTI-FUNCTION DISPLAY UNIT FAIL

Cause

MFD DU power fail.

Effects

Centre lower DU blanks. Capt or F/O may display MFD information on their inboard DU (ND) using their INBOARD DSPL switch.

NAVIGATION DISPLAY UNIT FAIL / Capt & F/O

Cause

ND power fail.

Effects

Inboard DU (ND) blanks so that the affected pilot has to transfer display function to the lower DU (MFD) using the appropriate INBOARD DSPL switch.

OVERSPEED WARNING FAIL

Cause

3 WEU channel failure (channels L1, L2 and R2 fail).

Effects

Overspeed Warning function of the WES is Inoperative.

Message

OVERSPEED SYS (S) S31004;

PRIMARY FLIGHT DISPLAY UNIT FAIL / Capt & F/O

Cause

PFD power fail.

Effects

Outboard DU (PFD) blanks and PFD information automatically transfers to the inboard DU. ND display functions are transferred to the lower DU (MFD) using the appropriate INBOARD DSPL switch.

STAB GREENBAND PRESSURE SWITCH FAIL

Cause

Nose gear pressure switch fails to the open position if currently closed, or to the closed position if currently open.

Effects

Nose gear pressure switch disagrees with calculated greenband. Provided a Nose Up or Nose Down greenband selection is required, the EICAS message will be displayed after 30 Seconds.

Message

STAB GREENBAND (A) C31016;

STALL WARNING SYSTEM FAIL / Ch. 1 & Ch. 2

Cause

WEU two Channel Failure (Channel 1 fails L1 and R1 WEU's and Channel 2 fails L2 and R2 WEU's).

Effects

Stall Warning failure detected by Stall Warning System. Both stick shakers will be inoperative.

Message

STALL WARNING SYS L,R (S) S31063 S31064;

WEU CHANNEL FAIL / L1 & L2 & R1 & R2

Cause

Warning Electronic Unit (left channel 1) has an ARINC 429 output fault

Effects

Warning Electronic System remains fully functional, but an EICAS message will be displayed Valid Combinations are: L1, L1 & L2 Fault Detection: Error detected by WEU. Error also detected by WES System Test, AMM Task 31-51-00-730-801

Message

EICAS S31044 WEU CHANNEL L1 (STATUS) EICAS S31045 WEU CHANNEL L2 (STATUS) MAT 31-78321 Warning Electronic Unit (left channel 1) has an ARINC 429 output fault MAT 31-78322 Warning Electronic Unit (left channel 2) has an ARINC 429 output fault

ATA 32

ALTERNATE BRAKE VALVE FAIL

Cause

Alternate source select valve fails in the normal position when the right hydraulic system pressure is low.

Effects

With loss of normal braking system, both active hydraulic brake sources (right and center/reserve) indicate low pressure. Brake source light will illuminate and braking due to accumulator only.

Message

BRAKE SOURCE (A) C32013;

ANTISKID VALVE FAIL CLOSED / 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12

Cause

Normal antiskid valve coil/wiring failure on selected wheel.

Effects

Must be using normal brake system (right hydraulic system must be available). Loss of braking on selected wheel. If armed, autobrake will disarm and AUTOBRAKE Advisory message will be displayed.

Message

ANTISKID (A) C32014;ANTISKID (S) S32006;ANTISKID NORM VLV L,R (S) C32022 C32023;

AUTOBRAKE FAIL

Cause

Autobrake solenoid pressure switch fails to high pressure mode.

Effects

Autobrakes shall disarm if autobrake mode is selected (mode dependent). AUTOBRAKE SOL VALVE (S) shall appear when autobrakes are selected off.

Message

AUTOBRAKE (A) C32015;

BRAKE FAIL / 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12

Cause

Wheelspeed transducer fails open circuit.

Effects

Zero braking effort achieved on selected wheel with appropriate aerodynamic effects. Brake temperature will not increase with brake application.

Message

ANTISKID XDCR L,R (S) S32024 S32025;

DRAGGING BRAKE (OVHT) / 4 & 9

Cause

Dragging brake causes brake temperature rise.

Effects

Brake overheat condition when temperature indication of brake is equal to or greater than 5.0 units. Will appear only after taxi, takeoff or landing (mode dependent).

Message

BRAKE TEMP (A) C32005;

GEAR COLLAPSE / Nose & L & R

Cause

Structural failure.

Effects

Gear collapses on touchdown.

GEAR DOOR FAIL OPEN / Nose & L & R

Cause

Landing gear door mechanically jammed open.

Effects

Hydraulically actuated landing gear door does not close following gear retraction or extension. Message appears 40 seconds after gear lever motion.

Message

GEAR DOOR (A) C32011;

GEAR DRAG BRACE SENSOR FAIL / L & R

Cause

System 1 and System 2 downlock sensors fail 'far' on main gear drag brace due to internal sensor short circuits.

Effects

Main Gear Drag Brace Sensor Dual Failure. Main landing gear side brace locked and drag brace not locked after normal extend time. Mode dependent (gear extended only) and indications are normal with gear retracted.

Message

MAIN GEAR BRACE L,R (C) C32018 C32020;

GEAR HANDLE LOCK SOLENOID FAILS

Cause

Lever lock solenoid wiring failed open.

Effects

Landing gear lever is locked in down position (mode dependent). Lock override switch shall allow the gear handle to be moved to up.

GEAR JAMMED DOWN / Nose & L & R

Cause

Any gear downlock mechanism frozen locked during gear retraction.

Effects

During gear retraction only (mode dependent). Gear and gear door position disagree messages displayed after 40 seconds.

Message

GEAR DISAGREE (C) C32008;

GEAR JAMMED UP (ALTN INOP) / Nose & L & R

Cause

Gear uplock is jammed with gear retracted.

Effects

Gear is jammed in the up position. Alternate gear extension is not possible.

GEAR JAMMED UP (ALTN OP) / Nose & L & R

Cause

Gear uplock does not release with gear retracted.

