
MAINTENECE TOOL
CFDS & PFR

The A320 Family Aircrafts having No Fault Found Policy (NFF)

The aircraft is equipped with a high number of digital items of equipment. In most of the cases, computers may be recovered after an abnormal behaviour or a detected fault, either by a software reset (reset of microprocessor) or by interrupting the power supply of its processing parts for a short time. This is achieved with the normal cockpit controls (engagement levers, pushbutton switches) by selecting the related control off then on or by action on the **corresponding** circuit breaker.
The A320 Family maintenance concept is based on the use of the **Centralised Fault Display System** (CFDS) and the Troubleshooting Manual (TSM).

The main purpose of the CFDS **is to ease** aircraft maintenance **by compiling** failure information from system BITE **(Built-In Test Equipment)** and providing system BITE test capability from the cockpit.

Built-In Test Equipment (BITE)

The CFDS also takes into account a major objective of the line maintenance **which is to** avoid **unjustified** removals **of equipment.** For these reasons the CFDS makes a detailed analysis to identify the responsible LRUs; this is also to confirm that the event was actually due to a hardware failure and not an intermittent fault. To achieve its purpose, the CFDS has several major functions which supply:-A **maintenance** Post Flight Report (PFR) which is printed at the end of each flight.

Failure Classification & Indication:- The CFDIU generates its flight/ground condition using some parameters transmitted by the **Flight Warning Computer (FWC),** the Flight Augmentation Computer (FAC), the memorised maintenance phases and a discrete signal from the Landing Gear Control and Interface Unit (LGCIU).

- In normal operation, flight phase information is transmitted by the FWCs to the CFDIU and when a new flight number is entered the information is given by the FAC.**Failure Reporting per flight phase**

Failure Classification

The maintenance message classification is based on fault consequences on flight operations:

- **Class 1 faults** may have an operational consequence on flight
- **Class 2 faults** have no immediate operational consequence on flight
- **Class 3 faults** have no consequence on flight.

Trouble Shooting of Faults Reported on the PFR

The following general procedure describes trouble shooting of Upper ECAM DU warnings, ECAM STS (Status) Maintenance messages or CFDS fault messages given on the PFR.

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Refer current Air-N@v AMM/TSM

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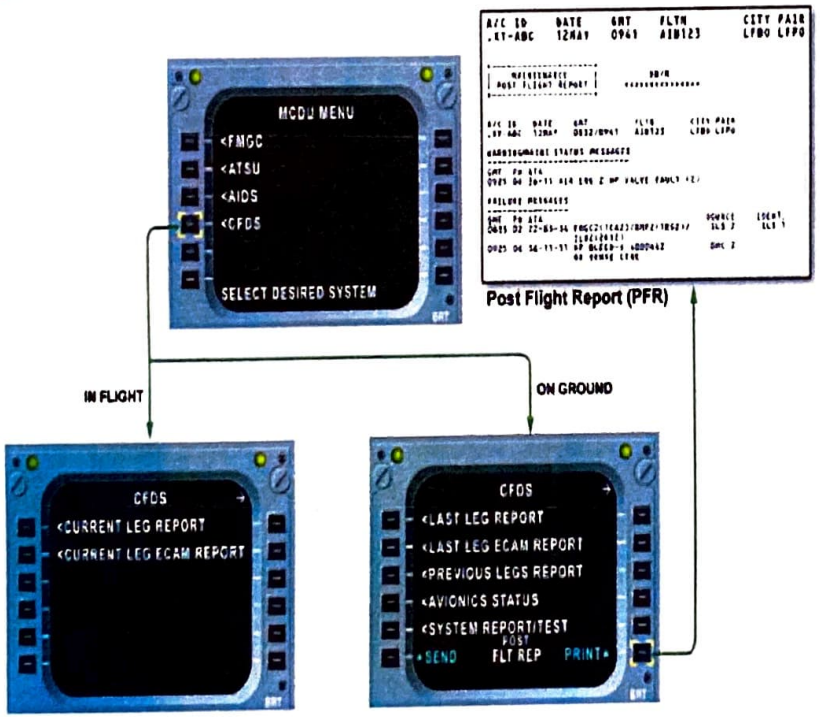
(1) Compare the ECAM warning or ECAM STS message with the CFDS fault message (if applicable) on the PFR to obtain the fault symptom and the ATA chapter reference. A time difference of 1-3 minutes between the fault message and the warning message may occur due to CFDIU internal behaviour.

(2) Use the Trouble Shooting function to retrieve the fault symptom, correlate the CFDS message and retrieve the associated fault isolation procedure.

For further fault isolation use the source (SOURCE column) and/or CFDS fault message identifiers (IDENT block). Due to the number of possible identifier, the fault message identifier in the TSM must be the same as on the PFR.

ECAM display:-Display :**Maintenance Status** are only displayed in **flight phases 1 and 10** (i.e. engine not running). It means that when one system sends a maintenance status to be displayed, the FWC will delay it until flight phase 10 pending the system keeps on sending the fault. But the alert will be reported in the PFR at the time when the maintenance status has been computed for **Maintenance action.**



CENTRALIZED FAULT DISPLAY SYSTEM

BITE:-Troubleshooting via MCDU

PFR:- The POST FLIGHT REPORT, which is part of the main maintenance menu, associates all the ECAM warnings (primary and independent) and the fault messages (class 1 and 2) of the last flight, given information concerning the failed LRU if the faulty message is not sufficiently precise. The correlation between the fault messages and the ECAM warnings is done by GMT time stamp comparison. This item is the "sum" of LAST LEG REPORT and LAST LEG ECAM REPORT items. These messages are separated into two parts; the first part contains the ECAM warnings associated with the time, the flight phase and the ATA reference, the second contains the failed LRUs associated with the time, the ATA reference and the identifiers. Aircraft identification, the date, the flight time, the flight number (airline) and the departure and arrival airports are included in the header.

The following data are recorded in the PFR:

· **ECAM WARNING MESSAGES**:-The **ECAM WARNING MESSAGES** contains::- the warning message available on the upper ECAM display unit **& the maintenance status** These warning messages are associated with their ATA reference (aid for cross referencing with the maintenance message).**FAULTS: Maintenance messages** are listed in the PFR in the **FAILURE MESSAGES** part. Additional information is associated with each message.

· **FLIGHT PHASE – GMT** Flight operational phases (CLIMB, CRUISE, etc.) are indicated in coded form in the PFR in front of the warning message. The time (GMT) is also given in front of the warning message and the maintenance message.

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· **ATA:** This is the ATA chapter of the first suspected component. It is the entry point to the technical documentation. It may also be an aid in relation to the **corresponding warning message and with the GMT.**

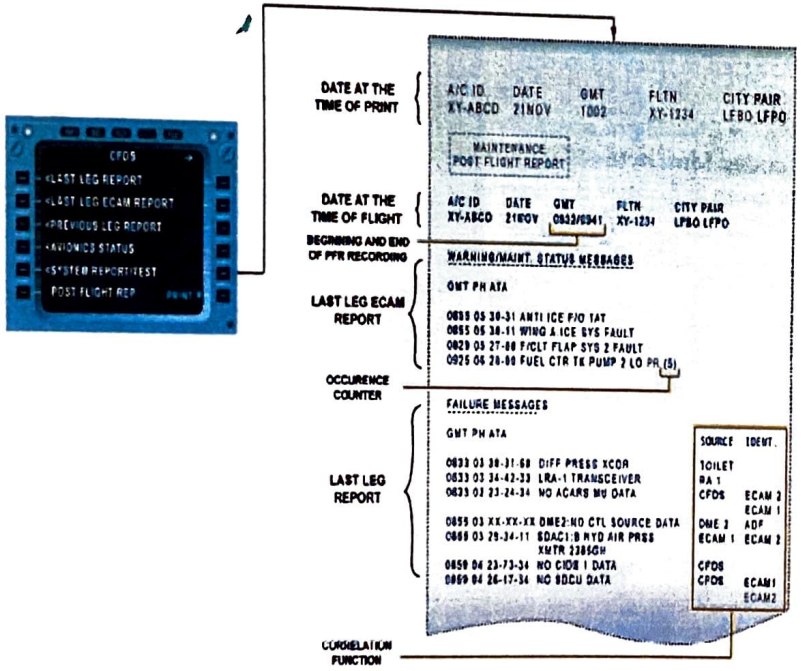
LAST/CURRENT LEG REPORT

A CURRENT LEG REPORT is elaborated during the flight. After the flight, its title becomes LAST LEG REPORT. The purpose of this item is to present the failure messages, concerning all systems, occurred during the last/current flight. Each message contains the test of the failure, the ATA reference and the flight phase and time at which the failure occurred. A function correlates the "**SOURCE**" failure message with the "resulting" failure messages.

SOURCE: Name of system affected by a failure.

IDENTIFIER: Name of system affected by an external failure, which is correlated with the "SOURCE" failure. The CFDIU capacity for failure messages memorization is up to 40 lines.

- **Class 1 Failure** Messages associated with an 'ECAM Warning'.
- **Class 2 Failure** Messages associated with a 'maintenance status F/CTL'.



UNSCHEDULED MAINTENANCE CHECKS .

Hence, we consider that the best and sufficient entry point to trouble shoot an A/C remains the ECAM warning message and the CFDS failure message (PFR, PLR, Quick Dispatch Guide and Cross-References= TASK 05-50-00-040-002-

Fluid Leak Measurement - Maintenance Practice

Measurement of Leaks = *ON A/C 101-150*	
INSPECTIONS TASK	**AMM REFERENCE**
Measurement of hydraulic system leaks	29-00-00-790-001
Measurement of flight-control system leaks	29-00-00-790-001
Measurement of fuel system leaks	28-11-00-280-002
Measurement of landing-gear system leaks	29-00-00-790-001
Measurement of cargo-door system leaks	29-00-00-790-001
Measurement of power-plant system leaks	71-00-00-910-803
Measurement of Leaks *ON A/C= 001-007, 009-100, 201-300*	
Measurement of hydraulic system leaks	29-00-00-790-001
Measurement of flight control system leaks	29-00-00-790-001
Measurement of fuel system leaks	28-11-00-280-002
Measurement of landing gear system leaks	29-00-00-790-001
Measurement of cargo door system leaks	29-00-00-790-001
Measurement of power plant system leaks	71-00-00-790-005
INSPECTIONS (SPECIAL)	**AMM REFERENCE**
Insp. after a hard landing or a hard overweight landing	**05-51-11-200-004-B**
Insp. After Brake Emergency Application or Overheat	**05-51-16-200-001-A**
Inspection more than the Gear down Limiting Speed	**05-51-12-200-001-A**
Insp after more than the Flap/Slat Limiting Speed	**05-51-13-200-001-A**
Inspection of the Aircraft after a Hail Strike in Flight	**05-51-14-200-802-A**
Insp after a Tire Burst or Tread Throw or Wheel Failure	**05-51-15-200-001-A**
Inspection after In-flight Excessive Load Factor due to Turbulence or Maneuver or in Excess of VMO/MMO	**05-51-17-200-001-A**
Inspection after a Lightning Strike	**05-51-18-200-001-A**
Insp of the Engine after a Bird Strike or Slush Ingestion	**05-51-19-200-001-A**
Inspection after a Tail Runway Impact	**05-51-21-200-001-A**
Inspection After a NLG Towing Overload or Overrun	**05-51-22-200-001-A**
Insp after NLG Steering Angle of more than 95 deg	**05-51-23-200-001-A**
Inspection after Leaving Runway or Taxiway	**05-51-24-200-001-A**
Inspection after a Flight through a Sand/Dust Storm or after Sand/Dust Contamination on the Ground	**05-51-25-200-002-A**
INSPECTION AFTER ENGINE FAILURE	**05-51-26-200-001-A**
Insp after an Impact on Nacelle or Engine Equipment	**05-51-27-200-001-A**

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Procedure after Fluid Spillage	05-51-28-200-002-A
Insp after Abnormal Movement of the Pax/Crew Door	05-51-29-200-001-A
Insp after Abnormal Movement of the Cargo Door	05-51-30-200-801-A
Insp after Significant MLG Vibration at Touch-Down	05-51-31-200-001-A
Insp after Engine Wind milling (In-Flight Shut Down)	05-51-34-200-001-A
Inspection after Impact on Wing Tip/Fence	05-51-35-200-001-A
Insp after Abnormal Movement of the Pax/Crew Door	05-51-29-200-001-A
Insp after Abnormal Movement of the Cargo Door	05-51-30-200-801-A
Insp after Significant MLG Vibration at Touch-Down	05-51-31-200-001-A
Inspection after Impact on Wing Tip/Fence	05-51-35-200-001-A
Inspection after Overweight Taxiing	05-51-41-200-001-A
Inspection after Very High Winds on Ground	05-51-42-200-001-A
Inspections after Work on System Electrical Installation	05-51-43-700-001-A
Insp Aircraft Operation with High Lateral Acceleration	05-51-44-200-001-A
Inspection after Flight in Severe Icing Conditions	05-51-45-200-001-A

➢ **The COMPUTER test function can be divided into 4 groups.**

Power up test.:-The power up test is primarily a safety test. The purpose of a safety test is to ensure compliance with the safety objectives. It is only executed on ground after long power cuts for approx. (more than 200ms). Its duration is a function of the system which is not operational during the power up test. If the aircraft is airborne, the power up test is limited to a few items to enable quick return to system operation.

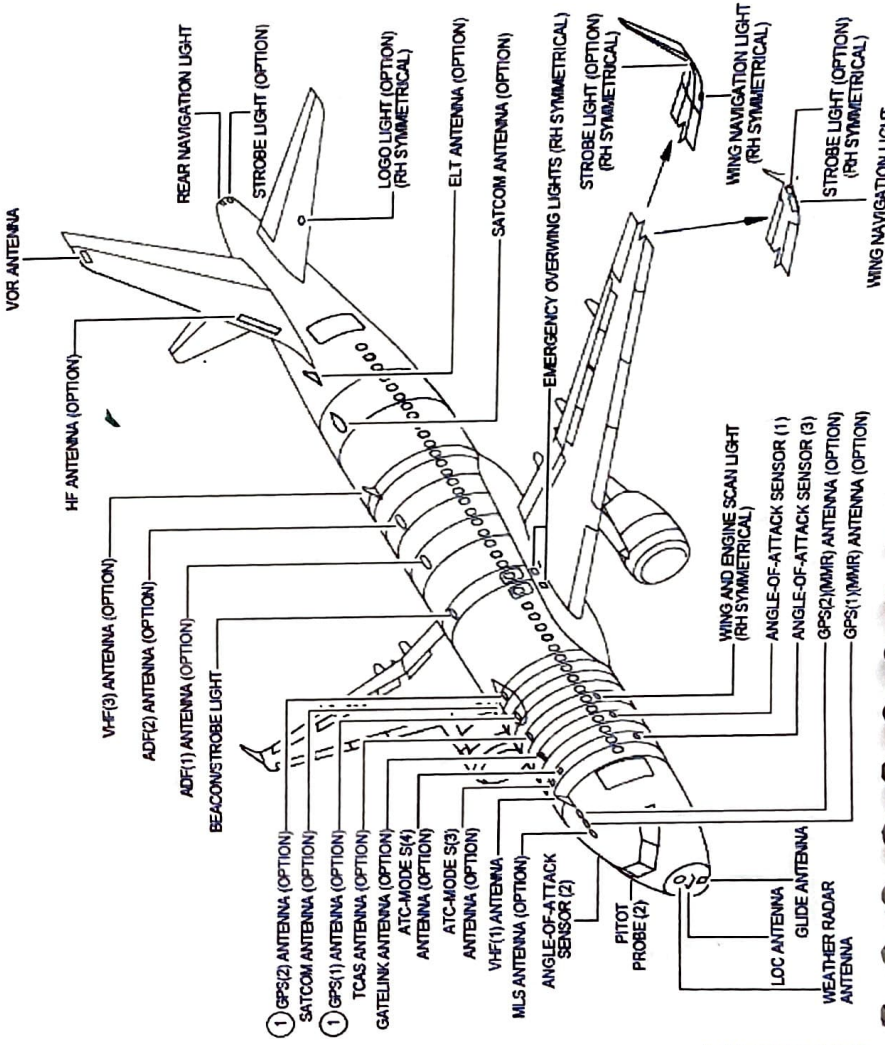
The typical tasks of a power up test are, microprocessor test, memory test, ARINC 429 and various I/O circuit tests, configuration test

Cyclic tests.:-These tests are carried out continuously. They do not disturb system operation. The typical tasks of a cyclic test (also called IN OPERATION TEST) are, watchdog test (a watchdog is a device capable of restarting the microprocessor if the software fails), RAM test.

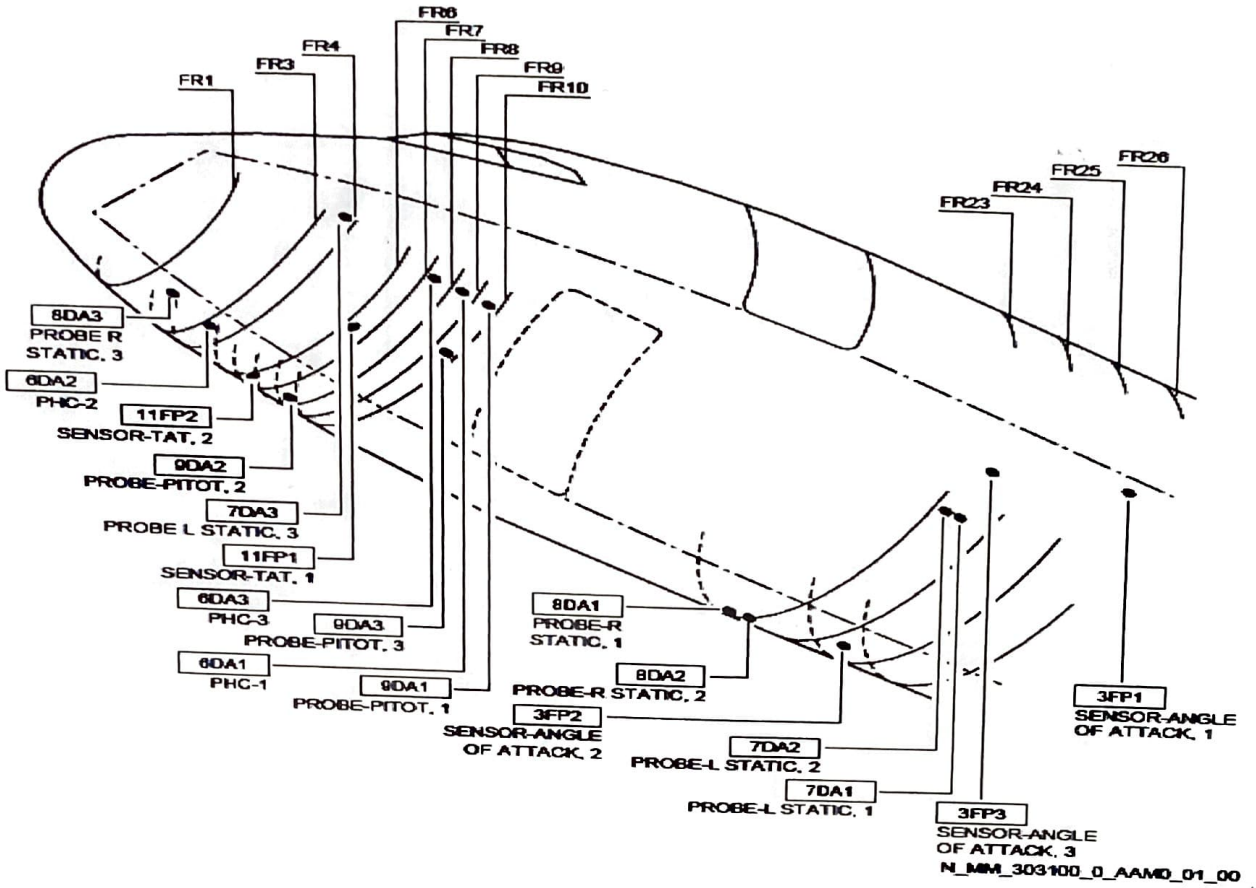
The BITE information stored in the system BITE memories is sent to a centralized maintenance device. The manual tests (SYSTEM TEST and SPECIFIC TESTS) can be initiated via this centralized maintenance device. i.e.CFDS

System tests.:- The purpose of these tests is to offer the maintenance staff the ability to test the system for trouble shooting purposes. This test can be performed after the replacement of an LRU in order to check the integrity of the system or sub-system. It is similar to the POWER UP TEST but it is more complete. It is performed with all peripherals supplied.

Specific tests.:- For some systems, specific tests are available. The purpose of these tests is to generate stimuli to various command devices such as actuators or valves. They can have a major effect on the aircraft (automatic moving of flight control surfaces, engine reverser).



(1) USED ONLY IF GPS(1)(MMR) AND GPS(2)(MMR) ARE NOT INSTALLED AND NOT IN OPERATION.

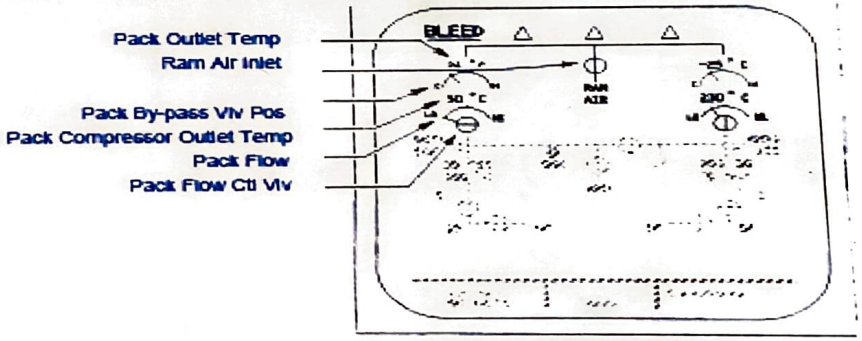


MAINTENECE TOOL

MEL ENTRIES / ITEMS

ME-21 Air Conditioning

FAULT MESSAGE	POTENTIAL CAUSES
AIR COND CTL 1(2)-A(B).	LANE A(B) of ACSC 1(2) is failed.
AIR PACK 1(2) FAULT	pack flow control valve position disagrees with the commanded position
Or The pack valve is closed.	
AIR PACK 1+2 FAULT	BOTH ACSCs are failed..
AIR PACK 1(2) OFF	PACK 1(2) sw to OFF & no failure detected.
AIR PACK 1(2) OVHT.	PACK compressor outlet temperature rises above 260 °C.
PACK 1(2) REGUL FAULT:-	TEMP REGULATION performance is degraded.
*(ACSC)*RE-SETTING the CB's (both Air Pack off) - Pull C/Bs W21 and W22 on 122VU-Pull C/Bs X21 and X22 on 122V: Pull C/Bs Y18, Y20 and Y21 on 122VU - Pull C/B D8 on 49VU: Wait 5 s before pushing all the C/Bs.	
*COND AFT CAB DUCT OVHT	The duct temperature rises above 88 °C
*, or The duct temperature rises above 80 °C four times during the same flight.	
COND CKPT DUCT OVHT.	Duct temperature above 88 °C.
OR above 80 °C four times during one flight	
COND FWD CAB DUCT OVHT.	The duct temperature rises above 88 °C,
Or The duct temperature rises above 80 °C four times during the same flight.	
COND HOT AIR FAULT.	POSITION of the hot air pressure regulating valve disagrees with commanded position.
COND L+R CAB FAN FAULT.	IF BOTH recirculation fans are failed.
COND LAV+GALLEY FAN FAULT	IF THE EXTRACTION FAN of the lavatory and galley is failed.
COND TRIM AIR SYS FAULT	One trim air valve is failed,
Or an overpressure downstream of the hot air valve.	