Effects

Gear is jammed in the up position. Alternate gear extension is possible.

Message

GEAR DISAGREE (C), C32008;GEAR DOOR (A), C32011;

MAIN GEAR DOWNLOCK DISAGREE / L & R

Cause

Drag brace lock sensor target is out of range.

Effects

Main gear drag brace on system 1 does not indicate down when the landing gear is extended. Disagreement between system 1 and 2 will generate EICAS status message.

Message

GEAR INDICATION SYS (S) S32014;

MAIN GEAR STEERING UNLOCKED / L & R

Cause

Main gear steering actuator locked mechanism jammed in the unlocked state.

Effects

Either main gear aft axle is indicating unlocked when it should be locked. Message will appear only with tillers centered (mode dependent). WES will generate a warning if takeoff thrust applied.

Message

CONFIG GEAR STEERING (W) C31008;MAIN GEAR STEERING (A) C32016;

SEMI LEVER GEAR FAILURE DURING TAKEOFF / L & R

Cause

L/R Semi-Levered gear hydraulic strut fails to lock when commanded

Effects

L/R main landing gear fails to lock in position on takeoff

Message

SEMI LEVER GEAR (S)

SEMI LEVER GEAR LOCKED / L & R

Cause

L or R SLG strut failed by locking when not commanded or control relay (in ELMS) failed

Effects

On Landing: Landing should feel harder with possibility of blowing rear tyres

Message

SEMI LEVER GEAR LOCK (S)

SEMI LEVER GEAR STRUT INOPERATIVE / L & R

Cause

L or R SLG strut is inoperative due to open CB or all sources of AIMS SLG data (Lock or ground invalid)

Effects

L/R main landing gear fails to lock in position

Message

SEMI LEVER GEAR SYS (S)

TAIL SKID FAILS IN POSITION

Cause

Tail Skid hydraulic strut fails in position

Effects

Tail Skid is locked in postion

Message

TAIL SKID ADVISORY (A); TAIL SKID STATUS (S) TAIL SKID ADVISORY - The tail skid sensed position disagrees with LDG position 40 sec after the LDG was selected UP or DOWN , or 40 sec after the LDG alternate extension has been commanded TAIL SKID STATUS- The tail skid sensed position disagrees with LDG position 40 sec after the LDG was selected UP or DOWN and the LDG alternate extension has not been commanded

TAIL SKID SENSOR FAIL

Cause

PSEU tail skid sensor data is invalid as detected by AIMS or the sensor disagree

Effects

Tail Skid will still extend/retract but no indication of position will be given

Message

TAIL SKID SENSOR (S)

TAIL STRIKE (SENSOR FAIL)

Cause

Both system 1 and system 2 tail strike sensors or wiring open.

Effects

Tail strike sensor dual failure. Tail strike blade has been lost.

Message

TAIL STRIKE (C) C32012;

TYRE BURST / 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14

Cause

Tire wear or foreign object damage.

Effects

Increased tire drag, attitude changes, sound effects and motion effects.

Message

TIRE PRESS (A) C32021;

ATA 34

ADF RECEIVER FAIL / L & R

Cause

ADF receiver power supply fails with no output.

Effects

ADF indications on ND exhibit fail conditions if selected on EFISCP. ADF audio fails. EICAS message.

Message

ADF L,R (S) S34048 S34049;

ADIRU FAIL (2 GYROS)

Cause

2 Air Data Inertial Reference Units (ADIRU) have internal faults

Effects

Double laser gyro fail Fault Detection: Errors reported by ADIRU to AIMS

Message

EICAS S34022 ADIRU (STATUS) MAT 34-200000 Air Data Inertial Reference Unit (ADIRU) has internal error

ADIRU FAIL (3 GYROS)

Cause

Three laser gyros have failed.

Effects

ADIRU inertial shutdown.

Message

NAV ADIRU INERTIAL (C) C34009;

AIMS FMC FUNCTION FAIL / L & R & MASTER

Cause

Software total failure of AIMS FMCF functions.

Effects

FMC function of AIMS failed.

AIR DATA MODULE FAIL / LP & LS & RP & RS & CP & CS & SP & SS

Cause

Loss of power to ADMs.

Effects

No signals from ADMs. Autopilot Effects. Flight instrument effects. Navigation effects. EICAS status message.

Message

SGL SOURCE AIR DATA (A) C31027;

AIR DATA SYSTEM FAIL (3 ADMS)

Cause

Left and right and center pitot air data modules (ADMs) have failed monitored BITE.

Effects

ADIRU and SAARU are incapable of providing voted air data.

Message

NAV AIR DATA SYS (A) C34010;

ALTITUDE ALERT SYSTEM FAIL

Cause

Loss of MCP data from the AFDCs on the 629 buses.

Effects

Loss of altitude alert function.

Message

ALTITUDE ALERT SYS (S) S34056;

ALTITUDE CALLOUTS FAIL

Cause

Discrete input has become deactivated - no longer grounded. GPWS defaults to a MINIMUMS MINIMUMS' callout provided MDA or DH is valid from AIMS.

Effects

GPWS Mode 6 - Altitude callouts are inhibited. If set during approach then all remaining Callouts not in progress are inhibited. Any in progress are allowed to finish. Note: An advisory message will only be displayed if OPC 'MFD Alt Callouts' or OPC 'ND Terrain Enab' is set.

Message

ALTITUDE CALLOUTS (A) C34049;

CDU FAIL / L & R & C

Cause

CDU power fails due to a broken wire.

Effects

CDU blanks.

Message

CDU L,C,R (S) S34040 S34039 S34041;

DME FAIL / L & R

Cause

Interrogator processor fails.

Effects

PFD and ND display DME fail conditions. DME audio fails. EICAS status message.

Message

DME L,R (S) S34046 S34047;

DRIFT GLIDE BEAM (AUTOLAND)

Cause

Ground Glide transmitter drift.

Effects

When in a captured GLIDE beam condition: On CAPT and F/O PFD and ND screens, the GLIDE deviation drifts to the top on the 2 GLIDE dots in 2 seconds and then stops until the malfunction is cancelled. (Best effect on the A/C before GLIDE capture).

DRIFT LOC BEAM (AUTOLAND)

Cause

Ground Localizer transmitter drift.

Effects

When in a captured LOC beam condition: On CAPT and F/O PFD and ND screens, the LOC deviation drifts to the left on the 3/4 LOC dot in 5 seconds and then stops until the malfunction is cancelled. (Best effect on the A/C before LOC capture).

DUAL AIMS FMCF FAIL

Cause

Software failure of FMCF in both AIMS.

Effects

Total failure of FMC function in L and R AIMS. All FMC generated display and guidance information will be unavailable. SATM answer to communication 438/Nov/2000: If activated in HOLD mode at T/O ATHR servos are lost.

Message

FMC (A) C34008;

DUAL GPS RECEIVER FAIL

Cause

Navigation receiver processors in both GPSUs have failed.

Effects

Dual Global Positioning System Unit (GPSU) failure.

Message

GPS (A) C34025;GPS L,R (S) S34052 S34053;

DUAL ILS G/S ANTENNA SW FAIL (L,R)

Cause

L and R glideslope antenna switches fail in the radome position.

Effects

L and R glideslope receivers will fail to switch to the nose gear door (track) antenna when the AFDC commands it.

Message

ILS ANTENNA (C) C34014;

DUAL ILS LOC ANTENNA SW FAIL (L,R)

Cause

L and R localizer antenna switches fail in the tail position.

Effects

L and R localizers will fail to switch from the tail fin (VOR) antenna to the nose radome antenna when the AFDC commands it on approach.

Message

ILS ANTENNA (C) C34014;

G/S RECEIVER FAIL / L & R & C

Cause

G/S portion of ILS receiver fail.

Effects

G/S indications will show fail on instruments. AFDC will give associated warnings if connected.

GND PROX SYS

Cause

GPWC internal failure of GP bus 3 receiver.

Effects

Ground proximity warning computer (GPWC) has failed. Appropriate effects on other related systems. Appropriate EICAS status message displayed. Note: An Altitude Callouts advisory message will also be displayed if OPC 'MFD Alt Callouts' or OPC 'ND Terrain Enab' is set. No callouts(V1, Engine Fail, Altitude)

Message

GND PROX SYS (S) C34041; WINDSHEAR ALERT (S) ALTITUDE CALLOUTS (A)

GPS POSITION ERROR

Cause

Poor satellite geometry resulting in measurement error.

Effects

GPS position is offset from ADIRU position.

GPWC FALSE WARNING

Cause

An erroneous Radio Altimeter signal to the GPWC received.

Effects

Appropriate modes give a false warning generated from it's incorrect closure rate determination.

GPWS WARNING PULL UP

Cause

Radio Altimeter input to the GPWC indicates simulated aircraft is approaching a mountain at high closure rate.

Effects

GPWS senses simulated aircraft entering the Mode-2A or Mode-2B envelope, giving a 'TERRAIN TERRAIN' aural alert followed by the warning PULL UP on the PFD with the aural message 'WHOOP WHOOP PULL UP'. Comments: Product Spec 965-0976-603 RevF ,Sheet 48 (section 5.1.4): To help prevent nuisances alerts in installations with one or two radio altimers or during false tracvking events affecting multiple altimeters the selected radio altitude is checked for reasonableness against computed terrain clearance . Computed terrain clearance is the aircraft height above terrain as determined by the geometric altitude of the aircraft and the elevation of the terrain below the aircraft. The reasonableness test is enabled in installations with geometric altitude when TAD is available and operating with high integrity and the aircraft is at least 4000ft above the terrain . Radio altitude is set invalid when the selected source indicates a terrain clearance significantly less than the computed terrain clearance. Example: LFPG

ILS RECEIVER FAIL / L & R & C

Cause

ILS receiver power supply fails.

Effects

PFD and ND exhibit ILS fail conditions. ILS audio fails. Autoland system degrades if failed prior to approach. If two channels are failed SINGLE SOURCE ILS (C) message displayed.

Message

ILS L,C,R (S) S34030 S34031 S34032;SINGLE SOURCE ILS (C) C34018;

ISFD FAIL

Cause

Total failure of standby instrument (Integrated Standby Flight Display)

Effects

Instrument display blanks.

ISFD READOUT FAILURE / ASI & Alt & ADI

Cause

ASI: Loss of data provided by static and total pressure sensors on the ISFD unit. Alt: Loss or corruption of altitude data on the ISFD unit. ADI: Loss or corruption of attitude data on the ISFD unit.

Effects

ASI: The Airspeed tape and the pointer are removed and the Red SPD flag is displayed. Alt: The display of the altitude tape is removed and the Red ALT flag is displayed. The display of the attitude is removed and replaced by black background, Red ATT flag is displayed.

LOC RECEIVER FAIL / L & R & C

Cause

LOC portion of ILS receiver fail.

Effects

LOC indications will show fail on instruments. AFDC will give associated warnings if connected.

MARKER RECEIVER FAIL

Cause

Marker section of left VOR/Marker receiver fails.

Effects

Marker indications on PFD and audio fail.

RADIO ALTIMETER FAIL / L & C & R

Cause

Loss of power to RAD ALT.

Effects

No signals from RAD ALT. Autopilot Autoland Effects. EICAS status message.

Message

RADIO ALT L,C,R (S) S34001 S34002 S34003;SGL SOURCE RAD ALT (A) C31029;

SAARU 629 BUS RECEIVER FAIL / L & R & C

Cause

SAARU internal circuit failure (left,right,center ARINC 629 rcvr fail).

Effects

SAARU internal failure.

Message

SAARU (S) S34007;

TCAS COMPUTER FAIL

Cause

TCAS computer processor overflow

Effects

All TCAS outputs fail. TA/RA displays show appropriate failure annunciations.

Message

TCAS (A) C34024;

TRIPLE RADIO ALTIMETER FAIL

Cause

Total failure of all Radio Altimeters.