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ACSC = PACK TEMP CONT , PACK # 1				
X-21	SYS1	CH-A	28V	DC
X-22	SYS1	CH-A	115V	AC
D-08	SYS1	CH-B	28V	DC
Y-18	SYS1	CH-B	115V	AC
ACSC = PACK TEMP CONT , PACK # 2				
W-21	SYS2	CH-A	28V	DC
W-22	SYS2	CH-A	115V	AC
Y-20	SYS2	CH-B	115V	AC
Y-21	SYS2	CH-B	28V	DC

IMP- Before re-setting the CB's ensure both Air Pack off First pull **X-21, & X-22** then **W-21 & W-22,** wait for 5 sec and then push in the reverse order & **30 sec for power up test.**

AIR CONDITIONING SYSTEM CONTROLLER

The Centralized Fault Display Interface Unit (CFDIU) is **only connected to the ACSC 2. All BITE data of ACSC 1 will be transmitted to ACSC 2** first before it goes to the CFDIU.

Air Conditioning System Controller:-The ACSC is a **2 lane,** fully redundant computer system with independent **central,** processing units and duplicated hardware interfaces. **One lane is active** while the other lane is passive **("hot-standby"). If** the active lane is not able to control the system, the passive lane **will** become active and take over system control.

The **active lane switches at each aircraft landing,** assuming the **passive lane has no faults** which are more severe than those in the **active lane.**

ACSC1 and ACSC2 have different functions. Functional differences **between** the two controllers are determined by **pin programming** after installation in the aircraft.

ACSC1:- control of F/D zones, trim system and trim air pressure relief valve,; wing and nacelle anti ice logic.

ACSC2:-control of cabin zones and trim system,; CFDS interface and fault storage, wing anti ice fault analysis, mixer flap drive and monitoring.

FLOW CONTROL UNIT:-Each FCU includes the FCV, 2 solenoids, one torque motor, **one position sensor and 2 pressure sensors.** The FCU operates in **MAIN or BACK-UP** mode, controlled by the ACSC through the solenoids. The functions of the components are:- **Solenoid 1** controls the ON/OFF **(isolation)** function. When this solenoid is energized, the FCV is open and regulates when bleed air pressure is available.-**Solenoid 2** controls the **MAIN or BACK-UP** operation. When this solenoid is de-energized, the FCV operates in MAIN mode. The solenoid is energized for BACK-UP operation.

1) COMPRESSOR DISCHARGE TEMPERATURE SENSOR:- The compressor discharge temperature sensor signals the compressor outlet temperature to the ACSC for pack temperature control and overheat detection.

Pack temperature control: - up to **180°C normal operation,**

- 180°C to 220°C:- the ram air inlet flap opens more in order to increase the RAM airflow. **The pack FAULT light** comes on in if there is **pack overheat of 260°C.** If the A/C is on ground, **automatic FCV closure** occurs.

2) WATER EXTRACT TEMPERATURE SENSOR;-The water extract temperature sensor signals the water extractor temperature for the pack outlet temperature control. The pack temperature sensor has two thermistors: one sensing element is **connected to lane 1** and the other to lane 2 of the related ACSC. They are used to **modulate the pack outlet temperature.**

3) PACK DISCHARGE TEMPERATURE SENSOR:-The pack discharge temperature sensor signals the pack outlet temperature to the ACSC for ECAM display. The pack outlet temperature sensor also gives pack overheat warning indications if the pack outlet temperature exceeds 88°C.

➢ **When Fault as AIR PACK 1 or 2 OVERHEAT" warning**

FLOW PASSING through the Flow Control Valve is **given by the Differential** Pressure **Sensor** and the **Pack Inlet Pressure Sensor.** A drift **between** the information given by the **Differential Pressure Sensor** and the **Pack Inlet Pressure Sensor** could result in high flow regulation **of** the Flow Control Valve.

This higher flow leading to the ACM fan running faster, **in prevention as soon as** the Compressor Discharge Temperature (CDS) **increases above 180°C,** the Air Conditioning System Controller **(ACSC)** then commands the Ram Air Door **in open** position. **If opening** of the Ram Air Door is not sufficient to decrease the **compressor outlet** temperature, when the CDS increases **above 215°C,** the Flow Control Valve starts to **close,** controlled by **the ACSC.** When the temperature becomes higher **than 260°C,** an AIR **PACK 1 or 2 OVHT ECAM warning** is triggered. **On ground,** the Flow Control Valve is automatically **switched off**

.

➢ **When Fault as 'AIR PACK1(2) OVHT' ECAM** Warning

OCCURRENCES on ground and during **climb.** Several ACM were removed as a result of **torn pack supply sleeves, damaged pipes and cracked water extractor.** Please confirm **ACM overheat** occur due **faults out of ACSC control.**

The **water extractor crack had resulted in** Pack **Overheat**

➢ The **ACSC (or Pack Controller)** only monitors the **ACM compressor and turbine** outlet temperatures to **detect a possible overheating pack.**

Damaged pack supply sleeves or ACM hoses would not be detected by the ACSC unless high temperature is **detected at ACM compressor or turbine outlets.**

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The Pack Outlet Temperature demand computed by the ACSCs is transmitted to the packs. To reach the temperature target the ACSCs control the Ram Air Inlet doors and the BPVs. The RAI doors regulate the cooling flow of the heat exchangers. On ground they should be more open than in flight except during the take-off & landing phases where they close up to prevent contamination.

The BPV control by the ACSC is automatic and this By-Pass Valve has an impact on the pack permeability. The more the BPV opens up the less air flows through the ACM which tends to lower its speed hence the pack air flow. In addition to having a de-icing function at turbine outlet, the BPV aims to adjust the Pack Outlet Temperature.
In summary, for maximum cooling, the RAI doors are fully open and the BPV is fully closed. For maximum heating, the RAI doors are nearly closed and BPV is fully open. Eventually, an overheating pack can be caused by ice accretion in the ACM turbine due to a failed Water Extractor (WE). Ice particles can be found in the turbine if the WE is not ensuring its function anymore. In this case the ACM can be found to be overheating.

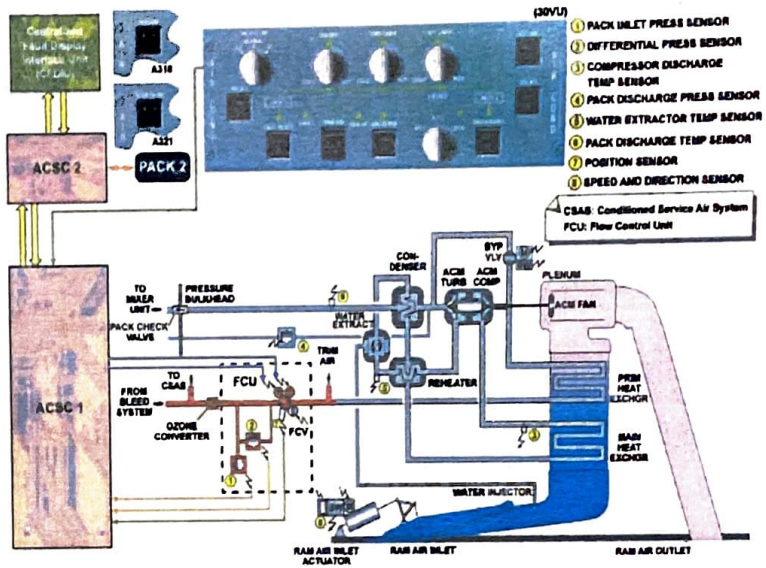
➢ Pack Performance Quick Check

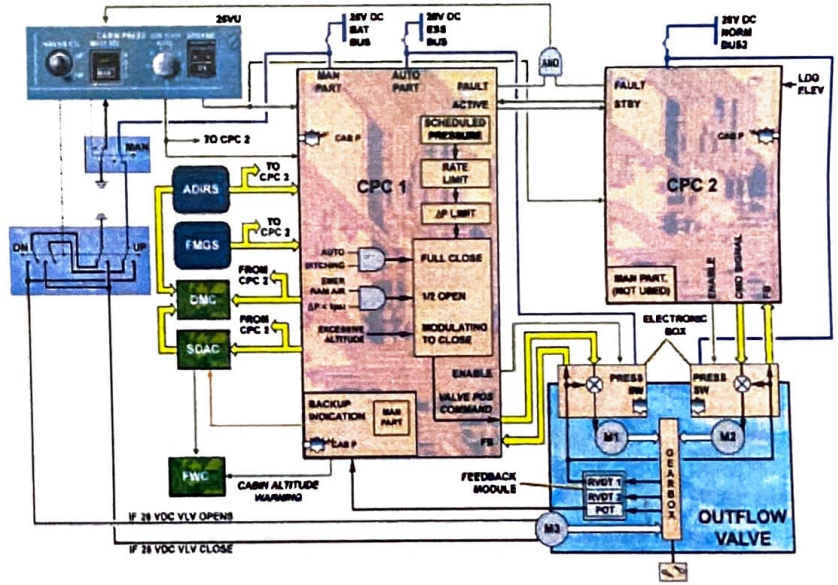
The A320 air conditioning pack incorporates 3 heat exchangers that are susceptible to contamination and may therefore affect the pack outlet temperature. Present system monitoring is such that it does not facilitate identification of Environmental Control System (ECS) components which are affected by contamination and therefore can have an impact on the cooling capability. Three parameters are displayed on the ECAM BLEED page, and can be monitored via the MCDU these being pack flow, pack outlet temperature and compressor outlet temperature.. Therefore in the case of high pack discharge temperature being reported on ground (higher than 10 degree Celsius (10°C) with full cold selected in all zones)
it is recommended to refer with regards to pack performance on ground it is recommended to refer to trouble shooting manual

- ➢ When Fault as "Pack x High Discharge Temperature"
- ➢ as per TSM tasks ref. 21-61-00-810-832-Aor TASK 21-61-00-810-833-A.

ALPHA CALL UP:-

PF – Pack flow
COT- Pack compressor outlet temperature- in Deg. Of Centigrade
TP- Pack discharge temperature-sensors
TW- water extractor temperature-sensors
PBV- Pack By-pass valve position in percentage





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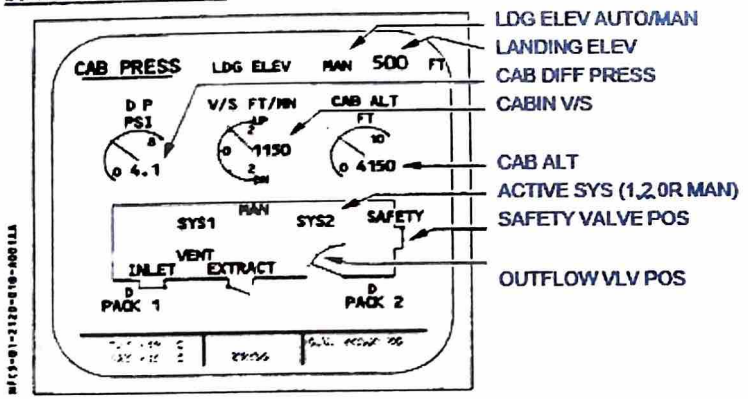
CPC	
*CAB PR EXCESS CAB ALT.	when:- In climb or descent, the cabin altitude is above the higher of:- 9 550 ft, or 1 000 ft above the airfield pressure altitude- 550 ft.
* The warning can be triggered by a cabin pressure sensor different from the one used to control the pressure and display the cabin altitude on the SD.	
CAB PR LDG ELEV FAULT	when the LDG ELEV selector is set to AUTO and the landing field elevation of the FMGS is not available.
*CAB PR LO DIFF PR	when:-The time to reach ΔP = 0 is less than 1.5 min, and The time to reach ΔP = 0.
Time for CAB ALT to reach landing field elevation +30 s, and The aircraft is at least 3 000 ft above the landing field elevation.	
* *Note: The alert remains, when the aircraft descends within 3 000 ft of the landing field elevation.*	
CAB PR EXCES RESIDUAL PR	DIFFERENTIAL PRESSURE is still above 2.5 hPa (0.036 PSI) 12 s after the last engine shutdown.
CAB PR OFV NOT OPEN	ON GROUND, when the outflow valve is not fully open (time delay 70 s).
CAB PR SAFETY VALVE OPEN	On ground, if the safety valve is not fully closed,
* or In flight, if the safety valve is not fully closed for more than 1 min.	
CAB PR SYS 1(2) FAULT	when the cabin pressure controller is failed.
CAB PR SYS 1+2 FAULT.	when both cabin pressure controllers are failed.

The Pressure Control and Monitoring System	
D-09	PRESS/CTL1.
Y-22	PRESS/CTL/2.
Y-23	PRESS/CTL/MAN
PULL CBs FOR : 5 SEC AND THEN WAIT FOR 85 SEC. Reset of the CPCs the subsequent circuit breakers must be opened for at least 5 seconds: When the circuit breaker for the related CPC is closed again the CPC power–up test starts.	
PLEASE NOTE:- REFER TECHNICAL CIRCULAR NO. 6/2010 FOR HIGH ALTITUDE OPERATIONS AS THE CABIN PRESSURISATION FAILURE INDICATION ARE HAVING THE DIFFERENT VALUES FOR TRIGGERING THE AS STATED FAULT FAILURE MSGS.	

ECAM CAB PRESS PAGE



PRESSURIZATION TEST OF THE FUSELAGE – Three(3) Pressurization Tests in the AMM ATA Chapter 05- 53- 00.	
➢ *Test at a Differential Pressure of 4 psi	05- 53- 00- 780- 001
* To find possible leaks in the repaired area after small structural repairs.	
➢ *Test at Differential Pressure of 8 psi.	05- 53- 00- 780- 002
*To find possible leaks in the repaired area after major structural repairs.	
➢ *Test at a Differential Pressure of 8.4 psi.	05- 53- 00- 780- 003
*Reason for the Job:-To measure structural leakage.	

AIDS Alpa Call up:

- ➢ "PDC" CABIN DIFF.PRESSURE
- ➢ "VSCB" CABIN VERTICAL SPEED
- ➢ "ZCB" CABIN ALTITUDE
- ➢ "OVP" OUTFLOW VALVE POSITION

CABIN PRESSURE ALTITUDE ENVELOPE

The cabin altitude is limited to 8000 ft with a DELTA P of 8.06 psi for an A/C altitude of 39000 ft. If cabin altitude increases:
- at 9550 ft, the MASTER WARN comes on,
- at 11300 ft, passenger signs are activated.

In the outflow valve, a safety device closes the valve when the cabin altitude reaches 15000 ft.

Under normal conditions, the LANDING field ELEVATION selector is selected in the AUTO position enabling the CPCs to use the landing field elevation data from the FMGS. In all other cases the LDG ELEV selector signal overrides the FMGS data (semi-automatic operation).

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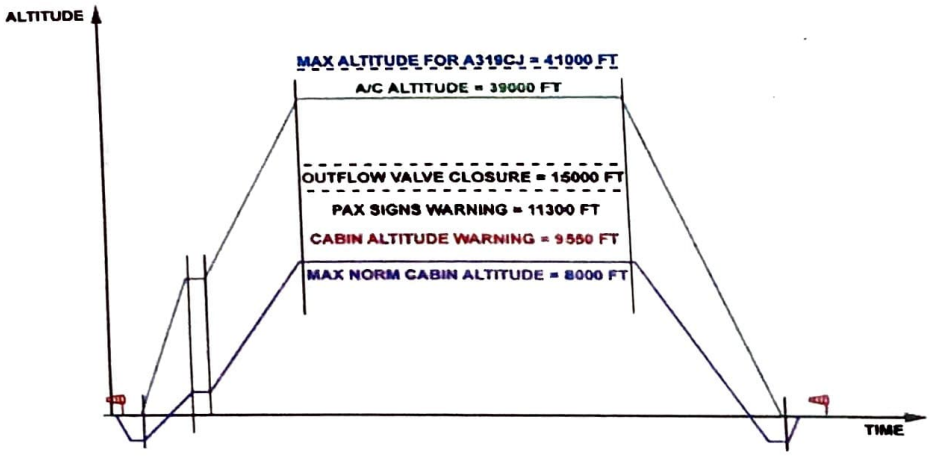

CABIN PRESSURE CONTROLLERS

There are **two interchangeable controllers,** which are identified as Cabin Pressure Controller (CPC) 1 and CPC 2 by means of **pin programming.** Each controller has an automatic and manual part which are functionally and electronically independent of each other. One controller operates the system at a time according to flight profile data and A/C configurations. The **second controller is in active stand-by with automatic changeover after each flight or in case of failure of the active one.**

CPC Auto Transfer:-At every flight, 70 seconds after touchdown, the CPC in control (MASTER MODE) during the flight will switch in **STANDBY MODE** and the CPC in **STANDBY MODE** during the flight will switch in **MASTER MODE.** However, **the auto transfer** will also take place **if a failure is detected on the CPC in control.** Therefore, the CPC in control will switch in STANDBY MODE and the CPC in STANDBY MODE will switch in MASTER MODE.

CABIN ALTITUDE INDICATION AUTO MODE:- The calculation of the cabin altitude in the AUTO mode is done differently in relation to the aircraft altitude:

- If the aircraft altitude is higher than 5000 ft above take-off or landing fields, the cabin altitude is calculated to the standard atmosphere.
- If the aircraft altitude is lower than 5000 ft above take-off or landing fields, the cabin altitude is calculated to the true altitude above sea level with the barometric correction from the Air Data Inertial Reference System (ADIRS)..

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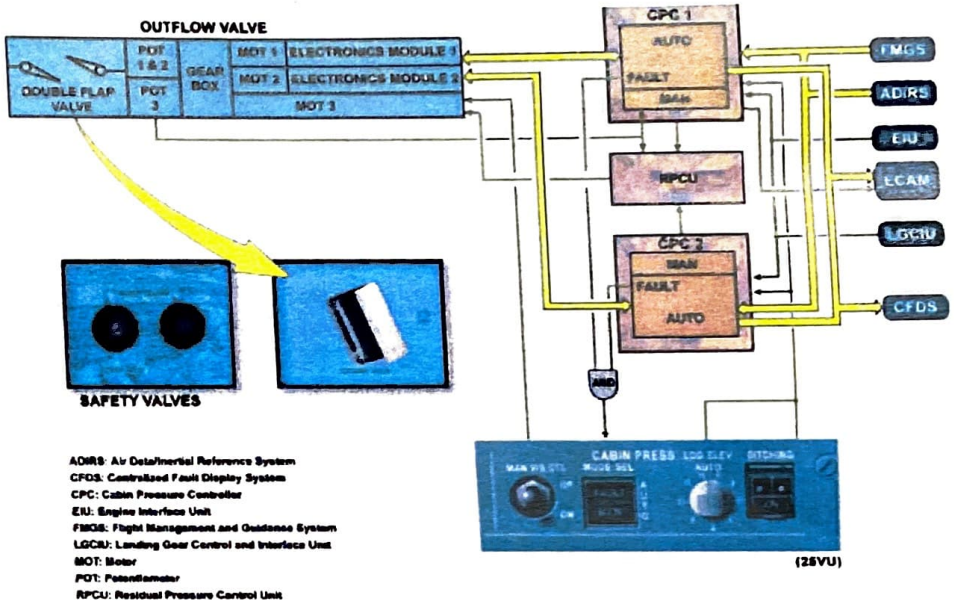
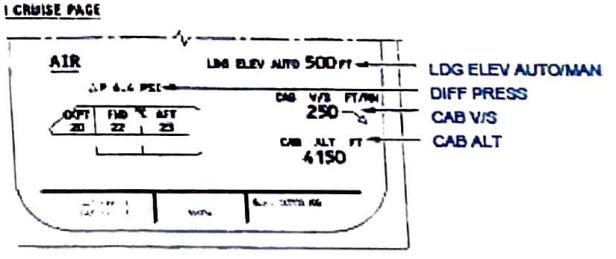


ADIRS: Air Data/Inertial Reference System
CFDS: Centralized Fault Display System
CPC: Cabin Pressure Controller
EIU: Engine Interface Unit
FMGS: Flight Management and Guidance System
LGCIU: Landing Gear Control and Interface Unit
MOT: Motor
POT: Potentiometer
RPCU: Residual Pressure Control Unit

When **manual mode is used,** the manual part of controller 1 operates only as a back-up indication circuit processing outputs for indicating and monitoring. CPC 1 **manual part outputs for** monitoring and indicating are: FWC and SDAC. CPC 2 **manual part is** not used.

SAFETY VALVES:-The safety valves prevent **excessive positive and negative differential** pressure (DELTA P) in the fuselage. They are installed on the aft pressure bulkhead above the A/C flotation line. The safety valves are poppet-type pneumatic valves. They operate independently.

RPCU:-The RPCU interfaces with the CPCs and takes over the control of the outflow valves automatically if the **outflow valve is not in the fully open** position when the aircraft is on ground. This is to prevent any door violent opening **in case of residual cabin pressure.**



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Avionics ventilation system

The avionics ventilation system operates in **different configurations.** These configurations are dependent on, **ambient temperature,** whether the aircraft is on the **ground, or in flight.** The avionics equipment is also cooled in different ways, these are **not dependent** on the ventilation system configurations.

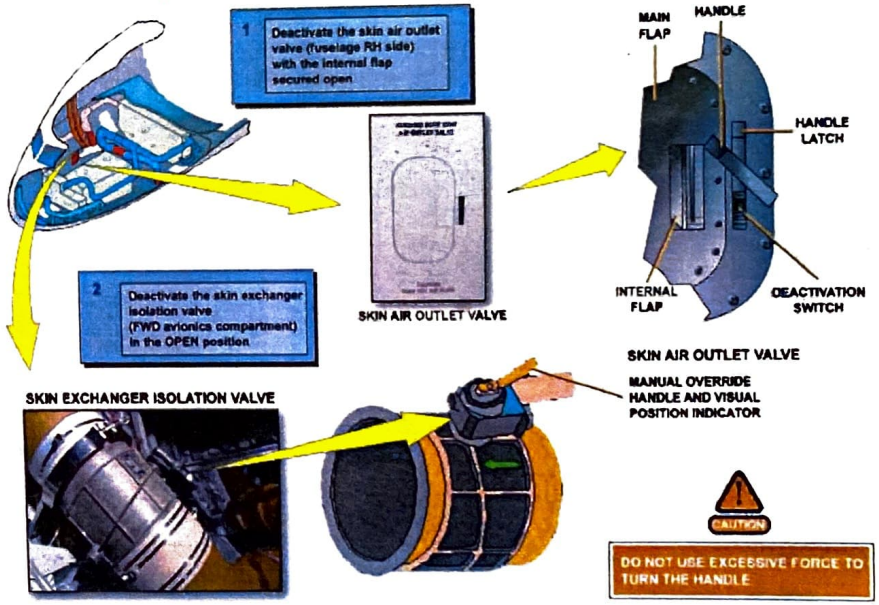
AEVC- AVIONICS EQUIPMENT VENTILATION	
VENT AVNCS SYS FAULT.	The power up test is not satisfactory,.
* or The AEVC is not supplied, or The valve position disagrees with the commanded position. Pull C/B Y17 on 122VU. Wait 5 s before pushing C/B.	
VENT BLOWER FAULT.	Blowing pressure is low or there is a duct overheat.
VENT EXTRACT FAULT	Extract pressure is low.
*VENT SKIN VALVE FAULT	-The extract valve is fully open in phase 3,
*or extract vlv is fully open in flight, or The inlet vlv is not fully closed in flight	
D-5	VENT CONT
D-6	VENT CONT
Y-17	VENT MONG
FIRST PULL AND RESET Y-17. PULL CBs FOR : 10 SEC; THEN WAIT FOR 85 SEC	
AMM 21-26-00-710-009	Read the LAST LEG REPORT of the AEVC
AMM 21-26-00-710-008	Read the CLASS 3 faults of the AEVC
AMM 21-26-00-710-001	OPS test of the avionics equipment ventilation
VENT AVNCS SYS FAULT:- Ref. TASK 21-26-00-810-829 When Fault as "VENT AVNCS SYS FAULT" ECAM warning is a spurious fault, it is recommended to perform the reset of the AEVC C/B 3HQ/Y-17. Reset of the AEVC by using C/B Y-17. will initiate the AEVC BITE test:- --If the fault is not confirmed, the test result is OK, then the initial warning can be considered as spurious, the AEVC can remain installed on aircraft and the aircraft dispatched -- If the fault is confirmed, it is recommended to perform TSM task 21-26-00-810-829 "Failure of one or more valves or of the AEVC". The inadvertent "21-26-34 AEVC" failure message in flight (phase 6) without any associated ECAM warning can be considered as a spurious message. FIRST PULL AND RESET Y-17. PULL CBs FOR : 10 SEC AND WAIT FOR 85 SEC	

MEL/DEACTIVATION:-AVIONICS VENTILATION SKIN AIR OUTLET VALVE

In case of failure, the Skin Air Outlet Valve may be deactivated in the PARTIAL-OPEN position for dispatch per the MEL. The PARTIAL-OPEN position is when the main flap of the valve is closed and the auxiliary flap is OPEN. This will allow for smoke removal in case of avionics smoke in flight. The valve is equipped with a handle which is used to crank the valve open or closed. When the Skin Air Outlet Valve is deactivated PARTIALLY OPEN, the Skin Exchanger Isolation Valve must be deactivated into the OPEN position.

The valve is equipped with a manual lever/position indicator which may be used to put the valve in the OPEN position.

Procedure:- push latch to release the handle from the valve,
- pull the handle to engage the splines,-set the Deactivation switch to OFF,
- turn the handle clockwise until the main flap is closed and the auxiliary flap is OPEN,-stow and latch the handle,-disconnect the electrical connector of the Skin Exchanger Isolation Valve and move the manual override handle to the OPEN position,& then perform AEVC BITE.



MEL/DEACTIVATION - AVIONICS VENTILATION SKIN AIR OUTLET VALVE

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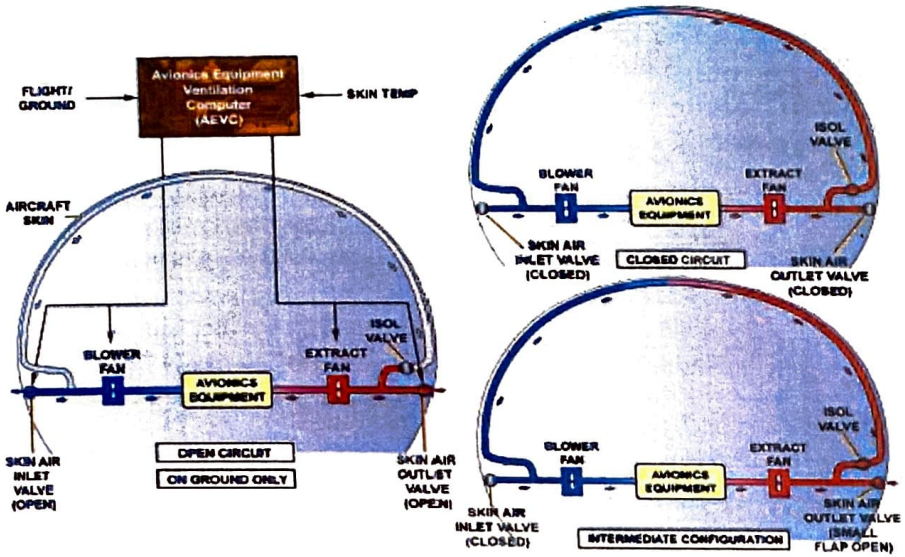
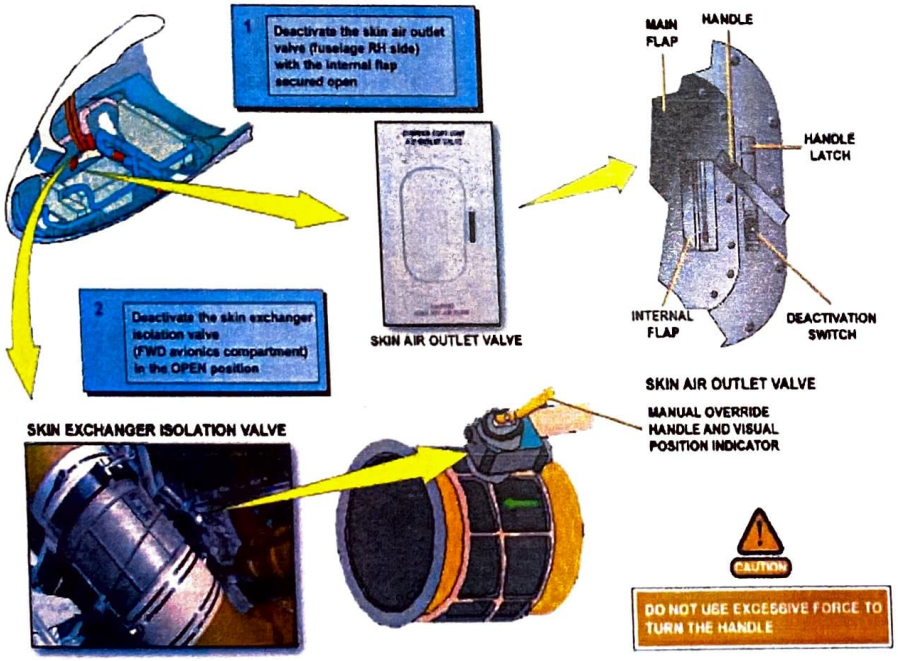


SYSTEM OVERVIEW - AVIONICS VENTILATION



MEL/DEACTIVATION - AVIONICS VENTILATION SKIN AIR OUTLET VALVE

ME-22 Auto Flight

FAULT MESSAGE	POTENTIAL CAUSES
*AUTO FLT A/THR LIMITED	WHEN A/THR IS ACTIVE but thrust levers are set below CL detent (2 engines),or MCT detent (1 Eng.)
*This caution is repeated every 5 s as long as the thrust lever are not moved.	
*AUTO FLT A/THR OFF.	WARNING is displayed only for involuntary disconnection.
The amber A/THR OFF and ENG THRUST LOCKED messages are displayed in the left lower part of ECAM upper DU	
*. AUTO THRUST PROBLEM=1ST RESET FCU ,then RESET FMGC ,3rd TURN IRUs OFF AND REALIGN	
*AUTO FLT AP OFF.	WARNING is displayed only for involuntary disconnection.
* For voluntary disconnection, a red AP OFF message is displayed in ECAM upper DU.	
FLT FAC 1 FAULT.	ONE FAC computer is failed.
FLT FAC 2 FAULT.	ONE FAC computer is failed.
*FLT FAC 1+2 FAULT.	TWO FAC computers are failed..
* With FAC 1 + 2 inoperative, the rudder travel limit system, rudder trim control, yaw damper and PFD characteristic speeds are lost	
*FLT FCU 1(2) FAULT	ONLY ONE FCU channel remain operative.
*- Pull the C/B B05 on 49VU for FCU 1, or M21 on 121VU for FCU - Push it after 5 s - If AUTO FLT FCU 1(2) FAULT disappears, check the displayed targets and barometer reference, and correct them if necessary (RESET successful) - If AUTO FLT FCU 1(2) FAULT remains, pull both C/B B05 on 49VU and M21 on 121VU-Push them after 7 min , with a delay of less than 5 s between side 1 and 2 Wait at least 30 s for FCU 1 and FCU 2 safety tests completion. Check the displayed targets and barometer reference, and correct them if necessary (RESET successful).	
* FLT FCU 1+2 FAULT	FCU IS COMPLETELY LOSS.
*Re Setting same as above	
* With both FCU channels failed, barometer ref automatic goes to 1 013 hPa.	
REAC W/S DET FAULT	REACTIVE WINDSHEAR function is lost.
RUD TRIM 1(2) FAULT.	ONE RUDDER TRIM actuator is failed.
FLT RUD TRIM SYS	RUDDER TRIM SYSTEM is failed.
FLT RUD TRV LIM1(2).	ONE RUDDER TRAVEL limitation actuator is failed.
FLT RUD TRV LIM SYS.	RUDDER TRAVEL limitation system is failed.
TCAS MODE FAULT	TCAS flight guidance mode is inoperative.
*YAW DAMPER 1(2).	when one yaw damper actuator is failed.
*YAW DAMPER SYS.	yaw damper system is failed.
. Loss of one channel or YD Sys 1ST TRY FAC P/B ON & OFF THEN Yellow and Green hydraulic systems pressurized: Reset the FAC	

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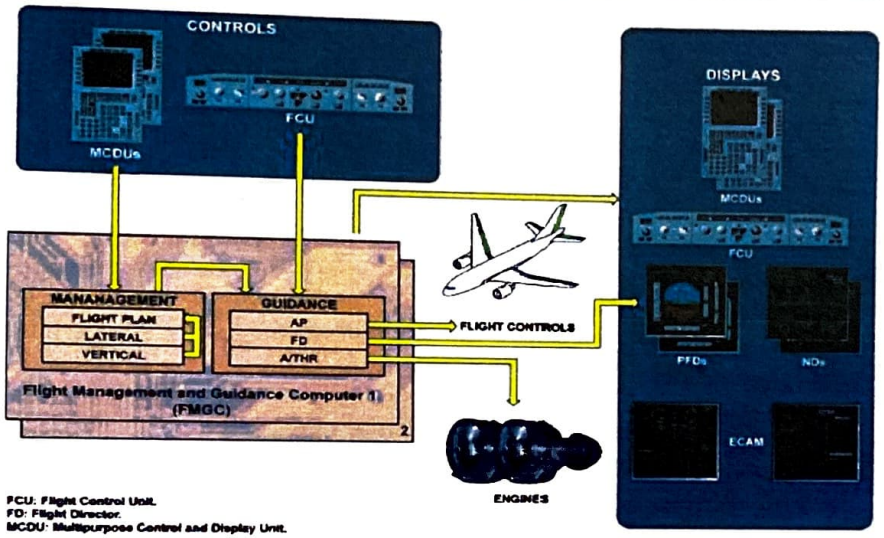
WINDSHEAR=A/C STOPPED, then SELECT **FAC #1** OFF then PULL **CB FOR FAC #1 & WAIT 30 SEC-RESET CB AND FAC #1**
FAC RESET= W/ ENG(s) RUNNING ONLY RESET 1 SYS AT A TIME.
AUTO PILOT 1(2) FAULT=TYPICALLY CAUSED BY FMGC FAULT
DUAL CAT III MESSAGE-RESET FAC CBs,=(Results with loss of 1 FMGC)



FMGC:-There are **two interchangeable FMGCs**. Each FMGC is made of two parts: the **Flight Management (FM) part and the Flight Guidance (FG)** part. The **FM part** gives the functions related to flight plan definition, revision and monitoring and the **FG part** gives the functions **related to the aircraft control.**

FLIGHT MANAGEMENT AND GUIDANCE COMPUTER (FMGC)	
49VU AUTO FLT/FMGC/1	B02
121VU AUTO FLT/FMGC/2	M17
Operational Test of the AFS	AMM-22-96-00-710-001-A
Do not do a reset of the FMGC **circuit breakers until the** power-up test is completed (approximately 2 minutes). **FMGC RESET=1st FDS OFF. Then PULL CBs FOR 10 secs.2nd=(A) ENGS Shut/ Down, (B) Stable Power Source FOR 3 mins. (C) Both FDS OFF, (D) PULL** FMGC AND MCDU **CBs FOR 2 MIN. then2 MIN PWR-UP TEST (WAIT I MIN AFTER "PLEASE WAIT" ON MCDU.) 3rd =POWER DOWN A/C**	
MCDU FAILURE:-When a Multipurpose Control and Display Unit (MCDU) fails, an amber **FAIL annunciator comes on, on this MCDU. This warning is not generated by the FWC but by the MCDU itself**	

Multipurpose Control and Display Units (MCDUs),	
49VU AUTO FLT/MCDU/1	B01
121VU AUTO FLT/MCDU/2	N20
One MCDU locked or blank (MCDU)= Pull the C/B for the locked or blank MCDU and push it back after 10 s. The circuit breakers for AUTO FLT/MCDU 1 B1 ON 49 VU AUTO FLT/MCDU 2 N20 ON 121 VU.	
Both MCDU locked or blank or FMGC malfunction (FMGC)= - Apply external power or APU generator power- **Wait 2 min before resetting the FMGC** circuit breakers FD 1(or 2) **(OFF).-** Pull the C/B of the affected FMGC and reset it after 10 s. The circuit breakers for the FMGCs are:-AUTO FLT/FMGC 1 B2 ON 49 VU. AUTO FLT/FMGC 2 M17 ON 121 VU .	
Always wait 1 min after the **"PLEASE WAIT" message disappears from the** MCDU, **before** engaging or reengaging **the** FDs **and the** AP **of the** reset FMGC.	
DUAL **MCDU** LOCK UP-NORMALLY **RESETS VIA MCDU. The RDY annunciator comes on (green)** when the MCDU passes **its long-term** power- up or **power-off reset test,** after its BRT knob is turned **to OFF.** **If a failure** is found, the **FAIL annunciator** comes on and the MCDU FAIL discrete output is set from **ground to open circuit.**	

Flight Control Unit (FCU).	
49VU AUTO FLT/FCU/1	**B05**
121VU AUTO FLT/FCU/2	**M21**
When Fault Message as :-BARO REF=BOTH FD OFF ,then PULL **FCU SYS #1 CB** FOR **10 SEC**	
Flight Augmentation Computers (FACs),	
49VU AUTO FLT/FAC1/28VDC	**B04**
49VU AUTO FLT/FAC1/26VAC	**B03**
121VU AUTO FLT/FAC2/28VDC	**M19**
121VU AUTO FLT/FAC2/26VAC	**M18**
121VU FAC1 BAT SPLY	**M16**
Pull C/Bs for: 5s Post Power up **Test: 90s.** Stable state **hyd.** reset p/b **10s.**	
121VU AUTO FLT/RUDDER/TRIM/IND	**M20**
121VU AUTO FLT/RUDDER/ARTF/FEEL	**N17**
121VU AUTO FLT/STICK/LOCK	**N16**

The FCU and the MCDUs let the pilots control the functions of the **FMGCs.** The FAC engagement **P/BSWs and the RUDDER TRIM** control panel are connected to the FACs - **FLIGHT AUGMENTATION COMPUTER (FAC):-**The computer is **divided into three parts:**

· Two virtually identical channels, the **COMMAND channel** and the **MONITOR channel. One independent** channel which performs the **FIDS functions**

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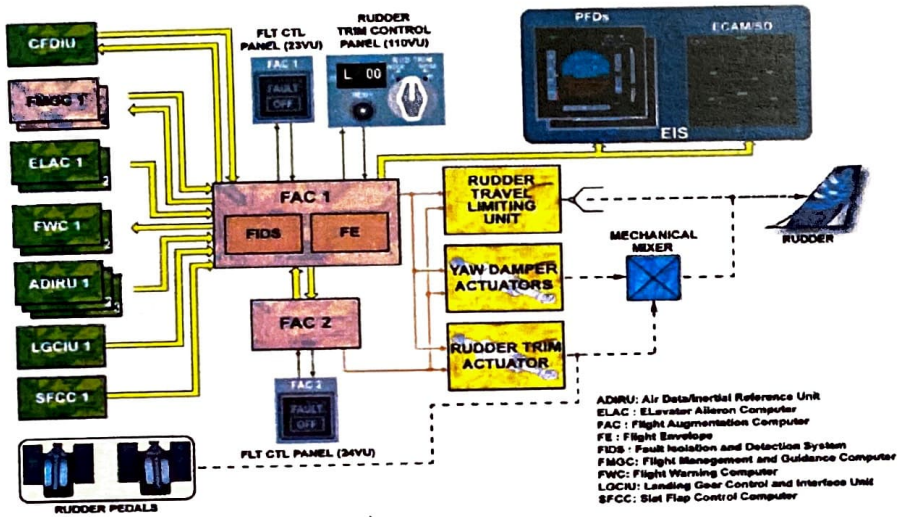

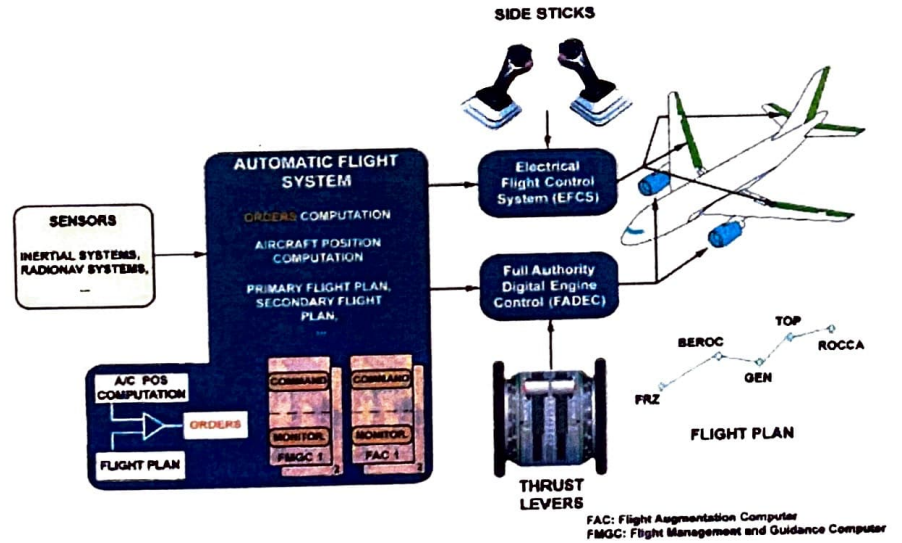

FIDS:-For maintenance purposes, the FIDS centralizes the failure information from the various BITE of the AFS computers and provides an interface between these BITEs and the Centralized Fault Display Interface Unit (CFDIU). The FIDS function is only active in FAC 1.

The FIDS is a card physically located in each FAC. Both FACs are interchangeable, but only the FAC 1 FIDS is active due to the side 1 signal..

FAC/FM/FG BITE:-As the FAC and FG have a BITE in the CMD and the MONitor (MON) sides, the fault analysis is generally made on each side and a synthesis is made on the CMD side. Each BITE memorizes the result of the analysis, the failure context, the flight leg number, the time and date of each given failure. Then the BITE sends the result of the analysis, with a maximum of two suspected LRUs in the order of probability, to the FIDS.

FCU BITE:-Each FCU BITE computes the maintenance status of its related part and permanently sends this maintenance data to the FG CMD part.

- **Monitoring of FAC**

FAC monitors the following devices for correct operation. The engagement status of the **pushbuttons** for the YD, RT, **and** RTLs Internal monitoring **of the computer,** acquisition channel, transmission and software (FAC healthy).

Monitoring of specific failures in transmission and reception of **FMGC and ELAC.**

Monitoring of **sensors (LVDT and RVDT).** Monitoring of the peripherals ADRIS, LGCIU and SFCC.

The safety test automatically **tests** for the correct **operation of digital devices** and safety devices. It is activated on ground only when engines are shut down.

Done after every **power cut off (> 4 seconds)** and lasts for a **maximum of a** minute. If the safety test is passed then **only the FAC can be engaged.**

- **When Fault Message as: Pitch Trim/MCDU/CG disagree:**

In the frame of "take off securing", a Pitch Trim/MCDU/Center of Gravity (CG) disagree caution is implemented in FAC, computes a theoretical Trimmable Horizontal Stabilizer (THS) position using the MCDU CG. This theoretical position is sent to the FWC which compares it with the actual THS position. In case of discrepancy (threshold defined in FWC logics) the **"pitch trim / MCDU / CG** disagree" alert is triggered.

Purpose of this project was to increase reliability of CG input in FMS, THS setting at take-off and reduce the rate of events due to erroneous entries. The real pitch trim value, The pitch trim value calculated by the FAC, based on the CG, The pitch trim value entered in the MCDU.

. A failure of one system is unlikely at the origin of the alert. Therefore there is no TSM procedure dedicated to this specific ECAM alert.