Effects

Multiple effects including loss of flare compensation.

Message

FLARE COMPENSATION (C) C27009;RADIO ALT L,C,R (S) S34001 S34002 S34003;

VOR RECEIVER FAIL / L & R

Cause

VOR power supply fails.

Effects

VOR indications on ND exhibit fail conditions if selected on EFISCP.

Message

VOR L,R (S) S34050 S34051;

VOR/MKR RECEIVER FAIL / L & R

Cause

TBD.

Effects

VOR/marker receiver fails. VOR receiver instrument indications and audio fails. For VOR L receiver marker indications/audio also fail.

Message

VOR L,R (S) S34050 S34051;

WEATHER RADAR TEST FAIL

Cause

R/T internal fault giving low power output.

Effects

WXR does not output test display to ND when test mode is selected.

WEATHER RADAR TRANSCEIVER FAIL / L & R

Cause

Transmit processor circuit card fails in the transceiver.

Effects

When selected to the failed R/T, displays fail to show radar information. WXR FAIL message on ND changes to WXR R/T when Test Mode is selected on control panel.

ATA 35

CREW OXYGEN LOW

Cause

Crew oxygen usage.

Effects

Crew oxygen pressure drops below 700 psi. Crew Oxygen requires Refill.

Message

CREW OXYGEN LOW (A) C35002;

PASS OXYGEN AUTO DEPLOY FAIL

Cause

Cabin pressure > approx. 13500 ft sensors fail.

Effects

With Cabin Alt above approx. 13500 ft, passenger oxygen masks fail to drop automatically. Manual override deployment functions normally.

ATA 36

APU BLEED VALVE FAILS CLOSED

Cause

APU bleed valve fails closed due to control pressure loss (pneumatic line to APUSOV disconnects).

Effects

APU bleed valve spring loads closed.

Message

BLEED OFF APU (A) C36009;

ASCP CONTROLLER FAIL (S/W) / L & R

Cause

ASCPC failure due to digital software failure.

Effects

Air Supply Cabin Pressure (ASCP) Controllers incompatibility.

Message

ASCP CONTROLLER (S) S36045;

BLEED ISLN VALVE FAIL CLOSED / L & R & C

Cause

Control pressure line on isolation valve mechanically disconnects.

Effects

Isolation valve spring loaded closed.

Message

BLEED ISLN CLOSED L,R,C (A)C36008 C36006 C36007;

BLEED ISLN VALVE OPEN (SENSOR FAIL) / L & R & C

Cause

RVDT fails in open range.

Effects

Selected isolation valve indicates open when it is actually closed.

Message

BLEED ISLN OPEN C (A) C36025;

BODY DUCT LEAK

Cause

Pneumatic leak in body bleed duct.

Effects

Overheat/leak detected. No pressure loss effects. Appropriate isolation valves close to isolate the leak.

Message

BLEED LEAK BODY (C) C36017;BLEED LOSS BODY L,R (A) C36021 C36022;

BODY DUCT RUPTURE (OUTER + R ADP)

Cause

Duct ruptures in the outer distribution duct and in the right hydraulic air driven pump (ADP) duct.

Effects

Air escapes from duct and leak is detected by DLODS. Appropriate PRSOV and Isolation valves close to isolate the detected leak. BLEED LEAK Caution is eventually removed when overheat detectors cool down.

Message

BLEED LEAK L,R,BODY (C) C36018 C36019 C36017;BLEED LOSS BODY L,BODY R,BODY (A) C36021 C36022 C36020;

BODY DUCT RUPTURE (OUTER)

Cause

Duct ruptures in the outer distribution duct.

Effects

Ducts rupture with air loss and bleed leak detection.

Message

BLEED LOSS BODY L (A) C36021;

BODY DUCT RUPTURE (R ADP)

Cause

Duct ruptures in the right hydraulic air driven pump (ADP) duct.

Effects

Ducts rupture with air loss and bleed leak detection.

Message

BLEED LOSS BODY R (A) C36022;

DUCT LEAK DUAL LOOP FAIL (OPEN,SHORT) / L Wing & R Wing & Body

Cause

Loop 1 fails (open circuit), Loop 2 fails (short circuit).

Effects

Loop 1 open sensed as loop fail (not overheat). Overheat/leak detected from Loop 2. Appropriate PRSOV and isolation valves close to isolate the detected leak causing BLEED LOSS Advisory to be displayed and remain displayed because loop faults remain.

Message

BLEED LEAK L,R,BODY (C) C36018 C36019 C36017;BLEED LOSS WING L,WING R,BODY (A) C36023 C36024 C36021;BLEED LOOP 1 WING L,WING R,BODY (S) S36029 S36027 S36025;

DUCT LEAK DUAL LOOP FAIL (SHORT,SHORT) / L Wing 1 & R Wing 1 & Body 1

Cause

Both Loop 1 and Loop 2 fail (short circuit).

Effects

Overheat detected. Air Supply and Cabin Pressure Controller (ASCPC)responds by closing appropriate PRSOV and isolation valves. No loss of pressure.

Message

BLEED LEAK L,R,BODY (C) C36018 C36019 C36017;BLEED LOSS WING L,WING R,BODY L (A) C36023 C36024 C36021;

FAN AIR MOD VALVE FAIL CLOSED / L & R

Cause

Selected high pressure fan air controller (HPFAC) FAMV torque motor flapper failure.

Effects

Fan air modulating valve (FAMV) goes full closed. No cooling from the failed side precooler.

Message

BLEED OFF ENG L,R (A) C36001 C36002;

HP SHUT OFF VALVE FAILS OPEN / L & R

Cause

HPSOV mechanical failure (valve disk disconnects).

Effects

High pressure shutoff valve (HPSOV) remains open during high thrust setting (duct pressure exceeds 210 psi). Failure also detected during post flight tests.

Message

BLEED OFF ENG L,R (A) C36001 C36002;

HP VALVE FAIL CLOSED / L & R

Cause

HPSOV mechanical failure.

Effects

High pressure shut off valve fails in the closed position. Engine bleed valve closes and duct pressure will be supplied from the opposite engine via the isolation valves.

Message

BLEED OFF ENG L,R (A) C36001 C36002; BLEED HPSOV L,R (S)

STRUT DUCT LEAK / L & R

Cause

Pneumatic leak in selected strut bleed duct.

Effects

Overheat/leak detected. No pressure loss effects. Appropriate isolation valves close to isolate the leak.

Message

BLEED LEAK STRUT L,R (C) C36015 C36016;BLEED LOSS WING L,R (A) C36023 C36024;

STRUT DUCT LEAK (LP DUCT) /L,R

Cause

Pneumatic leak in selected strut bleed duct.

Effects

Overheat/leak detected. No pressure loss effects. Appropriate isolation valves close and leak is isolated at low engine power setting.

Message

BLEED LEAK STRUT L,R (C) C36015 C36016;

BLEED LOSS WING L,R (A) C36023 C36024;

STRUT DUCT LEAK (HP DUCT) /L,R

Cause

Pneumatic leak in HP bleed duct.

Effects

Overheat/leak detected. No pressure loss effects. Appropriate isolation valves close , however the leak will never be isolated.

Message

BLEED LEAK STRUT L,R (C) C36015 C36016;

BLEED LOSS WING L,R (A) C36023 C36024;

WING DUCT RUPTURE / L & R

Cause

Wing duct ruptures at inboard leading edges.

Effects

Wing duct ruptures, causing PRSOV and isolation valve to latch closed.

Message

BLEED LOSS WING L,R (A) C36023 C36024;

ATA 49

APU AIR TURBINE STARTER VALVE FAIL

Cause

Air turbine starter valve solenoid failure. Valve remains closed.

Effects

No pressure available to ATS. APUC detects lack of air pressure and switches to electric start. APU starts successfully. Status message displayed.

Message

APU AIR STARTER (S) S49005;

APU AUTO SHUTDOWN - HIGH EGT

Cause

Inlet guide vane (IGV) actuator failure.

Effects

IGVs open despite being commanded closed. APU EGT rises quickly to over 900 deg C. Unattended mode: advisory message, and APU autoshutdown. Attended mode: caution message and aural caution tone, prompting pilot shutdown.

Message

APU LIMIT (C) C49002;APU SHUTDOWN (A) C49003; APU (S);

APU AUTO SHUTDOWN - OVERSPEED

Cause

APU fuel metering unit driver fails full open.

Effects

APU overspeed detected. Autoshutdown occurs.

Message

APU SHUTDOWN (A) C49003;

APU AUTO SHUTDOWN (MODE DEP) - LOW OIL PRESSURE

Cause

Internal oil pump failure causes larger fluid bypass, resulting in pump performance reduction and low oil pressure.

Effects

Fault is detected 16 secs after APU oil pressure falls below minimum (35 psig). Unattended mode: advisory message, and APU autoshutdown. Attended mode: caution message and aural caution tone, prompting pilot shut down.

Message

APU LIMIT (C) C49002;APU SHUTDOWN (A) C49003; APU (S);

APU FUEL FILTER CLOGGED

Cause

APU fuel filter clogged

Effects

APU status message appears

Message

APU (S) S49004;

APU IGNITOR PLUG FAIL / 1 & 2

Cause

Igniter plug fails.

Effects

One ignitor fails: APU ignition on alternate ignitor, status message displayed. Both ignitors fail: No ignition, autoshutdown occurs, advisory message displayed.

Message

APU START SYS (S) S49008; APU SHUTDOWN (A):

APU INLET DOOR FAILS IN POSITION

Cause

Inlet door actuator fails in closed position (APU start only).

Effects

APU autoshutdown after 60 seconds because door fails to open.

Message

APU SHUTDOWN (A) C49003;APU DOOR (S) S49003;

APU SCV CONTROL FAIL

Cause

Surge control valve (SCV) actuator linkage breaks.

Effects

Valve stuck in present position. No surge control by APUC. APU bleed air unavailable. Status message displayed. Valve posn 10deg = open, 90deg = close.

Message

APU BLEED AIR (S) S49006;

APU SPEED SENSOR FAIL / 1 & 2

Cause

Single speed sensor monopole fails.

Effects

One sensor fails: APU continues to function, Status message displayed. Both sensors fail: APU shuts down, advisory message displayed.

Message

APU CONTROL (S) S49007; APU SHUTDOWN (A);

APU STARTER FAIL

Cause

APU start relay fails open, preventing connection of APU starter to APU battery.

Effects

APUC detects starter failure during start attempt. Autoshutdown occurs.

Message

APU SHUTDOWN (A) C49003;

ATA 52

ACCESS DOOR WARNING (IND ONLY) / Fwd & E/E

Cause

Coil in proximity sensor fails.

Effects

If aircraft is on ground EICAS message is generated due to failed sensor indicating target far.

Message

DOOR FWD ACCESS (A) C52016;DOOR E/E ACCESS (A) C52015;

CARGO DOOR OPEN / Fwd & Aft & Bulk

Cause

Cargo Door opens.

Effects

Door opens when commanded shut. Appropriate pressurization effects will occur.

Message

DOOR FWD CARGO (C) C52011; DOOR AFT CARGO (A),or (C) C52012 or C52013; DOOR BULK CARGO (A)

CARGO DOOR WARNING / Fwd & Aft & Bulk

Cause

Closed indication sensor wire breaks at connector - open circuit. Note: DOOR AFT CARGO will be a Caution or Advisory message depending upon door size on aircraft.

Effects

If aircraft is on ground EICAS message is generated due to closed sensor indicating target far.

Message

DOOR FWD CARGO (C) C52011;DOOR AFT CARGO (A) C52012;or DOOR AFT CARGO (C) C52013;DOOR BULK CARGO (A) C52014;

DOOR FLIGHT LOCK WARNING / L1 & R1

Cause

Flight lock solenoid fails to energize due to a broken wire at connector.