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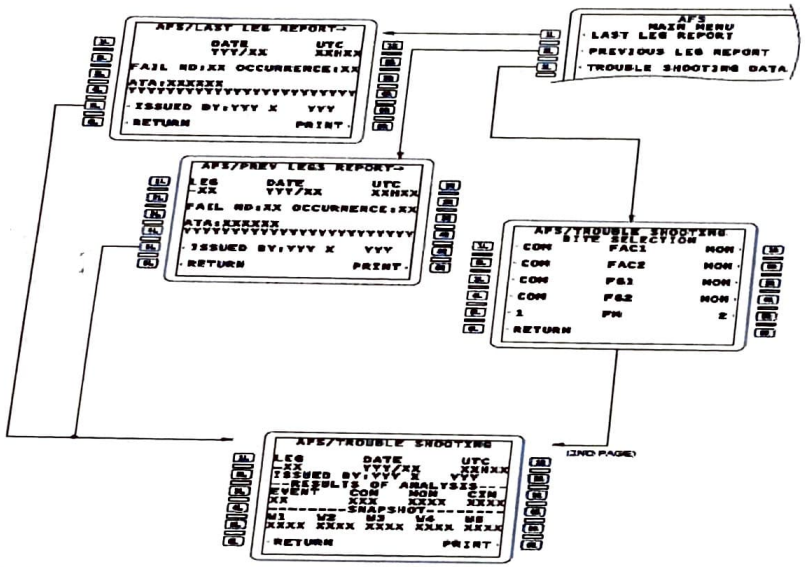
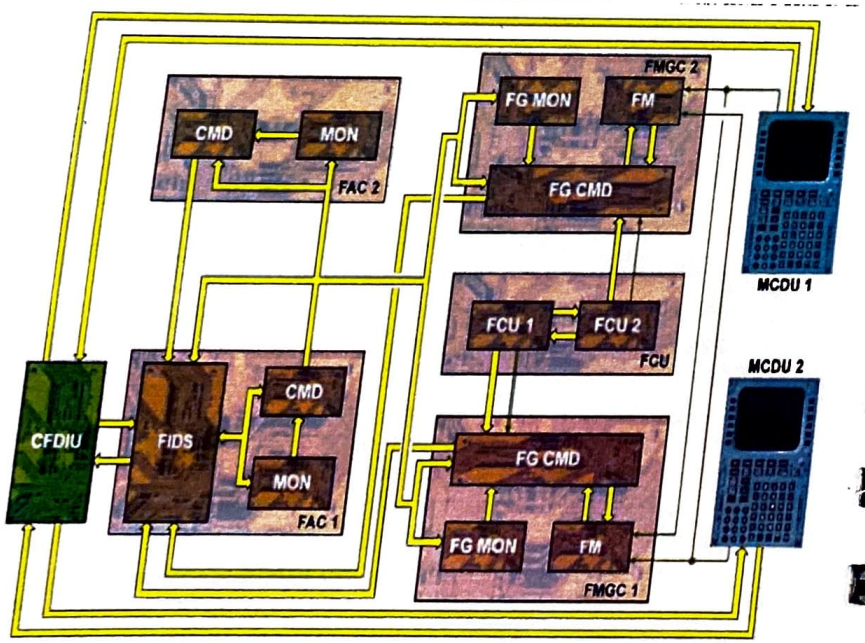




22-91-00 - FAULT ISOLATION FUNCTION - PRINCIPLE

The **line maintenance of the** Automatic Flight System (AFS) is based on the use of the **Fault Isolation and Detection System (FIDS).** The system:

· **detects, isolates and stores** the AFS internal and external faults,

· initiates and performs the test after **replacement of an AFS LRU,**

initiates and performs the availability test of the category **III automatic landing function**

FIDS : The FIDS will only accept the test request if its ground condition is met **(NOSE GEAR PRESSED).**

· **LRUs UNDER TEST : The LRUs under test will only** accept the test request if their own ground conditions are met **(NOSE GEAR** PRESSED **AND ENGINES** STOPPED).

· A **FIDS card** physically **located in each Flight Augmentation Computer (FAC), only** the card located in the **FAC1** is activated (by the **SIDE 1 signal)**

The purpose of the **AFS TEST** is to check the integrity of the AFS after replacement of an LRU (line replaceable unit).

The **FIDS card includes:-** a CPU (Micro processer and associated circuits),

· a memory module containing the application program,; ARINC input/output circuits,;-discrete input/output circuits.

The FIDS serves as the SYSTEM BITE (maintenance data concentrator).

The FIDS is linked in acquisition and reception to the centralized fault-display interface-unit (CFDIU) and is connected to the BITEs of the various AFS computers.

the BITE diagnosis and generates a fault message which is sent to the CFDIU.

The AFS TEST completes the AFS computer monitoring and safety tests.

This test, which is performed in the FACs and the FMGCs (FM and FG sections) consists in:- using the computer safety test results (FAC, FG, FM, FCU and MCDU)

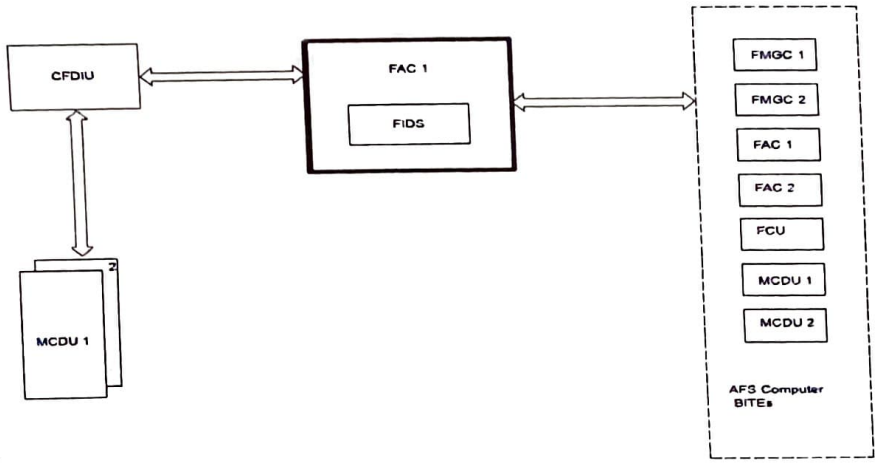
· the test of symmetrical discrete inputs : **FAC COM and FAC MON, FG COM** and **MON;**- the test of the **symmetrical ARINC inputs**

22-97-00 - LAND CAT III CAPABILITY TEST:-The purpose of the test is to verify the capability of the involved systems to perform a **CAT 3 DUAL fail** operational automatic landing. It also verifies the takeover and priority pushbutton switches, the A/THR instinctive disconnect pushbutton switches and the warnings associated to the automatic landing.

LAND TEST function is mainly performed in the FIDS and utilizes **FG** failure detection (snapshot, analysis and reporting). Consequently, the **LAND TEST** efficiency is identical to the **FG BITE efficiency..**

List of LRUs Covered by the FIDS:-All the internal and external LRUs covered by the FIDS are listed in the **table:-22-91-00**

Safety Tests:-are performed automatically in the FIDS card on the ground after prolonged power **supply cutoff (>4s)..**

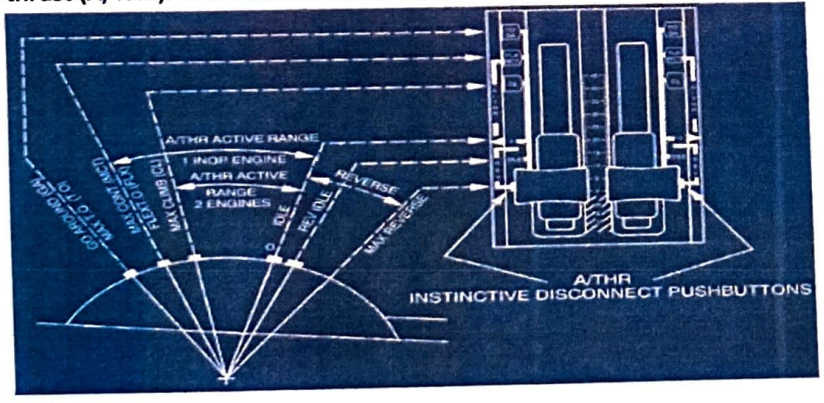


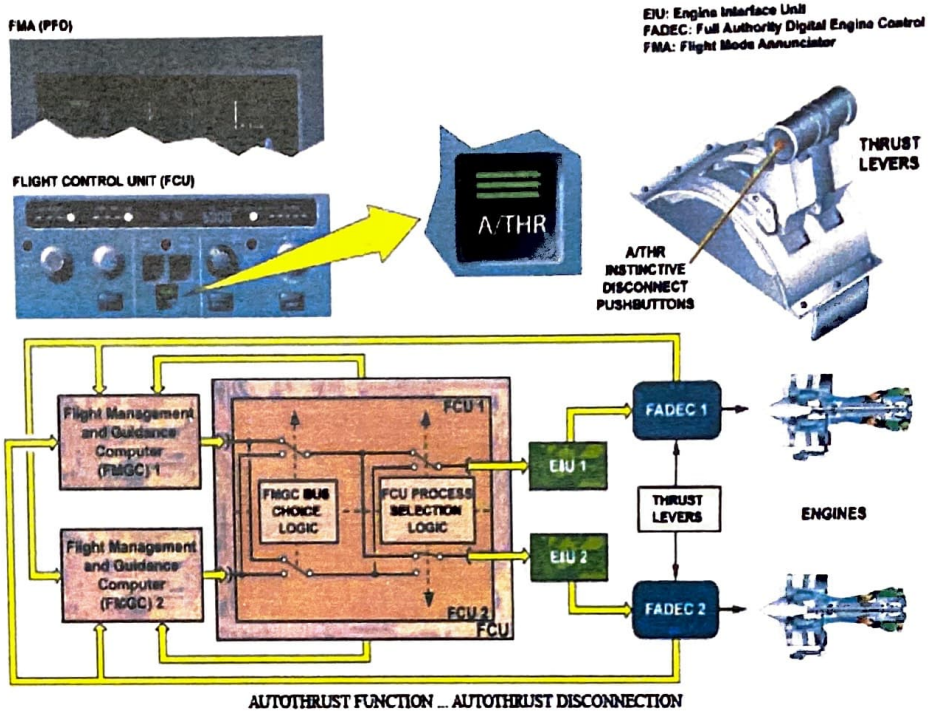
AUTOTHRUST FUNCTION:-The A/THR function sends a computed thrust command (thrust target) to the Full Authority Digital Engine Control (FADEC) for automatic engine control. The A/THR functions are:

- acquisition and holding of a **speed or a Mach number,**
- acquisition and **holding of a thrust,**
- reduction of the thrust to idle during descent and flare in final approach,
- protection against excessive Angle-Of-Attack (AOA) called alpha-floor protection, by ordering a maximum thrust when an alpha-floor detection signal is received from the Flight Augmentation Computers (FACs).

AUTOTHRUST LOOP PRINCIPLE:-To get the A/THR function, the thrust target computed by the Flight Management and Guidance Computers (FMGCs) is chosen by the Flight Control Unit (FCU). Then each FCU processor sends, along its own bus, the thrust target to the FADEC via the Engine Interface Units (EIUs).

A/THR pb:-The flight crew uses this pushbutton to arm, activate, or disconnect the auto thrust (A/THR). This button illuminates green if the A/THR is armed or active.





AUTOTHRUST FUNCTION ... AUTOTHRUST DISCONNECTION

➢

➢ WIND SHEAR DETECTION

Wind shear is a sudden change of wind velocity / speed over a relatively Shorter distance in atmosphere.

This can have an adverse effect on aircraft's performance, during t/o and landing phases. **FACS** generate the wind Shear warning, whenever the energy level of the aircraft falls below a predetermined threshold. **No sensor** is available to detect **wind shear.**

There are two types of wind shear detection systems, **reactive** and **predictive.**

The **reactive wind shear** system react to the aircraft being in wind shear and the predictive system, such as weather radar, looks ahead to predict a wind shear.

When encountering a wind shear, on final approach, the AIRCRFAT first enters an increasing headwind and updraft.

The pilot may react by reducing power to bring the aircraft back down.

But, next the aircraft enters an area of severe downdraft followed by increasing tailwind. At this point, it may be too late to develop the thrust required to escape before sinking to ground. **(Request watch U tube Video)**

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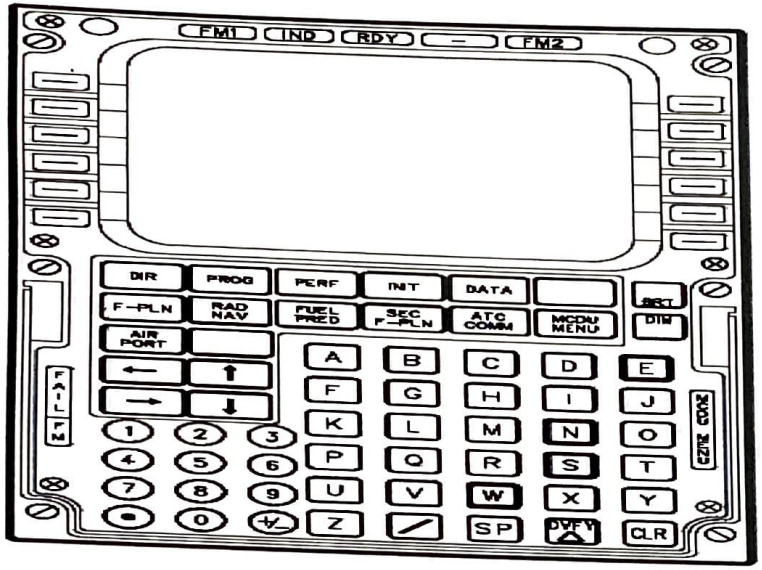

There are three illuminable annunciators on the MCDU front panel:
· FAIL: This annunciator comes on (amber) when the MCDU has failed.
· MCDU MENU: This annunciator comes on (white) when sys linked to the display
· FM: This annunciator comes on when an FM page is not displayed.
BRT/DIM keys:-The BRT/DIM keys allows brightness adjustment of the screen. The fully decreasing of the brightness switches off the MCDU.
(5) Top panel annunciators There are five illuminable annunciators across the top of the MCDU front panel of which one is spare and not utilized.
(a) FM1 and FM2:-The FM failure annunciators at the top of the MCDU indicate when a FM failure occurs. The FM1 failure light on MCDU1 and/or MCDU2 comes on (amber)
(b) RDY:-This annunciator comes on (green) when the MCDU passes its long-term power up or power off reset test after its BRT knob is turned to OFF.
(c) IND:-This annunciator comes on (amber) when the selected FM detects an independent operation (loss of dual mode) while both FMs are healthy. If either FM is failed, the annunciator is not on, regardless of state of the intersystem bus.
MCDU BITE:-The MCDU does the tests on its processor, memory and display unit.
If a failure is found by the MCDU BITE:
- the FAIL annunciator comes on and the display is blank,
- the MCDU FAIL output discrete is set and sent to the FM part and then to FG 1 and FG 2 CMD parts through the crosstalk bus

ME-23 Communications

FAULT MESSAGE	POTENTIAL CAUSES
COM ACARS FAULT	Failure of the ATSU
failure of ACARS= ATSU=Pull the C/Bs in the following order: L16, L15 on 121VU;- then;-Push the C/Bs in the following order: L15, L16..	
*COM CIDS 1+2 FAULT	There is a total loss of CIDS
*. Passenger address, cabin and service interphone, & passenger signs are inop	
COM CIDS 1+2 FAULT and/or Loss of Passenger Address (PA) and/or Loss of Cabin Interphone (CIDS)= Pull the C/Bs in the following order:-P13 and P14 on 121VU G01 and G02 on 49VU M05 and M06 on 121VU Wait 10 s, then - Push the C/Bs in the following order: M05, M06, G01, G02, P13 , P14 - After CIDS reset, wait approximately 4 min, before recovering normal operation.	
FAP freezing (FAP)= - Pull the C/Bs in the following order: L16, L15 on 121VU - Wait 5 s, then -Push the C/Bs in the following order: L15, L16.	
Frozen RMP (RMP)= Reset all the RMPS one after the other via the RMP control panel:-Set RMP ON/OFF sw to OFF position Wait 5 s. & Set RMP sw to ON pos.	
Un commanded EVAC horn activation (CIDS)= Press the EVAC HORN SHUT OFF pb. Set the EVAC CAPT & PURS/CAPT sw to the CAPT only position. Wait for 3 s. • IF UNSUCCESSFUL:-Pull the C/Bs for DIR 2 in the following order: G02 on 49VU, M06 on 121VU.:IF UNSUCCESSFUL: - Pull the C/Bs for DIR 1 in the following order: G01 on 49VU, M05 on 121VU - Wait for 1 min, then:-Push the C/Bs for DIR 2 in the following order: M06 , G02 . - After CIDS reset, wait approximately 4 min, before recovering normal operation.	
COM HF 1(2) DATA FAULT	Data communications via HF 1(2) are inoperative.
COM SINGLE PTT STUCK	When any PTT transmission selector is jammed in the transmit position
. For more than 40 s (VHF) or for more than 180 s (HF).	
COM VHF 3 DATA FAULT	Data communication via VHF 3 are inop.
ATSU=Pull the C/Bs in the following order: L16, L15 on 121VU;- S, then;-Push the C/Bs in the following order: L15, L16.	
COM VHF 1(2)(3) /HF 1(2) EMITTING)	For VHF 1(2)(3) EMITTING, the alert triggers when the transmitter emits more than 60 s
* For HF 1(2) EMITTING, the alert when the transmitter emits more than 60 s.	

*If any Push To Talk (PTT) transmission selector (sidestick PTT ,or hand mike PTT , or ACP PTT switch is jammed in the transmit position, try to release it in order to remove the caution.
*2. If unsuccessful, deselect the identified failed VHF/HF transmission keys on the associated Audio Control Panel (ACP) to remove the caution. This ACP should only be used in reception mode. The associated PTT transmission selectors must not be used.

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*3. If no transmission key on the ACP is found in the "transmit" position, pull the affected VHF/HF C/B associated to the ECAM message :-

HA 14	COM\HF1 on 49 VU
L13 on 121 VU, COM\VHF\1 C/B G09 on 49 VU, COM NAV\VHF\2 C/B L04 on 121 VU, COM \VHF\3 C/B L05 on 121 VU	

IMPORTANT NOTE:-REF: TASK 23-73-00-862-001-A FOR De-energizing CIDS

To prevent failure messages, it is necessary to de-energize CIDS in the correct sequence.TASK 23-73-00-861-001-A FOR energizing CIDS To prevent failure messages, it is necessary to energize CIDS in the correct sequence.

CIDS DIRECTION = OPEN IN CORRECT SEQUENCE & AFTER 30 SEC	
49VU COM/CIDS/DIR ESS/1	G01
49VU COM/CIDS/DIR ESS/2	G02
121VU COM NAV/CIDS/DIR NORM/1	M05
121VU COM NAV/CIDS/DIR NORM/2	M06
121VU COM NAV/CIDS/DIR NORM/2	M06
121VU COM NAV/CIDS/DIR NORM/1	M05
49VU COM/CIDS/DIR ESS/2	49VU
49VU COM/CIDS/DIR ESS/1	G01
DEU A = OPEN IN CORRECT SEQUENCE & CLOSE AFTER 30 SEC *DEU A-CONTROLS LIGHT, CALL SIGNS, SPEAKERS	
49VU COM/CIDS/DEU A ESS/FWD R	HA10
49VU COM/CIDS/DEU A ESS/FWD L	HA09
49VU COM/CIDS/DEU A ESS/AFT R	HA12
49VU COM/CIDS/DEU A ESS/AFT L	HA11
121VU COM NAV/CIDS/DEU A NORM/L FWD	M09
121VU COM NAV/CIDS/DEU A NORM/R FWD	M10
121VU COM NAV/CIDS/DEU A NORM/L AFT	M11
121VU COM NAV/CIDS/DEU A NORM/R AFT	M12
AFTER 30 SEC CLOSE IN CORRECT SEQUENCE	
121VU COM NAV/CIDS/DEU A NORM/R AFT	M12
121VU COM NAV/CIDS/DEU A NORM/L AFT	M11
121VU COM NAV/CIDS/DEU A NORM/R FWD	M10
121VU COM NAV/CIDS/DEU A NORM/L FWD	M09
49VU COM/CIDS/DEU A ESS/AFT L	HA11
49VU COM/CIDS/DEU A ESS/AFT R	HA12
49VU COM/CIDS/DEU A ESS/FWD L	HA09
49VU COM/CIDS/DEU A ESS/FWD R	HA10

DEU B = OPEN IN CORRECT SEQUENCE& CLOSE AFTER 30 SEC ➢ *DEU B-CONTROLS INTERPHONE, P/A, CALL, EVAC LITES	
49VU COM/CIDS/DEU B/ESS	G03
121VU COM NAV/CIDS/DEU B/NORM	M08
CLOSE IN CORRECT SEQUENCE	
121VU COM NAV/CIDS/DEU B/NORM	M08
49VU COM/CIDS/DEU B/ESS	G03
CIDS SMOKE DTECTION FUNCTION OPEN IN CORRECT SEQUENCE	
49VU AIR COND/CIDS/SDF/DIR1 ESS	C05
49VU AIR COND/CIDS/SDF/DIR2 ESS	C06
122VU AIR COND/CIDS/SDF/DIR NORM/2	T18
122VU AIR COND/CIDS/SDF/DIR NORM/1	T17
CIDS SMOKE CLOSE IN CORRECT SEQUENCE & AFTER 30 SEC	
122VU AIR COND/CIDS/SDF/DIR NORM/1	T17
122VU AIR COND/CIDS/SDF/DIR NORM/2	T18
49VU AIR COND/CIDS/SDF/DIR2 ESS	C06
49VU AIR COND/CIDS/SDF/DIR1 ESS	C05
FAP= OPEN IN CORRECT SEQUENCE	
49VU COM/CIDS/FLT ATTND PNL/ESS	H01
121VU COM/FAP1/NORM	Q14
FAP CLOSE IN CORRECT SEQUENCE:- & AFTER 30 SEC	
121VU COM/FAP1/NORM	Q14
49VU COM/CIDS/FLT ATTND PNL/ESS	H01
CIDS Interface/ Power-Up test through the CFDS.	AMM 23-73-00-740-005
Energize the CIDS.	AMM23-73-00-861-001
Replacing DIR unit, - OBRM Download procedure	AMM23-73-00-869-001
The full BITE function is given only when both ESS and NORMAL power types are connected (e.g: not with A/C with servicing bus only).	

CIDS DIRECTOR:-For redundancy, the system has two identical directors. In normal operation, director 1 is active and director 2 is in hot stand-by. This means that director 2 receives and computes the same data as director 1 but its outputs are disabled.

The director commands cabin equipment via DEUs. The cargo smoke system is linked by Controller Area Network (CAN) busses. The FAP is linked by Ethernet busses. Each director is separated in two parts:

- The director main functions with the integrated Vacuum System Control Function (VSCF).:-The smoke detection board.

In the emergency mode, only the essential bus supplies 28VDC to the CID

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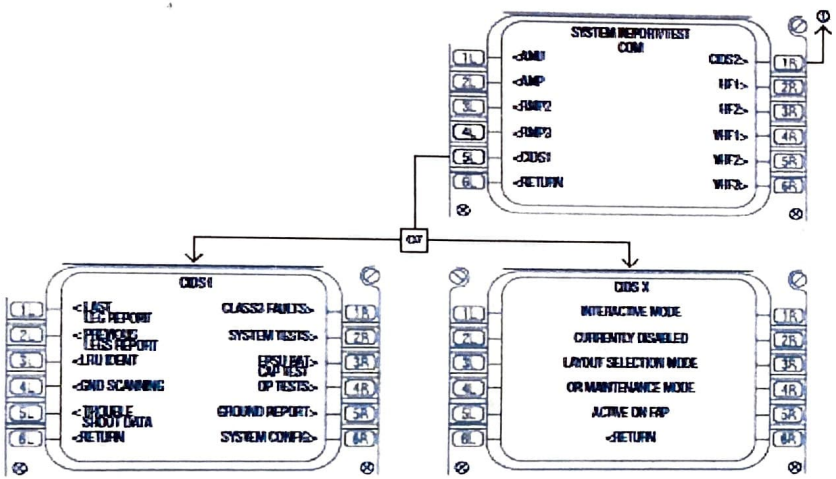
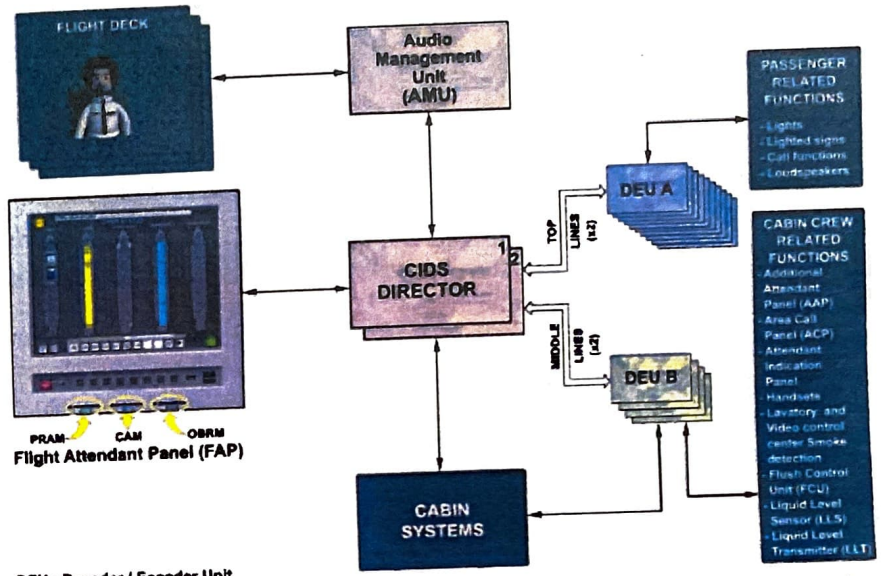
CIDS WARNINGS:- The indication of the failures depends on their importance. There is a **CIDS CAUTION (CAUT)** light in the upper **left corner of FAP** page display. It is **normally off**. The **CAUT light** comes on **amber (flashing)** when the **active director** detects a fault that needs cabin crew action. The action needed is displayed in the **HEADING ROW** (e.g. Select **Water / Waste page**). When you select the page, the CAUT light stops flashing and **remains on steady.** If the fault is cleared the **CAUT light goes off.**



CIDS DIRECTOR BITE:- SYSTEM TESTS: INTERFACE + POWER-UP TEST **if active** director is selected ;When you push the <INTERFACE + POWER-UP TEST line select key, the INTERFACE + POWER-UP TEST page with the messages DIRx ACTIVE and TEST IN PROGRESS 6 MIN comes on. The CIDS does a power-up test of the CIDS components and starts the internal BITE of the associated systems. It lasts 6 minutes. If there is a failure, the subsequent data about this failure come on:This page shows the subsequent legends:-

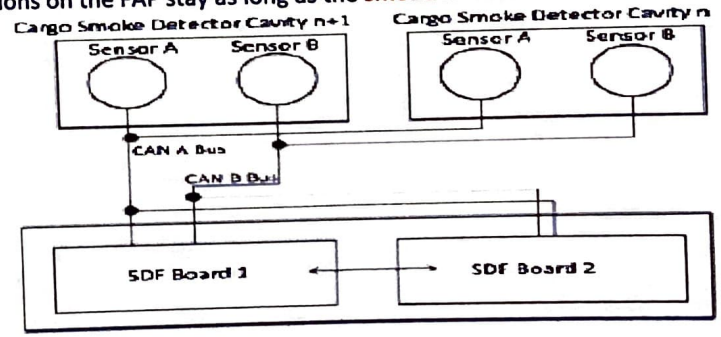
-DIR STATUS,;INTERFACE + POWER–UP TEST,; ILLUMINATION TEST; EPSU SYS TEST

EPSU BAT CAP TEST:- <EPSU BAT CAP TEST line select key, the CFDS transmits respective signals via director and DEU type B to the EPSU. The EPSU does the capacity test of the battery packs. The results are transmitted via DEU type B to the director which sends the results to the CFDS. After approximately 3 hours, when the battery capacity is completed, a test result message or a status message comes on.



DEU : Decoder / Encoder Unit

Cargo:- The Cargo Smoke Detectors :- The cargo smoke detectors are connected via 2 CAN buses (A & B) to both CIDS-SDF channels. There are two smoke detectors per cavity. **Lavatory:-** only one smoke detector is installed per lavatory. **Reset of a Smoke Alert:** If there is **no more smoke detected,** the **CIDS-SDF** resets all visual and aural indications **automatically.** To reset the visual and aural indication in the cabin manually you have to push the **"SMOKE RESET" button** either on the **"SMOKE DETECTION" page** on the **FAP touchscreen (general reset),** the FAP subpanel (general reset, CAM programmable button) **or** on the **AAP (local area reset only).** This affects AIP, ACP and the cabin aural indications. The indications on the FAP stay as long as the **smoke is detected.**



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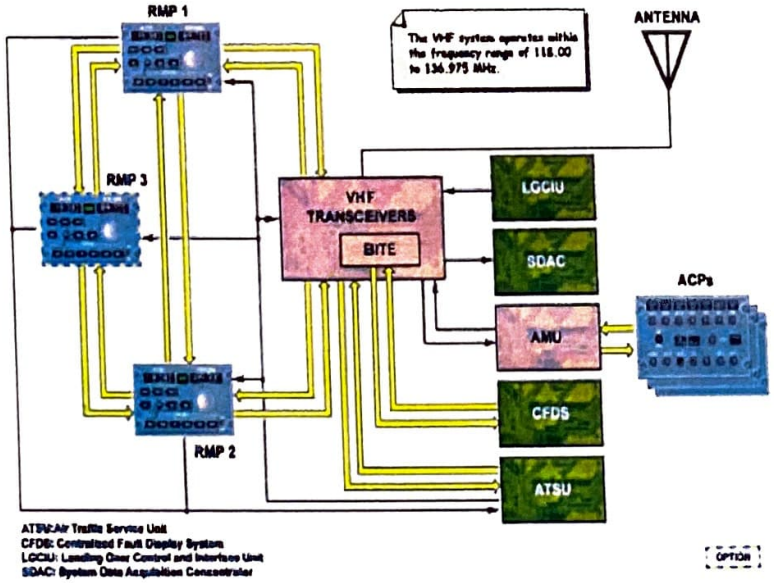
23-11-00 - HF SYSTEM:-- serves for all long-distance voice communications between different aircraft (in flight or on the ground), or between the aircraft and one or several ground stations.. Aircraft is provided with a single HF system (HF1):

HF SYSTEM	
49VU COM/HF1	HA14
Operational Test of the HF System	AMM 23-11-00-710-001
BITE Test of the HF System	AMM 23-11-00-740-001

23-12-00 - VHF SYSTEM:-The **Very High Frequency (VHF)** system is used for all the short-range voice communications between: · Different aircraft in flight · The aircraft (in flight or on the ground) and the ground stations.
The aircraft is equipped with three identical VHF systems which are fully independent: **VHF1, VHF2 and VHF3.** The VHF3 system is also used to transmit data link messages (Air Traffic Service Unit (ATSU)).

VHF SYSTEM	
49VU COM/VHF/1	G09
121VU COM NAV/VHF/2	L04
121VU COM NAV/VHF/3	L05
Operational Test of the VHF System	AMM23-12-00-710-001-A
BITE Test of the VHF System	AMM23-12-00-740-001-A
BITE Test of the VHF System	AMM23-12-00-740-803-A



23-51-00 - AUDIO MANAGEMENT SYSTEM (AMS):-provides the means for using: (1) **All the** radio communication **and** radio navigation facilities installed on the aircraft: · In transmission mode: it collects the microphone inputs of the various crew stations and directs them to the communication systems.
· In reception mode : it collects the audio outputs of the communication systems and the navigation receivers and directs them to the various crew stations.
(2) **The** flight interphone system: Telephone links between the various crew stations in the cockpit. · Telephone links between the cockpit and the ground crew from the external power receptacle.
(3) **The SELCAL (**Selective Calling**) system:** · Visual and aural indication of calls from ground stations equipped with a coding device used by the aircraft installation. (4) · Visual and aural indication of the ground crew and the Cabin Attendants' calls

AUDIO MANAGEMENT SYSTEM (AMS)	
49VU COM/AUDIO/FLT/INTPH	G08
49VU COM/AUDIO/ACP/F/O	G07
121VU COM NAV/ACP/THIRD/OCCPNT	M02
Deactivation of the Radio PTT Switch	23-51-00-040-001-A
Reactivation of the Radio PTT Switch	23-51-00-440-001-A
Operational Test of the Audio Management	23-51-00-710-001-A
Operational Test of the SELCAL System	23-51-00-710-002-A
Operational Test of the CAPT and F/O ACPs Switching	23-51-00-710-003-A
Operational Test of Oxygen Mask Microphone	23-51-00-710-004-A
BITE Test of the Audio System	23-51-00-740-002-A

23-13-00 -The radio management panels (RMP) centralize radio communication (VHF, HF) frequency control. They can also serve as backups of the flight management and guidance computers (FMGC) for radio navigation frequencies control. The aircraft is equipped with three RMPs which are identical and interchangeable. The aircraft is equipped with two RMPs which are identical and interchangeable. Full provision for a third RMP is installed on the aircraft. **The** RMP1 is supplied **by the** emergency **system.**

RADIO MANAGEMENT	
49VU COM/RMP/1	G10
121VU COM NAV/RMP/2	L02
121VU COM NAV/RMP/3	L03
Operational Test of the Radio Management	AMM23-13-00-710-001-A
Ops the Radio Navigation in Standby Mode	AMM23-13-00-710-002-A
BITE Test of the Radio Management	AMM23-13-00-740-001-A

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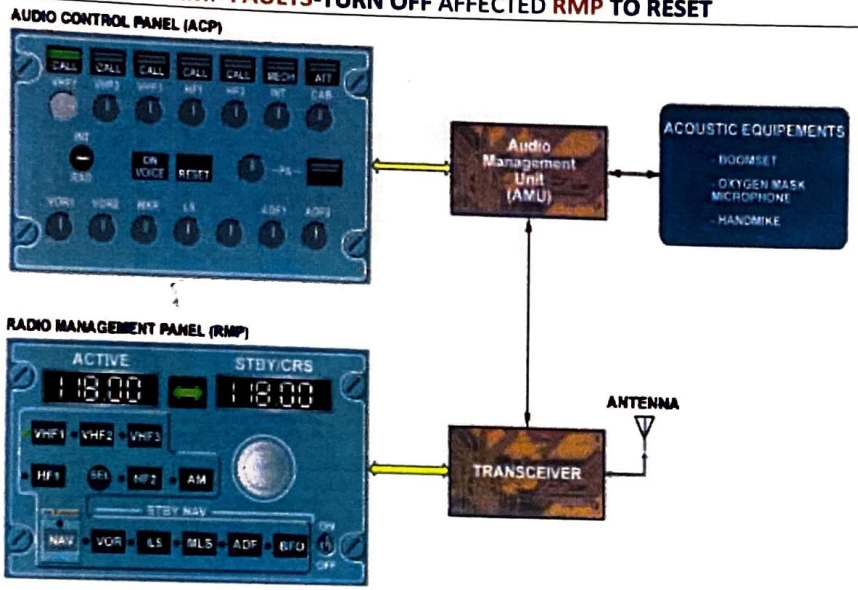
RMP FAULTS-TURN OFF AFFECTED RMP TO RESET



➢ **When jacking** the aircraft it might be necessary to communicate between personnel at various points around the aircraft. Once the weight off wheels, the service interphone system is disabled due to the logic of the system. The Landing Gear Control and Interface Unit (LGCIU) on ground discrete disables all service interphone connections.
The reason for this is to stop potential static noise started and amplified through the AMU due to the length of wires acting as antenna, into the audio system. To re-enable the service interphone, the **service interphone override** P/BSW must be switched to 'ON'. The Service Interphone Override switch is on the Maintenance Panel 50VU on the overhead in the cockpit.

COCKPIT VOICE RECORDER	
49VU COM/CVR/SPLY	E14
49VU COM/CVR/CTL	E13
Deactivation of CVR	23-71-00-040-801-A
Reactivation of CVR	23-71-00-440-801-A
Ops Check (CVR) and the CVR Channel Recording=	23-71-00-710-001-A
Test CVR Recording Logic Including Time Delay Relay	23-71-00-710-002-A
Operational Check of ULB	23-71-00-720-001-A
bulk-erase function and inhibition-logic of the CVR=	23-71-00-720-002-A

ME-24 Electrical Power

FAULT MESSAGE	POTENTIAL CAUSES
*C/B TRIPPED	On ground:-Do not reengage the circuit breaker (C/B) of the fuel pump(s) of any tank.
* For all other C/B, if the flight crew coordinates the action with maintenance, the C/B, may reengage a tripped C/B, provided that the cause is identified.	
*ELEC AC BUS 1 FAULT.	AC 1 busbar is not supplied..
* AC BUS 1 normally supplies the AC ESS BUS and, through TR1, the DC ESS BUS .IF AC BUS 1 FAULT, both the AC and DC ESS BUS will be lost and therefore the AC ESS BUS FAULT and the DC ESS BUS FAULT will be displayed on the ECAM.	
ELEC AC BUS 2 FAULT.	AC 2 busbar is not supplied.
ELEC AC ESS BUS ALTN	AC ESS busbar is supplied from AC 2 busbar
The AC ESS FEED pb-sw is set to normal.	
ELEC AC ESS BUS FAULT	AC ESS busbar is not supplied.
ELEC AC ESS BUS SHED.	AC SHED ESS busbar is not supplied.
ELEC APU GEN FAULT.	The protection trip is initiated by the associated GCU,
Or The line contactor is open with APU GEN pb-sw set to ON.	
ELEC APU GEN OVERLOAD.	LOAD of one generator is above 100% of rated output.
*ELEC BAT 1(2) FAULT.	CHARGING current increases at an abnormal rate..
* Battery contactor is opened automatically by the battery charge limiter	
ELEC BAT 1(2) OFF	BAT 1(2) sw is OFF and no failure is detected.
*ELEC BCL 1(2) FAULT.	BATTERY charge limiter 1(2) is failed.
*CYCLE APPROPRIATE BATTERY SW.	
ELEC DC BAT BUS FAULT	DC BAT busbar is not supplied.
ELEC DC BUS 1 FAULT	DC 1 busbar is not supplied.
*ELEC DC BUS 2 FAULT	DC 2 busbar is not supplied..
* *PROXIMITY SENSOR of the bulk cargo door is no longer electrically supplied*	
ELEC DC BUS 1+2 FAULT	DC 1 and DC 2 busbars are not supplied.
ELEC DC EMER CONFIG	DC 1, DC 2 and DC ESS busbars are not supplied.
ELEC DC ESS BUS FAULT.	DC ESS busbar is not supplied.
ELEC DC ESS BUS SHED.	DC SHED ESS busbar is not supplied.
ELEC EMER CONFIG.	AC 1 and AC 2 busbars are not supplied.
ELEC EMER GEN 1 LINE OFF	GEN 1 LINE pb-sw is abnormally set to OFF position.
With the GEN 1 LINE pb-sw (on the EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and GEN 2 supplies the AC BUS 1 channel.	

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ELEC ESS BUSSES ON BAT	DC ESS and AC ESS busbars are supplied by batteries.
AC ESS BUS is supplied via static inverter.	
ELEC GEN 1(2) FAULT	PROTECTION trip is initiated by the GCU.
Or The line contactor is open with the associated GEN pb-sw set to ON	
GEN 1(2) OFF.	GEN 1(2) sw is OFF and no failure is detected.
GEN 1(2) OVERLOAD	LOAD one gen is above 100% of rated output.
IDG 1(2) DISCONNECTED	IDG 1(2) is disconnected.
ELEC IDG 1(2) FILTER CLOG.	IDG 1(2) oil filter is clogged.
ELEC IDG 1(2) OIL LO LVL.	* IDG 1(2) oil level is low.
ELEC IDG 1(2) OIL LO PR	* IDG 1(2) oil pressure is low.
ELEC IDG 1(2) OIL OVHT.	IDG 1(2) outlet oil temp rises above 180 °C.
ELEC STATIC INV FAULT.	STATIC inverter is failed.
ELEC TR 1(2) FAULT.	TR 1(2) is failed.
GPU cannot be connected to the aircraft (GAPCU)= The GPU cannot be connected to the electrical network of the aircraft (AVAIL light is OFF):- • If at least one power source (IDG 1 or 2, APU GEN or batteries) is connected to the electrical network of the aircraft.- Reset the EXT PWR pb switch on 35VU (Press and release).- If no power source is connected to the electrical network of the aircraft Set the BAT 1 pb-sw and BAT 2 pb-sw to AUTO.	

**the associated engine is running, the IDG (integrated drive generator) must be disconnected from the engine at, or above, idle to prevent damage to the disconnect mechanism. Press the IDG pb-sw until the GEN FAULT light comes on. However, do not press for more than 3 s, to avoid damage to the disengage solenoid*
The IDG FAULT light goes off, when the IDG is disconnected.

- TRU NORMALLY WILL RESET VIA CFDS.

CFDS:SYS REPORT/TEST-ELEC-TR1(2,3)-RESET

- ESS TR (TR3)-IF CFDS NO RESET: -then

BLUE HYD ON, then DEPRESS EMER GEN (OVERHEAD-BLACK GUARDED SW) WHILE GEN IS SPOOLING UP-DEPRESS RED GUARDED, BUTTON ON 103VU TO RESET.

- ENG 1(2) GEN ON LINE (GREEN LINE) AND/OR PARAMETERS NOT SHOWN:-

ENG MUST BE DOWN-RESET GCU 1(2) CB T26(T27)

- NO "AVAIL" GREEN LEGEND DISPLAYED ON "EXT PWR" P/B SW:

ENG AND APU SHUT DOWN. GND PWR CONNECTED, RESET GPCU Y24.

The electrical power system consists of a three-phase 115/200 V 400 Hz constant-frequency AC system and a 28 V DC system. Electrical transients are acceptable for equipment. Commercial supply has secondary priority.

In normal configuration, the electrical power system provides AC power. The electrical power system is constituted of 2 engine generators and 1 APU generator. Each generator can provide AC power to all electrical bus bars. A part of this AC power is converted into DC power for certain applications.
In the event that normal AC power is not available, an emergency generator can provide AC power. In the event that all AC power is not available, the electrical power system can invert DC power from the batteries into AC power.
The main functions for the regulation and protection of the IDG are:

- regulation of the generator voltage at Point Of Regulation (POR),
- regulation of the generator speed,
- monitoring and protection of the system.

NOTE: With engine stopped, the IDG cannot be disconnected. An under speed condition inhibits the disconnection.

IDG-ENG 1- FOR FIN 4000XU1	
T26	122VU ELEC/GCU/1
T24	122VU ELEC/IDG1/DISC
IDG-ENG 2 - FOR FIN 4000XU2	
T27	122VU ELEC/GCU/2
T25	122VU ELEC/IDG2/DISC
AMM-REFERENCE	*ON A/C 001-007, 009-100, 201-300*
24-21-00-550-002-A	Preservation/Storage/Return to Service of the IDG
24-21-00-550-803-A	Preservation/Storage/Return to Service of the IDG
24-21-00-920-040-B	Drain IDG Oil, Discard Filter and Replenish
24-21-00-612-043-B	Servicing IDG after Oil Chemical Contamination
24-21-00-710-040-A	Ops Test IDG Disconnect and Reconnect Eng Static
*** ON A/C 101-129, 132-150*	
24-21-00-550-803-A	Preservation/Storage/Return to Service of the IDG
24-21-00-612-804-A	Servicing IDG after Oil Chemical Contamination
24-21-00-710-803-A01	Ops Test IDG Disconnect/ Reconnect Engine Opera
Reason for the Job:-Preservation of the IDG prevents corrosion and deterioration when the IDG is in storage for a short period (less than two years). The preservation procedure will give maximum protection to the IDG. You must do it in clean and dry conditions	
GPU cannot be connected to the aircraft= GAPCU= On the ELEC control panel 35VU: Push and release the EXT PWR pushbutton switch. If no power source is connected to the electrical network of the aircraft: - On the ELEC control panel 35VU:- Push the BAT 1 and BAT 2 pushbutton switches (the OFF legend goes off).	

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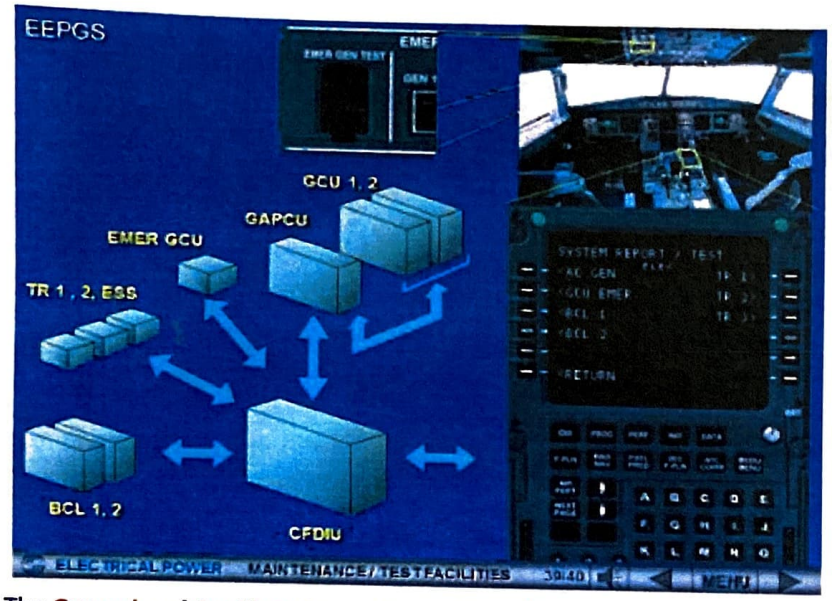

The **Ground and Auxiliary Power Control Unit (GAPCU)** is the interface between the Generator Control Unit (GCU) 1 and 2 and the Centralized Fault display Interface Unit (CFDIU).

GCU/GAPCU:-The GAPCU receives the fault information from GCU 1 and 2, and compiles them with its own failures and transmits them to the CFDIU.