Effects

Door status does not match flight lock command. (Mode Dependent).

Message

DOOR FLIGHT LOCK 1L, 1R (A) (S) C52003 C52010 S52001 S52008;

PASSENGER ENTRY DOOR FAILED OPEN / L1 & L4 & R1 & R4

Cause

Door mechanically jammed.

Effects

Door remains open when commanded shut. Appropriate pressurization effects will occur.

Message

DOOR ENTRY 1L,4L,1R,4R (A); C52017, C52020, C52021, C52024 ;

PASSENGER ENTRY DOOR WARNING / L1 & L4 & R1 & R4

Cause

Coil in sensor fails.

Effects

If aircraft is on ground EICAS message is generated due to failed sensor indicating target far.

Message

DOOR ENTRY 1L,4L,1R,4R (A); C52017, C52020, C52021, C52024 ; DOOR ENTRY IND 1L,4L,1R,4R (S); S52013, S52016, S52017, S52020 ;

ATA 72

ENG COMPRESSOR STALL / L & R

Cause

Compressor stall. Effects evident only when N1 exceeds 70%.

Effects

Loud bang and motion bump with RPMs dropping momentarily and EGT rising. Sudden loss of thrust causes aircraft to jolt and yaw. Effects recur every few seconds. If engine not shutdown, EGT exceeds red-line limit after three or four stalls, depending on level before stalls occur.

Message

None

ENG EGT OVERLIMIT / L & R

Cause

Turbine damage.

Effects

Engine idle parameters are normal. As power is increased EGT becomes higher than normal and is over limit at T/O power.

Message

None.

ENG FAN DAMAGE / L & R

Cause

Fan blade breakage has occurred due to foreign object ingestion.

Effects

No direct failure detection. High engine vibration and asymmetric thrust on aircraft only flight crew indications of condition. Fan efficiency and thrust loss. Decrease in scheduled fuel flow due to partial unloading of fan. Motion and sound effects evident on ingestion.

Message

None.

ENG FLAMEOUT / L & R

Cause

Engine flameout due to water ingestion.

Effects

EEC detects failure when engine runs down below minimum idle speed. Message annunciation is immediate. No relight while malfunction remains set. On run-down, ENG THRUST caution msg is possible but is quickly inhibited by ENG FAIL caution as engine runs down below idle, so will probably not be seen.

Message

ENG FAIL L,R (C) C73035 C73036; ENG THRUST L,R (C) C73015 C73016(CAS>V1 or in air, inhibited by ENG FAIL);

ENG HIGH FAN VIBRATION / L & R

Cause

Engine fan imbalance due to FOD damage.

Effects

Engine fan vibration will increase regardless of engine power setting. Motion vibration effects evident when indicated vibration exceeds 4.0 EICAS units. If engine is shutdown, vibrations will decay to windmilling level.

Message

None.

ENG SEIZURE / L & R

Cause

Severe failure of N2 rotor bearing.

Effects

Increased N2 vibration and seizure after 5 secs. Flameout. Motion and sound effects evident on seizure.

Message

ENG FAIL L,R (C) C73035 C73036;

ENG SURGE / L & R

Cause

Pressure disturbances within the engine cause rapid, continual fluctuations of burner pressure, culminating in a final severe drop if surges are allowed to continue.

Effects

EEC detects surge if burner pressure rate of change becomes sufficiently large. Dual igniters then commanded on. Possible engine flameout. Caution message if flameout. Motion and sound effects evident. Effects only at high power. The engine will recover if the throttle is retarded to idle.

Message

ENG FAIL L,R (C) C73035 C73036 (if flameout);

ENG SEV DAM (AIRFRAME VIBS) Speed - / L & R

Cause

N1 rotor bearing fail, structural damage on the nacelle

Effects

Immediate fan rotor seizure - N1 decreases rapidly to zero, EGT overshoots (may exceed red-line limit depending on power level prior to seizure), engine flames out, EGT and N2 decay to windmilling speeds. Motion bump and sound effect upon seizure, airframe vibrations decreasing as the airspeed is reduced by the crew. Vibrations stop when the airspeed reaches a limit specified by the instructor.

Message

ENG FAIL L, R (C) C73035 C73036; ENG THRUST L, R (C) C73015 C73016 (CAS>V1 or in air, inhibited by ENG FAIL)

ENG SEV DAM (AIRFRAME VIBS) Speed + / L & R

Cause

N1 rotor bearing fail, structural damage on the nacelle

Effects

Immediate fan rotor seizure - N1 decreases rapidly to zero, EGT overshoots (may exceed red-line limit depending on power level prior to seizure), engine flames out, EGT and N2 decay to windmilling speeds. Motion bump and sound effect upon seizure, airframe vibrations decreasing as the airspeed is increased by the crew. Vibrations stop when the airspeed reaches a limit specified by the instructor, defined as a speed delta from the IAS at which the Malf is activated.

Vibrations stop on the ground when the IAS sinks below 130 Kts.

Message

ENG FAIL L, R (C) C73035 C73036; ENG THRUST L, R (C) C73015 C73016 (CAS>V1 or in air, inhibited by ENG FAIL)

ENG SEVERE DAMAGE (N1 SEIZURE) / L & R

Cause

N1 rotor bearing fail.

Effects

Immediate fan rotor seizure - N1 decreases rapidly to zero, EGT overshoots (may exceed red-line limit depending on power level prior to seizure), engine flames out, EGT and N2 decay to windmilling speeds. Motion bump and sound effect upon seizure.

Message

ENG FAIL L,R (C) C73035 C73036;ENG THRUST L,R (C) C73015 C73016 (CAS>V1 or in air, inhibited by ENG FAIL);

ENGINE FAN DAMAGE DUE TO BIRD STRIKE / L & R

Cause

Bird strike.

Effects

Fan damaged due to bird ingestion. Motion and sound effects evident on ingestion. Fan efficiency and thrust loss. Decrease in scheduled fuel flow and EGT due to partial unloading of fan. High engine vibration.

Message

Vibration indication exceeds red-line limit.

ENGINE VOLCANIC ASH

Cause

Volcanic dust cloud above A/C altitude 20,000 ft

Effects

Above FL200 only: Upon malfunction insertion in cruise configuration the aircraft enters a continuous thin cloud of volcanic dust. On entering volcanic dust cloud: - Loss of visibility through windows - All engines power settings decrease - Cruise can not be maintained - Airspeed indication (speed tape) failed - Smoke enters flight deck through air conditioning outlets for approx 10 secs - Forward cargo fire warning 20 secs after entering cloud: - Smoke stops - Cargo fire warning latched for 2 mins - Right engine begins to roll back towards idle, with EGT increasing and no throttle control 40 secs after entering cloud: - Right engine flames out after EGT has reached a peak of 1000 deg C - Left engine begins to roll back towards idle, with EGT increasing and no throttle control 60 secs after entering cloud: - Left engine is hung at idle, with EGT above 700 deg C and no throttle control At any time, shutting down engines results in slow EGT decay towards ambient.

Message

ENG FAIL L,R (C) C73057, C73058

ATA 73

EEC ALTERNATOR FAIL / L & R

Cause

EEC power supply (PSU) circuitry detects a DC Bus Overvoltage fault from the Alternator supplied power (DC Bus Voltage > 68 volts).

Effects

Message annunciation occurs after 2 secs. No effect on engine operation. EEC will operate using aircraft power. Time limited dispatch condition.

Message

ENG EEC C1 L,R (S)

EEC ALTN MODE / L & R

Cause

Total Pressure reported by ADIRU is declared invalid.

Effects

Transition to soft alternate mode after 15 continuous seconds when the EEC uses last calulated delta ambient temperature (from ISA) to calculate the fan reference speeds. Altn mode light on mode switch is illuminated.

Message

ENG EEC MODE L,R (A) C73026, C73027 ENG EEC MODE L.R (S) S73018, S73006

EEC DUAL INPUT FAIL - TRA / L & R

Cause

EEC no longer receives throttle resolver angle.

Effects

EEC detects the loss and defaults to the minimum idle setting. The engine is unable to supply more than idle power. Thrust shortfall detected if higher than idle power requested.

Message

ENG THRUST L,R (C) C73015 C73016 (CAS>V1 or in air, inhibited by ENG FAIL); ENG REV LIMITED L,R (A) C78007 C78008; ENG CONTROL L,R (A) C73003 C73004; ENG CONTROL L,R (S) S73001 S73002;

ENG CONTROL (P0 FAIL) / L & R

Cause

P0 pressure sensor fails due to a broken connector.

Effects

EEC failure detection and message annunciation after 5 secs. Failure latches after a further 20 secs. No dispatch condition. When malfunction clear, latched failure can be cleared by cycling mode switch. SATM Answer to Communication 377/Jul/2000:On ground the EICAS message ENG CONTROL is displayed if v<80 kts

Message

ENG CONTROL L,R (A) C73003 C73004;ENG CONTROL L,R (S) S73001 S73002;

ENG FUEL FILTER BLOCKED / L & R

Cause

Engine fuel filter is clogged due to contamination.

Effects

Message annunciation after 20 secs.

Message

ENG FUEL FILTER L,R (S) S73009 S73010;

ENG FUEL FILTER SENSOR FAIL / L & R

Cause

Both fuel filter bypass pressure sensors failed due to severed wire connectors.

Effects

Message annunciation after 20 secs. Time limited dispatch condition.

Message

ENG FUEL FILT SNSR L,R (S)

ENG FUEL VALVE FAILS CLOSED / L & R

Cause

High pressure fuel shutoff valve stuck closed due to contamination. The valve must be closed for the malfunction to take effect.

Effects

EEC detects failure and message annunciation occurs when valve command and position have disagreed for 5 secs. Engine is inoperable. No dispatch condition.

Message

ENG FUEL VALVE L,R (A) C73013 C73014;ENG FUEL VALVE L,R (S) S73007 S73008;

ENG IDLE DISAGREE / L & R

Cause

The flap lever position received by the EEC is declared invalid.

Effects

Idle select defaults to Approach regardless of flight conditions. Message annunciation occurs if the other engine is operating normally at Minimum Idle.

Message

ENG IDLE DISAGREE (A) C73030

ENG OVERSPEED GOVERNOR FAILURE / L & R

Cause

The engine overspeed governor has failed the initialisation test due to a frozen valve.

Effects

Hydro-mechanical overspeed protection failure. Failure detected when the periodic initialisation test fails. Time limited dispatch condition.

Message

ENG OVERSPEED GOV L,R (S)

ENG STATOR VANE (SENSOR FAIL) / L & R

Cause

One Stator Vane Angle sensor signal lost due to a wire connector failure. VSV position signal exceeds valid electrical range.

Effects

Message annunciation occurs 20.0 seconds after the failure. Time limited dispatch condition. Single channel VSV display blank.

Message

ENG EEC C2 L,R (SMT) T73001 T73002;

ENG SVA TORQUE MOTOR FAILS / L & R

Cause

Stator vane actuator pilot valve torque motor fails due to a burned winding.

Effects

Stator vanes move to fail-safe open position.EEC detects failure when commanded and feedback positions disagree by > 0.23 inches. No dispatch condition.

Message

ENG CONTROL L,R (A) C73003 C73004;ENG CONTROL L,R (S) S73001 S73002;

ATA 78

ENG INADVERTENT REVERSE THRUST / L & R

Cause

Reverser inadvertently deploys in flight.

Effects

Excessive buffet and yaw of aircraft.

Message

ENG REVERSER L,R (C) C73032 C73033; ENG REVERSER L,R (S) S78007 S78008;

ENG T/R ISOLATION VALVE FAIL / L & R

Cause

Isolation Valve solenoid coil winding short circuit.