GAPCU/CFDIU:-The maintenance test can be performed only on ground with engine shut down. It is initiated either:

- **Automatically at each GAPCU power-up. Or manually from the MCDU.**

SYSTEM TEST:- The system test is done on the ground, with the GAPCU in the interactive mode. Only internal GAPCU and GCU tests are done. The first test page asks for confirmation that engines and APU are not running. The test displays the GAPCU and each GCU test results. In the example the GAPCU has passed, GCU 1 test did not run and GCU 2 has failed. A test will not run if the related engine or APU is running. More information about the failed test (GCU 2) is available by selecting the line keys. Selecting the CLASS 1 line key gives snapshot troubleshooting data.

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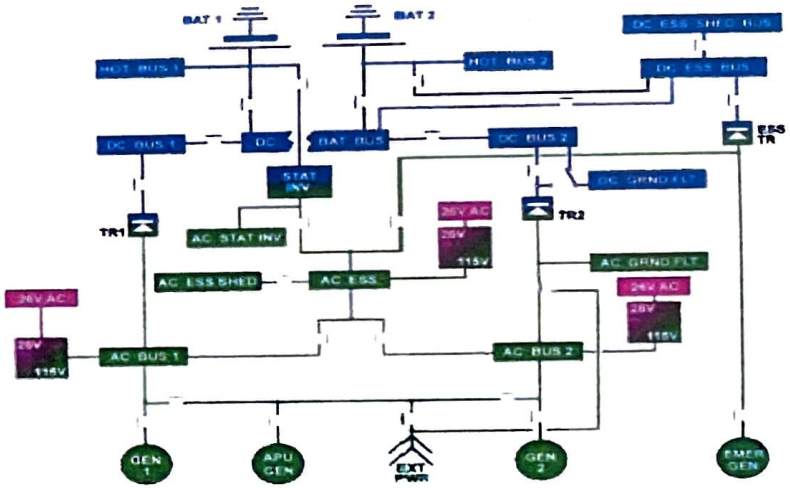
PURPOSE OF THE AC/DC ESS SHED bus is to cut off certain feeders (who would normally feed off the AC/DC ESS) from the AC/ESS bus for emergency purposes? Better put, is the principle that:-(In A320 Shed Bus most essential bus) i.e. **FMGC 1, FAC1=DC ESS SHED BUS MCDU 1=AC ESS SHED BUS ..... etc.**

The AC/DC ESS bus are busses that ensure an electrical supply to only the most important users during an **electrical emergency**. Then during an electrical emergency these users may be further sub-divided with regards to importance as there is not enough electrical supply for all the essential **users,** (hence a separate bus is created allowing for the removal of less important users) therefore those users attached to the **AC/DC ESS SHED bus** are cut off from the electrical supply leaving those users on the **AC/DC ESS** having **priority** to the remaining electrical supply.



CIRCUIT BREAKERS (C/BS):- The aircraft has **two types** of C/Bs:

- **Monitored (green):** When out for more than 1 min, the C/B TRIPPED warning is triggered on the ECAM.
- **Non-monitored (C/BS):- (black).**

The **Wing Tip Brake (WTB)** C/Bs have **red caps** on them to prevent them from being reset..

To clear the ECAM C/B TRIPPED caution by pressing:

- ***The EMER CANC pb:-** When pressed, this pushbutton clears and inhibits the ECAM C/B TRIPPED caution for the remainder of the flight, or*
- ***The CLR pb:-** When pressed, this pushbutton only clears the ECAM C/B TRIPPED caution*

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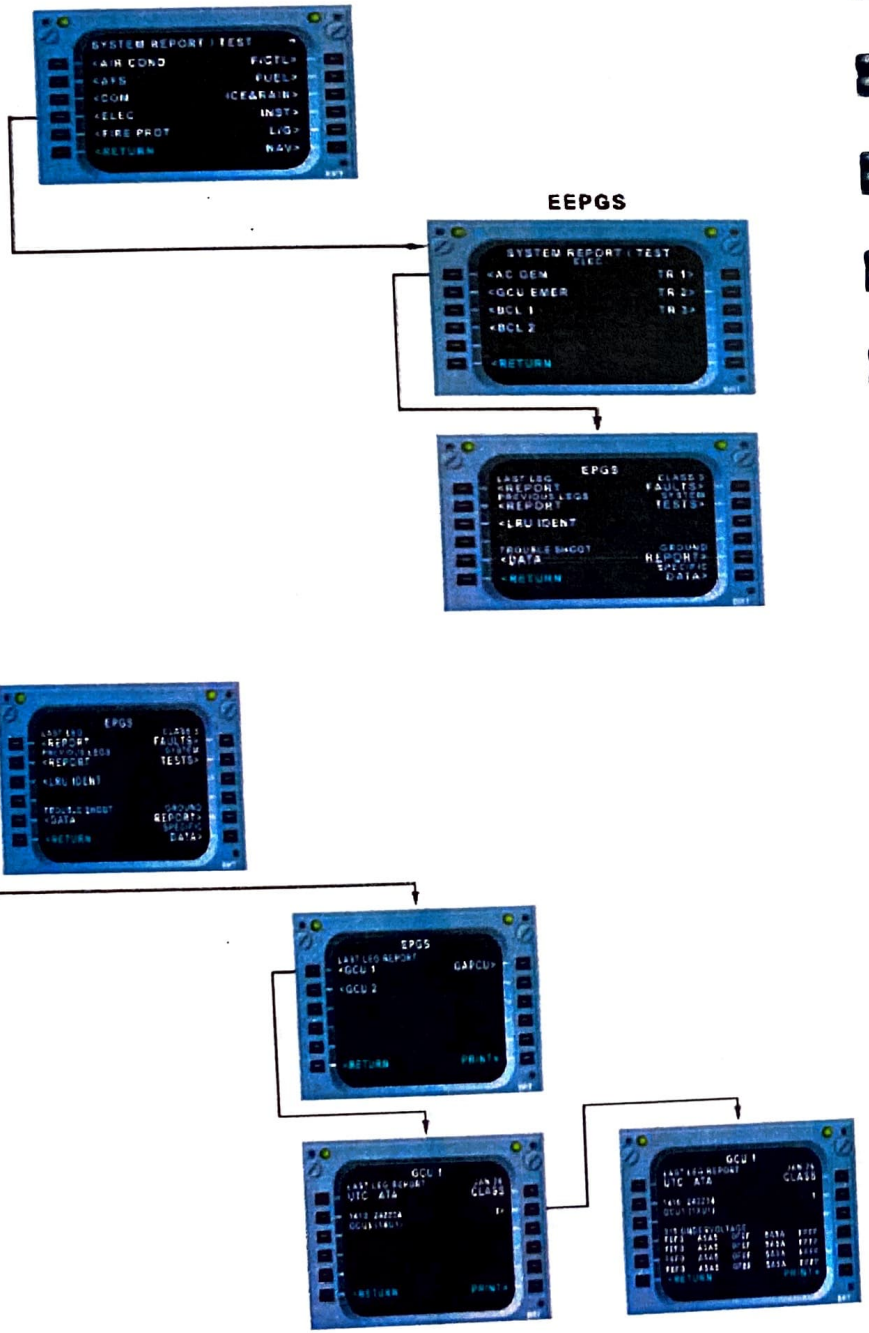

ME-26 Fire Protection

FAULT MESSAGE	POTENTIAL CAUSES
APU FIRE	Fire is detected by both loops,
Or Fire is detected by one loop when the other loop is faulty, or A rupture occurs in both loops within 5 s.	
APU FIRE DET FAULT.	Both loops are inoperative, or Fire Detector Unit is inoperative.
APU LOOP A(B) FAULT	Loss of both fire detection loops.
AVIONICS SMOKE	SMOKE in ventilation extraction duct is detected.
ENG 1(2) FIRE .	Fire detected by both loops or by one loop,
Other one being faulty, or break in both loops occuring within 5 s	
FIRE 1(2) DET FAULT.	Both loops are inop, or Fire Detector Unit is inop.
FIRE 1(2) LOOP A FAULT	*In case of a loop A failure the FDU supplies a loop fault warning signal to the ECAM
FIRE 1(2) LOOP B FAULT	*In case of a loop B failure the FDU supplies a loop fault warning signal to the ECAM
AFT CARGO SMOKE	SMOKE detected
SMOKE DET FAULT (CIDS-SDF)= Apply the following actions in the presented order:- - Pull the C/Bs C05 and C06 on 49VU, T17 and T18 on 122VU;- Wait 10 s, then - Push simultaneously the C/Bs C05 and C06 on 49VU ;-Within 2 s push simultaneously the C/Bs T17 and T18 on 122VU;-After CIDS reset, wait approximately 4 min before recovering normal operation.	
AFT CRG BTL FAULT.	Fwd or aft bottle squib failed or on low press.
AFT CRG BTL 1 FAULT.	Fwd or aft bottle squib failed or on low press.
AFT CRG BTL 2 FAULT.	Fwd or aft bottle squib failed or on low press.
AFT CRG DET FAULT.	SMOKE detection fault
FWD CARGO SMOKE	SMOKE detected
SMOKE FWD (AFT) CARGO DET FAULT SMOKE FWD (AFT) CRG 1/2 BTL FAULT (CIDS-SDF)= Apply the following actions in the presented order:--Pull the C/Bs C06 and C05 on 49VU, T17 and T18 on 122VU;-Wait 10 s, then Push simultaneously the C/Bs C06 and C05 on 49VU;-Within 2 s push simultaneously the C/Bs T17 and T18 on 122VU - After CIDS reset, wait approximately 4 min before recovering normal operation.	
FWD CRG BTL FAULT	FWD or aft bottle squib failed or bottle on low pr.
FWD CRG BTL 1 FAULT.	FWD or aft bottle squib failed or bottle on low pr.
FWD CRG BTL 2 FAULT.	FWD or aft bottle squib failed or bottle on low pr.
FWD CRG DET FAULT	SMOKE detection fault
LAV+CRG DET FAULT	Both CIDS Smoke Detection functions are failed.
SMOKE DET FAULT.	SMOKE detected in ventilation extraction duct
LAVATORY DET FAULT.	Toilet smoke detection is lost.

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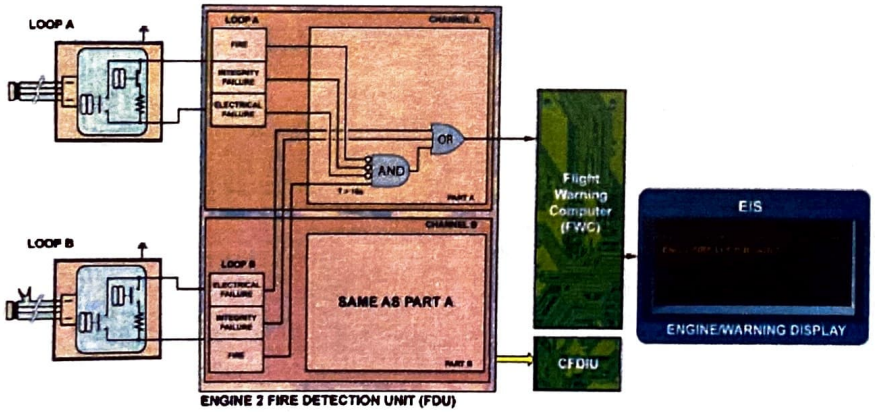
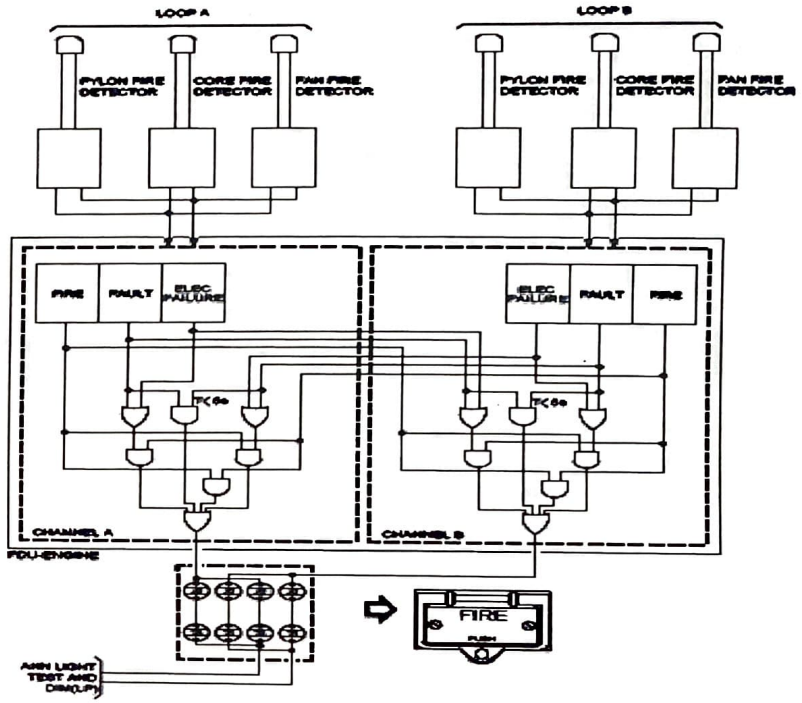
SMOKE LAVATORY DET FAULT with all lavatories declared inoperative on the FAP (CIDS or CIDS-SDF)= Apply the following actions in the presented order:- - Pull the C/Bs **P13** and **P14** on 121VU, **G01** and **G02** on 49VU, **M05** or **M06** and **M06** or **M07** on 121VU ;Wait 10 s, then;- Push the C/Bs in the following order: -**M05** or **M06** and **M06** or **M07** on 121VU, **G01** and **G02** on 49VU, **P13** and **P14** on 121VU.;-After CIDS reset, wait approximately 4 min before recovering normal operation. **If unsuccessful**:- Apply the following actions in the presented order:-Pull the C/Bs **C06** and **C05** on 49VU, **T17** and **T18** on 122VU.;-Wait 10 s, then;-Push simultaneously the C/Bs **C06** and **C05** on 49VU;-Within 2 s push simultaneously the C/Bs **T17** and **T18** on 122VU;-After CIDS reset, wait approximately 4 min before recovering normal operation.	
LAVATORY SMOKE.	SMOKE detected in one lavatory.

C05	**AIR COND/CIDS/SDF/DIR1 ESS**
C06	**COND/CIDS/SDF/DIR2 ESS**
T18	**AIR COND/CIDS/SDF/DIR NORM/2**
T17	**AIR COND/CIDS/SDF/DIR NORM/1**
G03	**COM/CIDS/DEU B/ESS**
G02	**COM/CIDS/DIR ESS/2**
G01	**COM/CIDS/DIR ESS/1**
A07	**ENGINE/2/FIRE DET/LOOP B**
A06	**ENGINE/1/FIRE DET/LOOP A**
Q39	**ENGINE/ENG2/FIRE DET/LOOP A**
Q38	**ENGINE/ENG1/FIRE DET/LOOP B**

***LOOP FAULT WARNING**:-In case of a **loop failure the FDU** supplies a **loop fault** warning signal to the ECAM and Centralized Fault Display Interface Unit (CFDIU). The **FDU generates an inoperative signal** if any of the following conditions are met:- (a) electrical failure, (b) integrity failure, (c) detection of a single loop FIRE during more than 16 s while the other loop is in normal condition.



ENGINE 2 FIRE DETECTION UNIT (FDU)



ENGINE AND APU FIRE DETECTION:-The engines and the APU have individual fire detection systems. Each system has **two identical detection loops (A and B)** installed in parallel. Each **loop includes 3 detector elements.**
The two loops are monitored by a Fire Detection Unit (FDU).
FDU 1 monitors the **loops on engine 1** and **FDU 2** monitors the loops on **engine 2.** The FDU sends **FIRE and FAULT** signals to the Flight Warning **Computer (FWC)** for display on ECAM.
DETECTION FAULT WARNING:-The detection fault logic is based on a dual loop failure. It agrees with a total loss of the detection system. When the FDU generates two inoperative signals related to loop A and loop B fault logic, the Flight Warning Computer (FWC) elaborates the fault warning.**FIRE DETECTION CIRCUIT**:-The **engine fire and overheat detection system** is supplied by the electrical Power from the DC system. Each engine has two continuous loops cnnected in parallel to a Fire Detection Unit (FDU) Each FDU has two identical channels: channel A and B. Each one has its own power supply and is connected to one fire detection loop.

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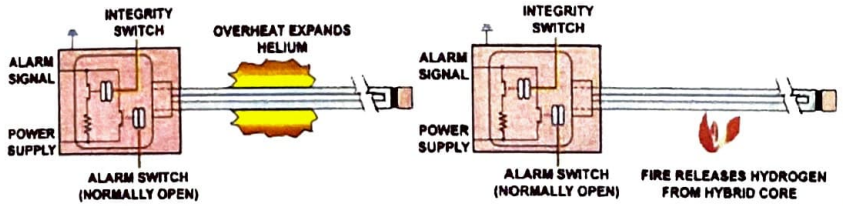
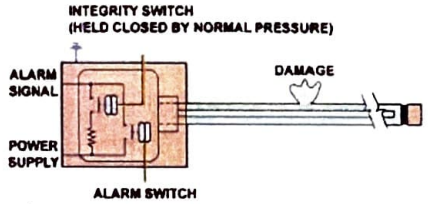
FIRE DETECTORS STATE:-

In NORMAL STATE, the INTEGRITY switch is closed and the ALARM switch is open.
In **ALARM STATE:** The effect of an average temperature expands the helium (inert) gas, which in turn closes the **ALARM switch,**(which was open) or the effect of heat caused by a flame or hot gas, releases core (active) gas from the hybrid core, which in turn closes the **ALARM switch.**
In both cases, the detector sends a fire signal.
In **FAULT STATE:**-In the event of gas pressure loss (pipe fracture or cut off due to a torching flame), the **INTEGRITY** switch opens (which was close) and generates a fault signal.



ALARM STATE



FAULT STATE

FIRE DETECTORS STATE

➢ FIRE PROTECTION CFDS MENU

Bite test:-Because the **SDCU is replaced by the CIDS–SDFs,** the SDCU menu page has been modified SDCU title becomes **CIDS–SDF1 or 2,**
SYSTEM TEST The system test check all Line Replaceable Units (LRU) connected to the CFDS and indicates failed **systems.** This test includes:
- **Restart of the Power Up test,**
- Monitoring of input and output signals.On ground, **SMOKE WARN TESTS** can be selected on the SDCU menu of the MCDU

If submenu **SMK WARN TEST** is selected, a submenu with all **smoke** detectors installed is displayed. A test for each smoke detector can be selected by the line key. During the test of the lavatory **smoke detectors** the active CIDS channel sends a test request to the relative lavatory smoke detector via the **DEU B and the CAN bus.**

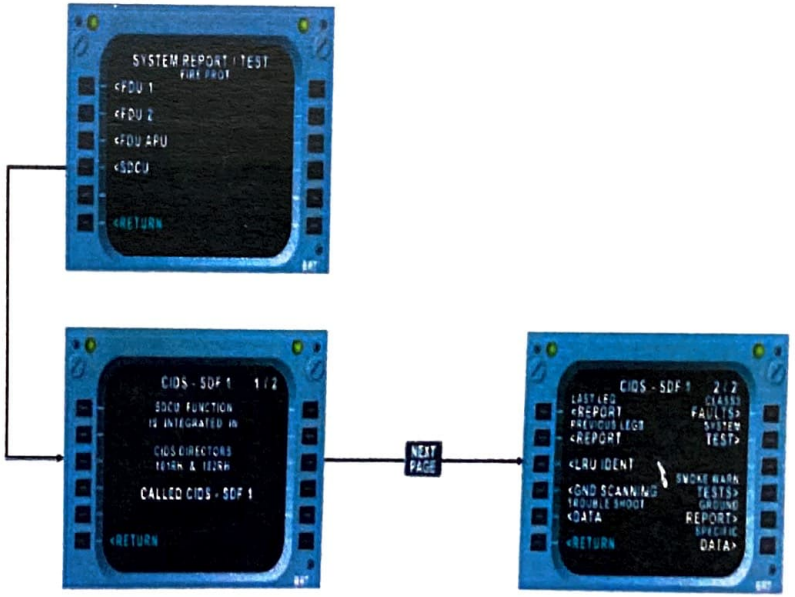
If the smoke **detector is** operative it transmits a test–alarm information to the DEU B. The DEU B transmits the information to the **CIDS–SDF via the CIDS internal bus.** The CIDS starts the cabin indications **(chime,** FAP, AIP, ACP) and the CIDS– SDF sets the ARINC 429 outputs to the FWC.

SPECIFIC DATA:- If the key "SPECIFIC DATA" is pressed the system shall transmit a **"SMOKE WARNING REPORT"** page. In case of smoke warning, if **"SMOKE WARNING REPORT" is pushed,** the "SMOKE **WARNINGS REPORT"** page layout characteristics shall be identical to the **PREVIOUS LEGS REPORT"** except that:-

-The title displayed shall be "SMOKE **WARNINGS REPORT",**

-No failure **"CLASS"** shall be displayed, In case of a smoke warning during the last leg the leg counter shall **indicate** "00",

In **case of a smoke** warning **on** ground the leg counter shall **indicate** "GD".



INTERMEDIATE PAGE **NEW CIDS-SDF1 MENU PAGE**

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MAINTENANCE TASK	AMM REFERENCE
BITE Test of the Smoke Detection - System Test	26-10-00-740-801-A
Ground Scanning of Smoke Detection Function	26-10-00-740-802-A
CIDS-SDF BITE for Channel 1 and Channel 2	26-10-00-740-803-A
Operational Check of Loop/Squib	26-12-00-710-001-A
Ops Test of Fire and Overheat Det with the CFDS	26-12-00-710-002-A
Visual Inspection of Engine Fire Detection System	26-12-00-200-003-A
Visual Insp of Engine Fire Detection System (NEO)	26-12-00-200- 80-A(NEO)

WHEN APU AUTO EXTINGUISHING TEST:- should be performed This test will insure that the APU will be protected in case of a fire. When a fire is detected the APU will shut down and the fire bottle will be discharged automatically.
The Auto extinguishing test pushbutton is found on the **overhead MAINT** panel. The test must be done with the **APU shut down** but with the master switch **selected ON**. During the test the APU auto shutdown is simulated and the APU fuel supply valve is closed.
Both squibs of each engine fire bottle No. 1 and one squib of the APU fire bottle are supplied by 28 VDC from the HOT bus. When performing maintenance with the FIRE pushbutton released out, make sure to pull both squib C/Bs to protect against bottle discharge. If the C/Bs are not pulled, the bottle may be discharged even without power on the aircraft.