Effects

Valve moves to open position. EEC outputs valve position to EICAS in conjunction with throttle and T/R position information. EEC Time limited dispatch condition.

Message

ENG REVERSER L,R (A) C78001 C78002;ENG REVERSER L,R (S) S78003 S78004;

ENG THRUST REVERSER FAILS IN POSN / L & R

Cause

Thrust reverser isolation valve has lost power.

Effects

EEC detects failure when it no longer receives feedback from the isolation valve power circuit. Thrust reversers will be unable to deploy or stow.

Message

ENG REV LIMITED L,R (A) C78009 C78011

ATA 79

ENG HIGH OIL TEMPERATURE / L & R

Cause

Engine oil temperature sensors are biased and reporting high data in the range 155 to 180 degC. Sensed temperature rises eventually to 180 degC.

Effects

EEC detects failure when sensed temperature exceeds 163 degC. Actual engine oil temperature normal. No dispatch condition.

Message

ENG OIL TEMP L,R (A) C79003 C79004;

ENG OIL FILTER CLOG / L & R

Cause

The engine oil filter is clogged due to contamination.

Effects

Message annunciation after 20 seconds. No dispatch condition.

Message

ENG OIL FILTER L,R (A); ENG OIL FILTER L,R (S) S79003 S79004;

ENG OIL LEAK / L & R

Cause

Broken oil line causes an oil leak at three US gallons per minute.

Effects

When oil quantity is low, oil temperature increases. Further depletion produces a fall in oil pressure, increased vibration and eventually, HP rotor seizure and engine flameout. Sound and motion bump evident upon seizure if the engine is not shut down.

Message

ENG FAIL L,R (C) (if seizure) C73038 C73040;ENG OIL PRESS L,R (C) C79007 C79008;

ENG OIL PUMP FAIL / L & R

Cause

Engine oil scavenge pump fails, causing loss of oil pressure.

Effects

EEC detects failure and message annunciation occurs when oil pressure drops below 70.0 psia. Engine damage or failure if condition continues. No dispatch condition. Oil pressure display blanks.

Message

ENG OIL PRESS L,R (C) C79001 C79002;

ATA 80

ENG BOTH IGNITORS FAIL / L & R

Cause

Both igniters fail.

Effects

EEC detects failure when ignition is requested on and engine does not light within 5 seconds. Message annunciation for currently selected igniter, or both if dual ignition. A second start using the other igniter will also fail.

Message

ENG IGNITOR L1,R1 (S) S74003 S74004;ENG IGNITOR L2,R2 (S) S74005 S74006;

ENG HOT START / L & R

Cause

Ignitors are operating with marginal effectiveness.

Effects

EGT rises faster than normal during start. In A/start, detected when EGT over 740 degC. Message after EEC Autostart terminated. Manual start possible if warnings ignored.

Message

ENG AUTOSTART L,R (C) C80003 C80004;

ENG HUNG START / L & R

Cause

N2 rpm increases slower than normal during engine start, and hangs at approx. 38-43 %N2. Eventual high EGT is likely if engine is not shutdown.

Effects

Engine hangs at approx 38-43 %N2. EEC detects hung start by low N2 acceleration rate. On ground, Autostart will make up to three start attempts before aborting if engine still hangs. In air, autostart will continue the motor/restart cycle indefinitely and pilot must abort start. No detection logic is active during manual starts.

Message

ENG AUTOSTART L,R (C) C80003 C80004;

ENG IGNITION 1 FAIL / L & R

Cause

Internal fault within the #1 igniter box (EEC alternates igniters on successive starts - selection of this malfunction overrides alternating logic and ensures igniter #1 is selected).

Effects

EEC detects failure when igniter #1 is requested on and does not respond within 5 seconds. Engine fails to light using igniter #1. If dual ignition, engine will light on igniter #2.

Message

ENG IGNITOR L1,R1 (S) S74003 S74004;

ENG IGNITION 2 FAIL / L & R

Cause

Internal fault within the #2 igniter box (EEC alternates igniters on successive starts - selection of this malfunction overrides alternating logic and ensures igniter #2 is selected).

Effects

EEC detects failure when igniter #2 is requested on and does not respond within 5 seconds. Engine fails to light using igniter #2. If dual ignition, engine will light on igniter #1.

Message

ENG IGNITOR L2,R2 (S) S74005 S74006;

ENG N1 NO ROTATION / L & R

Cause

N1 rotor locked prior to start due to temperature stresses and foreign matter contamination.

Effects

EEC detects rotor lock when N2 is greater than 58 %rpm and N1 remains less than 5.0 %rpm. Autostart aborts with message annunciation. No message if in manual start mode.

Message

ENG AUTOSTART L,R (C) C80003 C80004;

ENG START VALVE FAILS CLOSED / L & R

Cause

Starter air valve solenoid wire connection failure. SAV remains in fail-safe (closed) position.

Effects

EEC detects failure when the command and position disagree. Message annunciation occurs 5 secs later. Assisted starting not available.

Message

ENG START VALVE L,R (A) C80005 C80006;ENG START VALVE L,R (S) S80003 S80004;

ENG START VALVE FAILS OPEN / L & R

Cause

Starter air valve jams open due to contaminants in the valve linkage.

Effects

EEC detects failure when the command and position disagree. Caution message appears 12 secs after starter cutout. Status message annunciation occurs 20 secs after cutout if duct pressure remains above 18 psi.

Message

ENG STARTER CUTOUT L,R (C) C80001 C80002;ENG START VALVE L,R (S) S80003 S80004;

ENG STARTER DRIVE SHAFT FAIL / L & R

Cause

Starter shaft breaks at approx 5.5 %N2 during a start due to fatigue.

Effects

In Autostart, EEC detects failure when N2 falls below 5% N2 and causes message annunciation and aborts start. No message or start abort in manual start mode. Starter assisted starting no longer available. In air, N2 will fail to increase, and EEC will fail to detect shear as windmilling N2 normally exceeds 5%.

Message

ENG AUTOSTART L,R (C) C80003 C80004;