ME-27 Flight Controls

FAULT MESSAGE	POTENTIAL CAUSES
*CONFIG SLATS (FLAPS) NOT IN T.O CONFIG	If the slats or flaps are not in TO configuration,
*CONFIG SPD BRK NOT RETRACTED	If the speed brakes are not retracted,
*CONFIG PITCH TRIM NOT IN T.O RANGE	PITCH TRIM is not in TO configuration,.
* RUD TRIM NOT IN T.O RANGE	RUD TRIM is not in TO configuration,.
-* when thrust levers are set at TO, or Flex TO, or when pressing T.O CONFIG pb	
R (L) SIDESTICK FAULT	L or R sidestick is inoperative
CONFIG PARK BRK ON	PARKING brake is on and thrust levers are set at TO or FLXTO power position..
* Check that the parking brake handle is in the OFF position. If warning stays on, check that the brake pressure is at zero on the BRAKES PRESSURE indicator	
DUAL INPUT	Both sidesticks are moved simultaneously.
#AIL SERVO FAULT.	LOSS of one servo jack on one aileron, or loss of one or both ELAC 1 rudder pedal transducers.
#F/CTL AIL SERVO FAULT(ELAC)= - Set ELAC 1 pb-sw to OFF;-Set ELAC 2 pb-sw to OFF;- Wait 3 s;-Set ELAC 2 pb-sw to On;- Perform a flight control check;-Set ELAC 2 pb-sw to OFF;-Set ELAC 1 pb-sw to On;-Perform a flight control check; Set ELAC 2 pb-sw to On;- Set pitch trim to takeoff CG	
DIRECT LAW.	DIRECT law is active.
*ELAC 1(2) FAULT	THERE is a failure of ELAC (FAULT lt on ELAC pb), or when one sidestick transducer is faulty.
ELAC 1 (2) PITCH FAULT.	THERE is a failure of pitch channel in ELAC 1(2).
#F/CTL ELAC 1 PITCH FAULT (ELAC)= - Set ELAC 2 pb-sw to OFF;-Set pitch trim to 5 UP position;-Set ELAC 1 pb-sw to OFF;-Wait 3 s;- Set ELAC 1 pb-sw to On;-After 15 s, check pitch trim at 0 position;- Perform a flight control check;- Set ELAC 2 pb-sw to On;-Set pitch trim to takeoff CG	
#F/CTL ELAC 2 PITCH FAULT (ELAC)= - Set ELAC 1 pb-sw to OFF;-Set pitch trim to 5 UP position;-Set ELAC 2 pb-sw to OFF;- Wait 3 s;-Set ELAC 2 pb-sw to On;- After 15 s, check pitch trim at 0 position;- Perform a flight control check;-Set ELAC 1 pb-sw to On;- Set pitch trim to takeoff CG	
BOTH ELACS OFF. BACK ON. BOTH SECS OFF. BACK ON. Or SET PAKING BRAKE, HYDRAULICS OFF, RESET ELAC P/Bs, PRESSURIZE HYDRAULICS	
ELEV SERVO FAULT	loss of one servo jack on one elevator.
*ALTN LAW.	ALTERNATE laws are active.
All protections, except maneuver protections, are lost.	
FCDC 1 (2) FAULT	THERE is a failure of one FCDC.

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*FCDC 1+2 FAULT	THERE is a failure of both FCDCs..
* When both FCDCs fails:-F/CTL warning are not available on the ECAM	
GND SPLR FAULT	Loss of ground spoiler function in SEC 1 + 3 or 1 + 2 or 2 + 3 or 1 + 2 + 3.
GND SPLR 5 FAULT.	Loss of ground spoiler function in SEC 2.
*GND SPLR / 1+2 / 3+4 / FAULT	GND SPLR FAULT :-Loss of ground spoiler function in SEC 1+3, or 1+2, or 2+3, or 1+2+3.
* If ground spoiler function is lost in SEC (1+2) or (1+3), one reverser is inoperative. If ground spoiler function is lost in SEC (1+2+3), both reversers are inoperative. In any case, the autobrake function is lost. - GND SPLR 1+2(3+4) FAULT:-Loss of ground spoiler function in SEC 3 (or 1).	
GND SPLR NOT ARMED	GROUND spoilers are not armed before landing.
*AMBER SPOILERS:- ON FLT CTL PAGE WITH NO SEC FAILURES PRESSURIZE ALL THREE HYD SYS (SHOULD CLEAR), CYCLE SIDE STICK TO VERIFY.	
L(R) AIL FAULT.	THERE is a loss of both servo jacks on one aileron.
L(R) ELEV FAULT.	Loss of both servo jacks on one elevator,
Or activation of elevator flutter protection in ELAC.	
L+R ELEV FAULT	BOTH elevators are lost.
L(R) SIDESTICK FAULT	TRANSDUCERS, on pitch or roll axis, are failed on one sidestick.
PITCH TRIM / MCDU / CG DISAGREE	*TO CONFIG pb on the ECP is pressed, or when thrust levers are set to FLEX or TOGA,
* there is a discrepancy between:-The actual pitch trim value from THSA &The pitch trim value calculated by the FAC, based on the CG The pitch trim value entered by crew in the MCDU.	
SEC 1 (2) (3) FAULT	THERE is a failure of one SEC.
*SIDESTICK PRIORITY	failure in a sidestick priority logic circuit.
*RESET BOTH ELACS' CBs(All 4 ELAC) CBs FOLLOWED BY SIDESTICK PRIORITY TEST * *In some sidestick transducer failure cases, ELAC 1(2) FAULT is triggered on.* If occurs on PWR XFER-reset ELAC 1(2) sw & perform FLT CTL ck vigorously from both sides	
SPD BRK DISAGREE. (SURFACE3+4AFFECTED)	THERE is a position disagree between surfaces and lever position..
SPD BRK DISAGREE. (SURFACEs2+3+4)	THERE is a position disagree between surfaces and lever position.
*SPD BRK FAULT.	SPD BRK lever transduc to SEC 1 and 3 failed..
* ASSOCIATED ground spoilers are available only through reverse selection	
SPD BRK STILL OUT.	SPEED brake out at least one engine not at idle.

SPD BRK 2 (3+4) FAULT.	SPD BRK lever transducers to SEC 3 (1) failed.
SPLR FAULT.	LOSS of one or more spoilers.
L (R) AIL FAULT	Loss of both servo jacks on one aileron
ELAC 1 PITCH FAULT	Failure of pitch channel in ELAC 1
STABILIZER JAM.	LOSS of the electrical control of the stabilizer (with or without jamming of the stabilizer)
When the Flight Control Computers detect a loss of electrical control of the stabilizer, pitch control law reverts to alternate law. Depending on the type of failure, the MAN PITCH TRIM may still be available	
STABILIZER JAM	Loss of the electrical control of the stabilizer (with or without jamming of the stabilizer)
L (R) ELEV FAULT	Loss of both servo jacks on one elevator, or activation of elevator flutter protection in ELAC.
#SPLR FAULT	Loss of one or more spoilers.
#F/CTL SPLR FAULT(SEC) =- Set SEC 1 pb-sw to OFF;- Wait 3 s;- Set SEC 1 pb-sw to On;- Set SEC 2 pb-sw to OFF;- Wait 3 s;-Set SEC 2 pb-sw to On;-Set SEC 3 pb-sw to OFF;- Wait 3 s;-Set SEC 3 pb-sw to On - Perform a flight control check	
ELAC 2 PITCH FAULT	Failure of pitch channel in ELAC 2, or loss of one or both ELAC 2 rudder pedal transducers.
FLAP ATTACH SENSOR	FAILURE of flap attachment's detection sensor.
FLAPS FAULT/LOCKED	If flaps locked:-WING TIP BRK ON OR ALIGNMENT FAULT
FLAP LVR NOT ZERO	FLAP lever is not in the zero position, and the aircraft is above 22 000 ft.
FLAP SYS 1(2) FAULT	FAILURE of flap channel in one SFCC.
FLAP/MCDU DISAGREE	AT phase 2 T.O CONFIG TEST pb is pressed,
or at phase 3, if the FLAPS lever position and the FLAPS position entered in the FMS are different.	
SLAT(FLAP) TIP BRK FAULT	FAILURE of one wing tip brake on slats.
or flaps, or failure of one wing tip brake solenoid on slats, or flaps	
SLAT SYS 1(2) FAULT	FAILURE of slat channel in one SFCC.
*CONFIG SLATS (FLAPS)	Slats or flaps are not in takeoff configuration,.
Thrust levers are set at TO or FLEX TO, or when pressing the TO CONFIG pb	
*The warning is automatically recalled by pressing the TO CONFIG pb	
FLAP ATTACH SENSOR.	Failure of flap attachment's detection sensor.
FLAP SYS 1 FAULT	Failure of flap channel in one SFCC.
FLAP SYS 2 FAULT	Failure of flap channel in one SFCC.
FLAPS(SLATS) FAULT.	Failure of both slat or flap channels.

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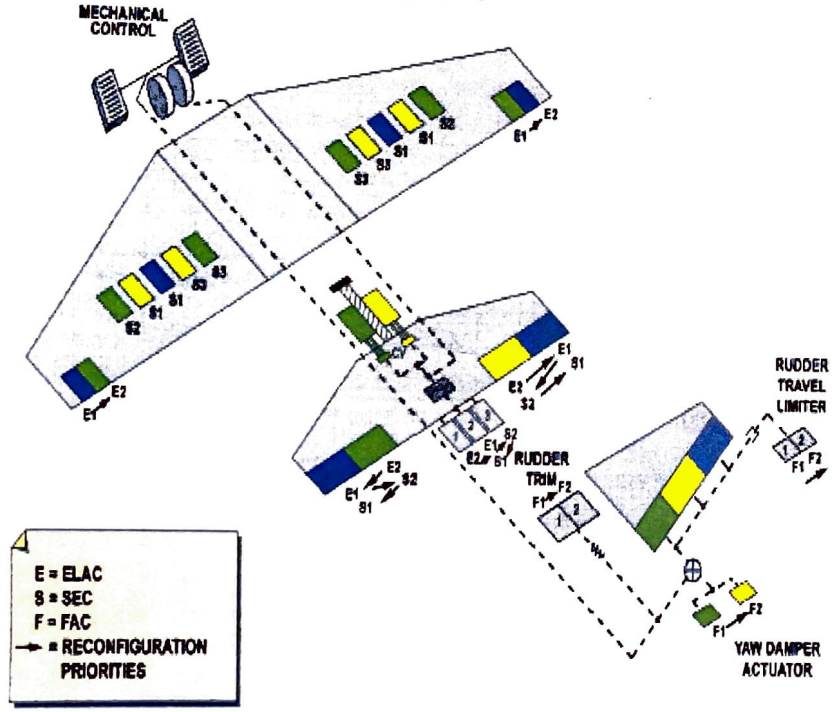
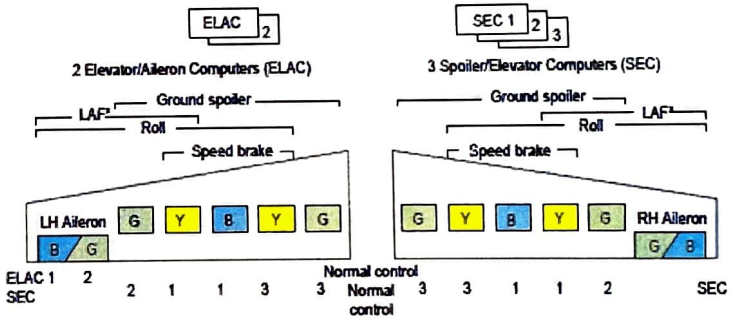
FLAPS(SLATS) LOCKED	Slats or flaps' wing tip brakes applied, or non alignment detected between 2 flaps.
FLT CTL LOCKED OUT-WING TIP BRAKE (WTB) RESET VIA CFDS	
SLAT SYS 1 FAULT	Failure of slat channel in one SFCC.
SLAT SYS 2 FAULT.	Failure of slat channel in one SFCC.
***SLOW SLATS OR FLAPS-RESET APPROPRIATE SFCC CTL MONG CBs.ONE AT A TIME, IF BOTH PULLED SAME TIME WILL LOCKOUT WTB.(#1 PROVIDES AMBER UPPER ECAM IND-RESET SYS 1) IF GREEN-RESET SYS 2)**	

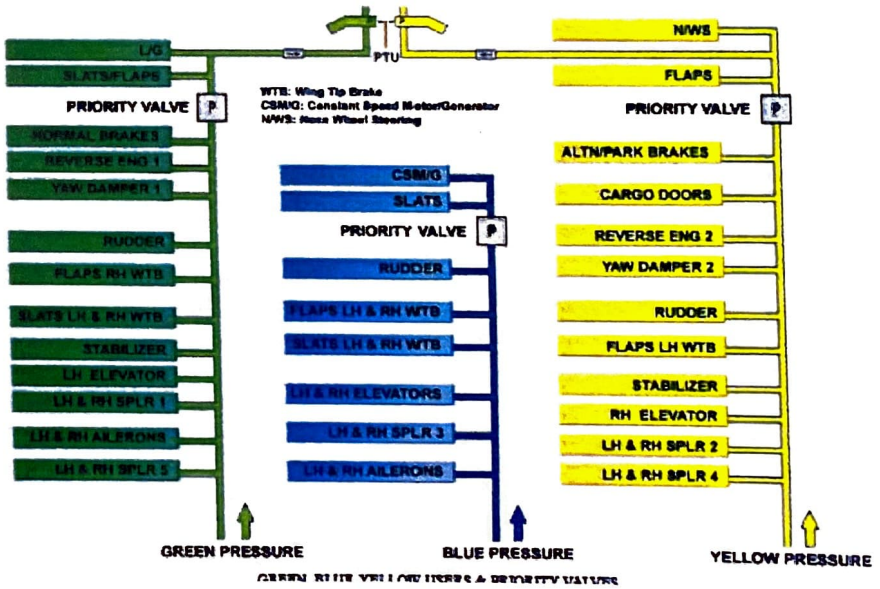
Failure Message and ECAM Warning (E/W) are defined by each FCDC (in parallel) based on information from all ELACs and SECs

Failure Message and E/W are different whether the FAULT is detected by one or more computers. This correlation is enabled by the FCDCs. Some F/CTL failures are **latched by the flight control computers**. These failures might require rewith low hydraulic system pressures (all 3 systems)



SYSTEM OVERVIEW - ACTIVE SERVO CONTROLS & RECONFIGURATION PRIORITIES





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ECAM PRESENTATION

The hydraulic system pressure indication is normally **green** and becomes **amber** in case of **low pressure.**

➢ ELAC/SEC Indication

- ELAC and SEC labels are always displayed in white
- The computer number is normally in green, and boxed in grey.

The number and box become amber, if the **computer fails,** or is switched **OFF.**

Hydraulic System Pressure

G B Y green System pressure normal

G B Y amber actuator not operative due to hydraulic low pr.or jamming.

ELECTRICAL FLIGHT CONTROL SYSTEM:-The Electrical Flight Control System EFCS includes the two ELAC's, the three SEC's, two Flight Control Data Concentrators (FCDC) and **four accelerometers.**

The two ELAC's are made by Thomson (Motorola). Internally they consist of two processor units, one being the controlling part the other dedicated to monitor. The two processors will individually calculate the actuator command signal. In case of discrepancy between the **COM and the MON channels,** output to the actuator will be inhibited.

The **ELAC's** provide output to control the Elevators, the Ailerons and the THS. Feedback from the surface actuator are returned to the ELAC's.

The three SEC's are made by Sextant (Intell). Internally they also consist of one COM and one MON processor. The SEC's provide output control to the Spoilers and will be back–up for control of the Elevators and the THS. The SEC's will also receive position feedback from the control surfaces.

27-95-00 - FLIGHT CONTROL DATA CONCENTRATOR (FCDC) Two Flight Control Data Concentrators (FCDC) are installed in the EFCS. The purpose of the two FCDC's is to isolate as far as possible ,**the ELAC's and the SEC's** from down stream aircraft systems.The **FCDC receives and concentrate data** from several sources such as:

- surface position,-T/O configuration warning,-mandatory parameters
- surface availability,-system status and warnings.

The **FCDC monitors and analysis the ELAC and SEC** maintenance messages at power up, in flight and after touch down. It concentrates and stores fault indications and deliver these information to **the CFDIU on request.**

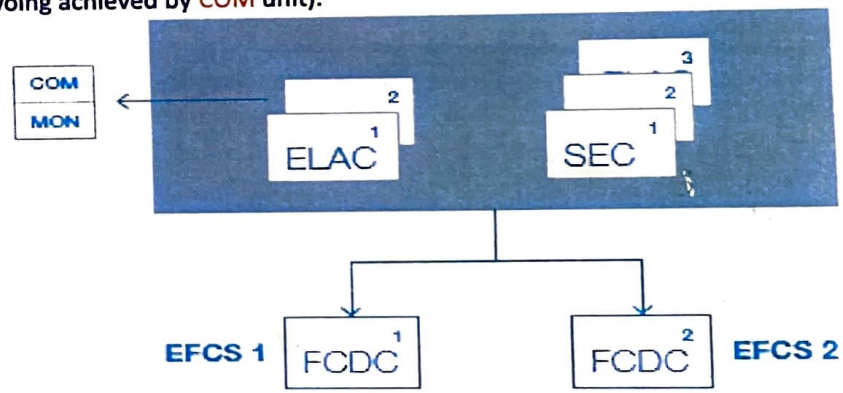
The FCDC commands also the illumination of the **lights indicating the priority between side sticks.** But the side sticks priority logic is implemented inside the ELAC and SEC.

The Flight Control Data Concentrators (FCDC) acquire data from the ELAC's and the SEC's and transmit this to the ECAM and the CFDS. The FCDC also provide access to the EFCS for CFDS tests.

The **accelerometers** are used for the **pitch control law and the detection of LAF.**

Automatic **"power–up and "pressure–up" tests of the EFCS are performed** without any surface movement.**COM/MON construction :- ELACs and SECs** consist of 2 units completely segregated. Each unit acquires sensors/peripherals and computes independently the servo control orders (Aileron, Spoiler and Elevator). However, each units has a specific function:

- **COM unit** is in charge of the servo control COMMAND (computed order is sent to the servo control).
- **MON unit** is in charge of the servo control MONITORING (computed order is not sent to the servo control but is used to check the servo control movement and servoing achieved by COM unit).



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Benefits for maintenance: -As each unit of the ELACs & SECs receives and monitors sensors/inputs independently, hence, the FCDCs receive the inputs from 10 different units. This enables a more accurate fault correlation.

Flight Control Data Concentrator (FCDC) Pwr-up Test=20 Sec	
FCDC-1	B-10 [PULL- 05 SEC, WAIT- 03 SEC]
FCDC-2	Q-20 [PULL- 05 SEC, WAIT- 03 SEC]
ELEVATOR AILERON COMPUTER (ELAC)	
ELAC-1	B-11 [PULL CBs FOR 1 SEC AND WAIT FOR 10 SEC]
ELAC-2	R-20 [PULL CBs FOR 1 SEC AND WAIT FOR 10 SEC]
27-93-00-040-001-A	Deactivation of the ELAC Computer
27-93-00-440-001-A	Reactivation of the ELAC Computer
27-93-00-710-001-A	Operational Test of ELACs Computers

27-93-00 - ELEVATOR AILERON COMPUTER SYSTEM (ELAC)

Power Up Test:-The power-up test is initiated when power is applied. After test is passed the F/CTL page will display **"ELAC"** in green.

During the test the ECAM F/CTL page will display "ELAC" in amber and aileron servo control amber boxed. The FAULT legend in the ELAC switch will illuminate for a specific time (depend on A/C condition).

- ECAM warning=**F / CTL ELAC 1 (2) FAULT**

Power-up and Pressure-up tests are performed without surface movement
Some F/CTL failures are latched by the flight control computers. These failures might require reset with low hydraulic system pressures (all 3 systems).
Reset method vs E/W – Refer to TSM **27-00-00-810-818-A**
(*) If fault is experienced during safety test (at power up)
F/CTL ELACx FAULT (*) = Low hydraulic system pressure (all 3 systems)
(*)Reset **ELAC C/B reset >5s or P/B reset** (OFF then ON)
SPOILER ELEVATOR COMPUTER:-Power Up Test
Power-up test is performed when the **SEC PB** switch is activated or when power is applied. The **"FAULT"** legend in the switch will be illuminated for a specific time.
The ECAM. F/CTL page will **indicate SEC 1-2-3 in amber** and associated elevators and spoiler legends will be crossed amber during the power up test.
ECAM warning::— **F / CTL SEC 1 (2) (3) FAULT** during 23sec approx.
27-96-00- MAINTENANCE AND SAFETY TESTS/BITE Maintenance
The functions of the FCDCs are to:-Collect the failures detected by the Elevator Aileron Computers (ELACS) and the Spoiler Elevator Computers (SECs)
. Compare the received data & Give the maintenance messages to the Centralized Fault Display Interface Unit (CFDIU)

SPOILER AND ELEVATOR COMPUTER [PULL CBS FOR 5 SEC & WAIT FOR 18 SEC	
SEC:-1	B-08
SEC:-2	Q-18
SEC:-3	Q-19
MAINTENANCE TASK	AMM REFERENCE
Deactivation of the SEC Computer	27-94-00-040-002-A
Deactivation of the SEC1 or SEC2	27-94-00-040-050-B
Reactivation of the SEC Computer	27-94-00-440-002-A
Deactivation of the SEC3 Computer	27-94-00-040-802-A
Reactivation of the SEC3 Computer	27-94-00-440-802-A
Operational Test of the SEC1 Computer	27-94-00-710-002-A
Operational Test of the SEC 2 Computer	27-94-00-710-003-A
Operational Test of the SEC 3 Computer	27-94-00-710-001-A
Operational Test of the FCDC	27-96-00-710-001-A
Ops Test of the Computers Engage /Disengagement	27-96-00-710-002-A
Operational Test of the Side Stick Priority	27-96-00-710-003-A
Ops Test of THS Actuator with Electrical Motor N°3	27-96-00-710-006-A
Ops Test of the Damping Measurement (Aileron)	27-96-00-710-007-A
Ops Test of the Damping Measurement (Elevator)	27-96-00-710-008-A
Ops Test of the Aileron and Hydraulic Actuation"	27-14-00-710-001
Ops Test of the Elevator and Hydraulic Actuation	27-34-00-710-001
Operational Test of the Sidestick assembly	27-96-00-710-020

- **Elevator or Aileron Damping Test**

Servo control in the active mode:- the mode selector valve in the active position. The two chambers of the piston are thus connected to the servo valve control lines. **Servo control in the damping mode:**-the mode selector valve in the damping position. This causes the two chambers of the piston to be interconnected through the **damping orifice.** The damping orifice is calibrated to provide an appropriate damping coefficient for the actuator.
Reason for the Job: To make sure that the damping coefficient of the servo controls is sufficient. The aim of the damping test is to detect potential hidden **failures** leading to decrease the damping coefficient of the actuator, i.e. all the actuator failures (internal hydraulic leak) that would allow the hydraulic fluid to communicate between the two chambers of the piston through a different way from the damping orifice. For instance, piston dynamic head seal leakage.
If the damping coefficient is below the **minimum** value, do the related trouble shooting procedure:

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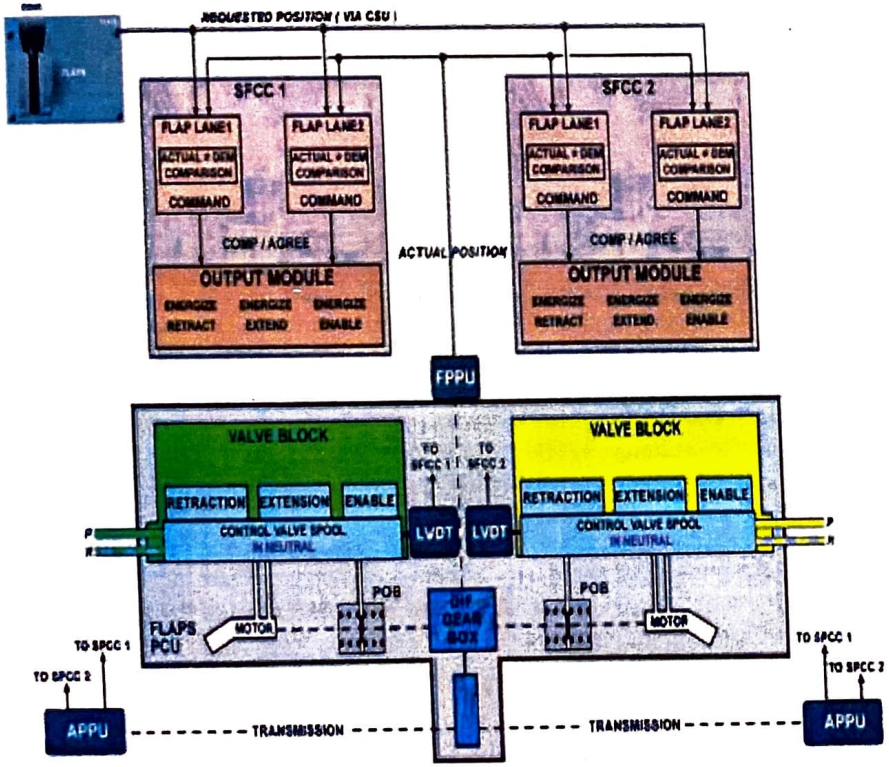
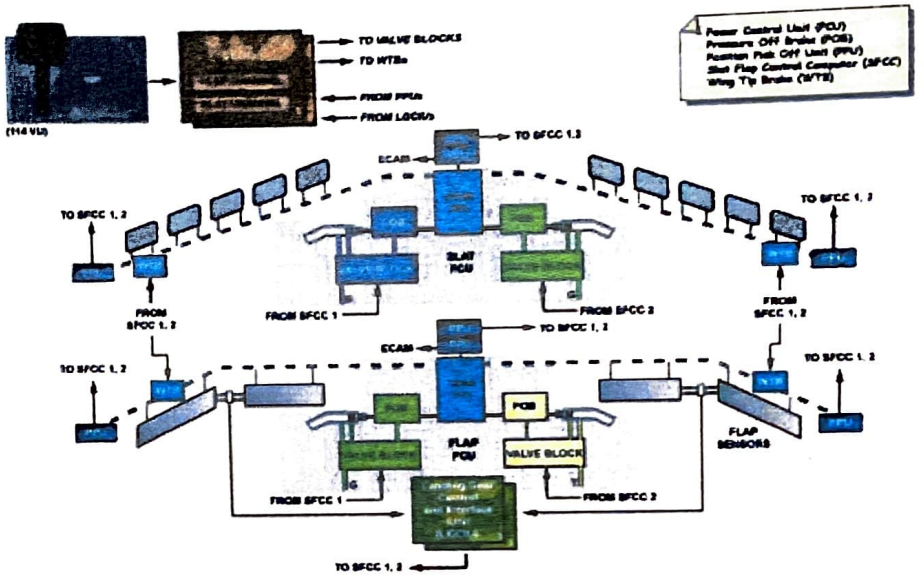
MAINTENANCE TASK	TSM REFERENCE
Ops Test of Damping Measure (Aileron) not OK".	27-10-00-810-838
Ops Test of the Damping Measure Elevator not OK".	27-30-00-810-852
If the AIL(ELEV) TEST NOT POSSIBLE msg is shown, do trouble shooting as :-	
Ailerons Damp Not Possible (Decoding) LH and RH	27-10-00-810-841
Elevator Damping Test Not Possible	27-30-00-810-848
Elevator Damping Test Not Possible (decode)"	27-30-00-810-851

FLAPS/SLAT ELECTRICAL CONTROL AND MONITORING:-HYDRAULIC SUPPLY as:-

- **SLATS USE B & G HYD**
- **FLAPS USE Y & G HYD**





SLATS/FLAP ELECTRICAL CONTROL AND MONITORING

The **two SFCCs monitor** the operation of the transmission system. The FPPU (which is part of the flaps PCU) and the two APPUs send signals to the SFCCs. They identify component failures of the transmission system and the control system. The Pressure-Off Brakes (POB) of the PCU and the WTBs stop and hold the transmission system when a failure occurs.

The two lanes in each channel have different hardware and software: – **lane ONE** has an INTEL 80C186 microprocessor (software programmed in assembler language) –**lane TWO** has a MOTOROLA 68HC000 microprocessor (software programmed in Pascal language).

The electrical control and monitoring system of the **slats/ Flap** has:

Each SFCC controls a valve block of a hydraulic motor, which is part of the slat PCU. The two SFCCs monitor the operation of the transmission system. The **FPPU** (which is part of the slats PCU) and the **two APPUs** send signals to the **SFCCs.** They identify component failures of the transmission system and the control system. The Pressure-Off Brakes (POB) of the PCU and the WTBs stop and hold the transmission system when a failure occurs.

Slat and Flap Control Computer **SFCC SLATS**	
49VU FLIGHT CONTROLS/SLT/CTL AND MONG/SYS1	B-6
121VU FLIGHTCONTROLS/SLT/CTL/SYS2	R-21
SFCC FLAPS	
SYS 1 CTL/MONG	B-7
SYS 2 CTL/MONG	Q-21

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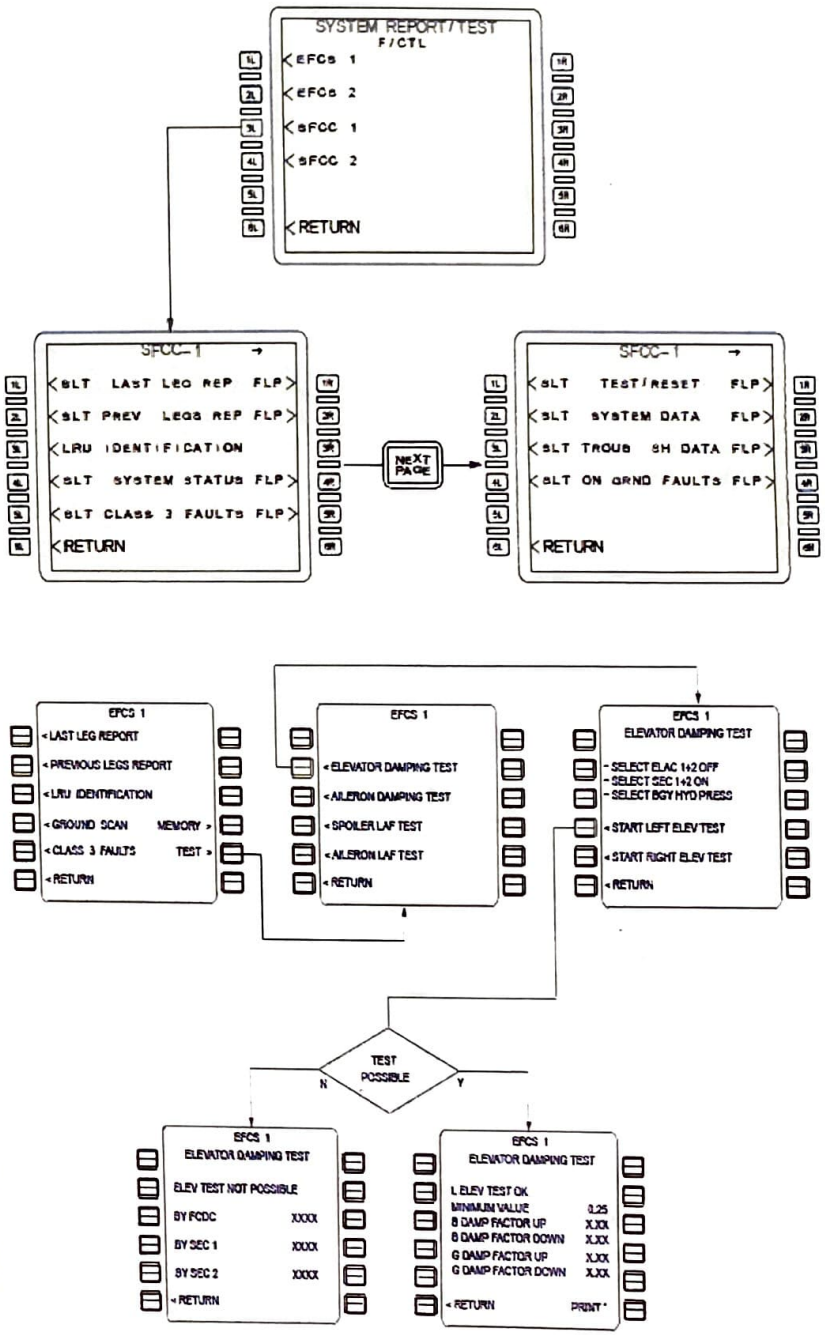
MAINTENANCE TASK	AMM REFERENCE
Deactivation of the (SFCC) No. 2 Flap Channel	27-51-00-040-001-A
Reactivation of the (SFCC) No. 2 Flap Channel	27-51-00-440-001-A
Deactivation of the (SFCC) No. 2 Slat Channel	27-51-00-040-005-A
Reactivation of the (SFCC) No. 2 Slat Channel	27-51-00-440-005-A
Flap WTB Solenoid - WTB Test Procedure	27-51-00-040-004-A
Ops Test of the Wing Tip Brake & Pressure Off Brake	27-51-00-710-001-A
Read-out of Class 3 Faults in the Flap System	27-51-00-740-001-A
BITE Test of the SFCC (Flap System)	27-51-00-740-002-A
Manual Adjustment of the Position Pick-Off Units	27-51-00-820-001-A
Ops Test of the Flap Interconnecting Strut and the Flap-Attachment Failure-Detection Sensors	27-51-00-710-002-A
Automatic Integrity Test of the SFCC Computers	27-51-00-750-001-A
Slat WTB Solenoids - WTB Test Procedure	27-81-00-040-001-A
Ops Test of the WTB and the Pressure-Off Brake	27-81-00-710-001-A
Read-out for Class 3 Faults in the Slat System	27-81-00-740-001-A
BITE Test of the SFCC(Slat System)	27-81-00-740-002-A
Manual Adjustment of the Position Pick-Off Units	27-81-00-820-001-A
Removal of Asymmetry-Position Pick-Off Unit	27-81-18-000-001-A
Install of the Asymmetry-Position Pick-Off Unit	27-81-18-400-001-A
Removal of the Feed Back Position Pick-Off Unit	27-81-19-000-001-A
Installation of Feed Back Position Pick-Off Unit	27-81-19-400-001-A
Removal of the Slat Wing-Tip Brake	27-81-51-000-001-A
Installation of the Slat Wing-Tip Brake	27-81-51-400-001-A
Removal of Solenoid Valve from the Slat (WTB)	27-81-51-000-004-A
Installation of the Solenoid Valve to Slat WTB)	27-81-51-400-002-A
SLAT/FLAP SYS1/2 FAULT ECAM warning due to opposite SFCC failure:-	
TSM TASK 27-81-00-810-832	(SLAT channel)
TSM TASK 27-51-00-810-845	(FLAP channel)

"F/CTL SLAT/FLAP SYS1/2 FAULT" ECAM warning, associated with SFCC1 21CV/SFCC2 22CV fault messages in PFR, recorded in flight phase 2, and **not** solved by replacement of the SFCC incriminated by the fault. In that failure mode,

- SFCC1/2 swapping will transfer the fault.
- BITE test will pass for faulty SFCC, and will fail for the opposite unit.
  - ➢ Replacement of opposite SFCC (the one not incriminated by E/W and F/M) enables to clear the fault.



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ME-28 Fuel

FAULT MESSAGE	POTENTIAL CAUSES
APU LP VALVE FAULT.	VALVE position disagrees with the selected pos.
FUEL AUTO FEED FAULT	CTR TK quantity > 250 kg and left or right wing tanks quantity < 5 000 kg ,
Or CTR TK pumps do not stop after slat extension or CTR TK level is low.	
AUTO TRANSFER FAULT.	CTR TK quantity > 250 kg and Left or right wing tanks quantity < 5 000 kg
CTR L(R) XFR FAULT (VALVE NOT FULLY CSED)	EITHER center transfer valve is failed in open position.
FUEL CTR L(R) XFR FAULT (VALVE NOT FULLY OPEN)	EITHER center transfer valve is failed in closed position.
CTR L + R XFR FAULT (VLVES NOT FULLY CLSED)	BOTH center transfer valves are failed in open position.
FUEL CTR L + R XFR FAULT (VLVES NOT FULLY OPEN)	BOTH center transfer valves are failed in closed position.
CTR TK PUMP 1(2) LO PR	*CTR TK PUMP that is not affected stop*
automatically because:-.The L(R) INR TK is full, or CTR TK is empty	
CTR TK PUMPS LO PR	PRESSURE of the CTR TK pumps is low.
FUEL CTR TK PUMPS OFF	BOTH CTR TK PUMP 1 pb-sw and CTR TK PUMP 2 pb-sw are at OFF with no failure.
FUEL CTR TK XFR OFF	BOTH CTR TK L XFR pb-sw and CTR TK R XFR pb-sw at OFF when the system is in automatic mode.
ENG 1(2) LP VLV OPEN	VALVE remains in the open position.
FUEL F. USED/FOB DISAGREE	DIFFERENCE between the initial FOB and the actual FOB + fuel used is significant.
FUEL FQI CH 1(2) FAULT	FQI channel is failed.
*FUEL L(R) INNER(OUTER) TK HI TEMP:-	FUEL temperature:- In outer cell, is above 55 °C on ground, In outer cell, is above 60 °C in flight
- In inner cell, is above 45 °C on ground-In inner cell, is above 54 °C in flight	
* This caution may spuriously trigger due to interference from communication equipment. Therefore, wait 2 min while the fuel temp measure is updated..	
FUEL L (R) OUTER (INNER) TK HI TEMP	FUEL temperature:-In outer cell, is above 60 °C or In inner cell, is above 54 °C.
FUEL L(R) INNER(OUTER) TK LO TEMP.	FUEL temperature is approximately below -43 °C.

FUEL L(R) OUTER XFR CLOSED.	*BOTH transfer valves remain closed after inner tank reaches the low level.
* *Note: When fuel quantity in affected wing reaches low level, corresponding FUEL WING TK LO LVL warning is triggered.*	
FUEL L(R) OUTER XFR OPEN	EITHER transfer valve opens before inner tank reaches low level.
L(R) TK PUMP 1(2) LO PR	PRESSURE of one tank pump is low.
L(R) TK PUMP 1+2 LO PR	PRESSURE of the tank pumps is low.
L (R) TK PUMP 1 + 2 LO PR (CTR TANK EMPTY)	PRESSURE of the tank pumps is low.
FUEL L (R) TK PUMP 1 + 2 LO PR (TK NOT EMPTY)	PRESSURE of the tank pumps is low.
* L(R) WING TK LO LVL.	LEFT OR RIGHT wing tanks Qty is below 750 kg.
* L+R WING TK LO LVL	LOW LEVEL is detected in both wing inner tanks.
*Note: This alert is triggered by sensors getting dry and is independent from the fuel quantity indications..	
L(R) XFR VALVE CLOSED	BOTH XFR valve fail to open after inner cell low level.
F L(R) WING TK overflow	overflow of the tank is *CTR TK PUMP 1(2) is ON,*
Fuel from the CTR TK can be used to cool the IDG 1(2) and recirculate into the left (right) outer tank. Switching the CTR TK PUMP 1(2) OFF enables to stop this fuel recirculation.	
FUEL L(R) XFR VALVE OPEN	EITHER transfer valve opens before inner tank reaches low level.
FUEL X FEED VALVE FAULT	VALVE position disagree.
FUEL LO LVL DET FAULT	BOTH low level sensors are failed.
FUEL X FEED VALVE FAULT	VALVE position disagrees with selected position.
FUEL IDG 1(2) COOL FAULT- MMEL Item (MI) 73-10-01	ALERT is created to take into account a failure of the Fuel Return Valve. It informs the Integrated Drive Generator (IDG) cooling system has failed.
- FUEL LO LVL DET FAULT "NO DISPATCH".	ALERT is created to take into account a failure of low level sensor in each inner tank..
FQI XX/ FQI degraded (NN)	Fuel probes, cadensicons or FQIC failed Check FQI input parameters including probe capacitances.
AMM 28-42-00-740-003 ;TSM 28-42-00-810-836;MMEL 28-40-02	
*FQI discrepancy between uplift and FOB	Water contamination, or fuel probes failed Perform water drain.
* AMM 12-11-28-650-007: AMM 12-32-28-281-001(Drainage)	

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FUEL TEMP XX (on ECAM) TSM 28-42-00-810-(837 to 840) MMEL 28-40-09	FQIC or fuel probe/temp sensor failed Select FUEL page on ECAM. ,Examine fuel temperatures.
HI LVL LIGHTILLUMINATED (when tank not full) AMM 12-11-28-650-007	High Level Sensor or FLSCU failed Manual refuel. Check MFLI to ensure there is no over spill.
END LIGHT FLASHING TSM 28-25-00-810-801	Refuel aborted before ACTUAL and PRESELECTED quantities are the same
or ACTUAL is higher than PRESELECTED, Set MODE SELECT switch to OFF. Perform manual refuel. If still failed, use override plunger on refuel valve.	
*Unwanted XFR from outer TK to inner TK	Outer Tank OPP or XFR valve failed Functional (BITE) Test of the Intercell Transfer Valves
*Unwanted XFR from left wing to centre TK	Centre Tank OPP failed; Transfer fuel from CTR tank to Left Wing to identify where leak stops.
* TSM 28-15-00-810-815; TSM 28-12-00-810-801	
ANY TANK UNABLE TO REFUEL	Refuel valve or refuel valve control; Use manual override on refuel valve if valve still closed
* TSM 25-25-00-810-803; TSM 28-25-00-810-802	
Loss of fuel quantity indication or Simultaneous triggering of FUEL L OUTER XFR CLOSED and FUEL R OUTER XFR CLOSED, although FUEL SD indicates no anomaly. (FQIC)= Pull the 3 C/Bs:- Channel 1 (A13 on 49VU);- Channel 2 (M27 on 121VU);- Channel 1 and 2 (L26 on 121VU).-Wait 5 s, before pushing the 3 C/Bs.;- *Note: The fuel quantity indication will be re-established within 1 min.*	

Pressure Refuel without Electrical Power (AMM 12-11-28-650-005)

Refuel on Battery (AMM12-11-28-650-003-A)

Fuel Quantity Indication Computer (FQIC)	
A13	FUEL/FQI/CHAN/1
*L26	FUEL/FQI/CHANNEL/1 AND 2
M27	FUEL/FQI/CHAN/2
*PULL L26 FIRST,RESET LAST. 80 Sec Pwr-up Test. IF BOTH CHANNELS RESET AT THE SAME TIME, OUTBD XFER. VLVS WILL OPEN AND SLIGHT AMOUNT OF FUEL WILL XFER. VLV OPERATION CAN BE MONITORED ON ECAM FUEL PAGE	
A11	49VU FUEL/XFR VALVE1/WING/R
M23	121VU FUEL/XFR VALVE2/WING/R
A10	49VU FUEL/XFR VALVE1/WING/L
M22	121VU FUEL/XFR VALVE2/WING/L
A08	49VU FUEL/LP VALVE/MOT1/ENG1
A09	49VU FUEL/LP VALVE/MOT1/ENG2
M25	121VU FUEL/LP VALVE/MOT2/ENG1
M26	121VU FUEL/LP VALVE/MOT2/ENG2

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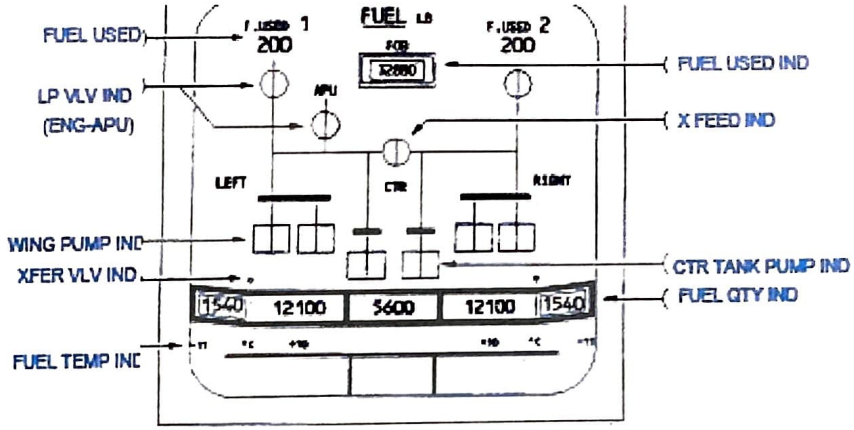


Fuel Quantity Indicating (FQI) system measures the quantity of fuel in the aircraft fuel tanks. The FQI system gives fuel quantity indications for each of these fuel tanks:- the LH and RH wing tanks & the center tank.

The FQI system has fuel probes. The electrical capacitance of the fuel probes is in relation to the fuel level. The Fuel Quantity Indicating Computer (FQIC) measures this capacitance **at regular intervals and calculates the fuel quantity in each tank**

To keep the number of computer removals and replacements to a minimum do the Power On BITE test of the FQI system as follows:

(a) If the FQIS is not energized:

1 Close the C/Bs 1QT **A-13** and 2QT **M-27.**

(b) If the FQIS is energized, reset the FQIC as follows:

Open the C/Bs 1QT A-13 and 2QT **M-27**. Wait 10 seconds .then Close the C/Bs 1QT **A-13** and 2QT**M-27**

IF LOSS OF FUEL QUANTITY INDICATION OR, SIMULTANEOUS TRIGGERING OF FUEL L XFR VALVE CLOSED although FUEL SD indicates no anomaly. Open On overhead circuit breaker panel 49VU **(A-13):-**

- Open the C/B. On the rear circuit breaker panel 121VU
- **(M 27 & L-26.**. After 5 seconds, close the three C/B's.

PULL L26 FIRST & RESET LAST. AND Pwr-up Test WILL TAKE APPROX. 80 Sec.

***** ON A/C 001-007, 009-100, 201-300***

A set of fuel probes are installed in each fuel tank. Each fuel probe has an electrical capacitance value which changes in relation to the change in depth of the fuel in its tank. The FQIC regularly measures the electrical capacitance values of all the fuel probes. It then uses each set of probe capacitance values to find the volume of fuel in a tank.

The **fuel probes 22QT1(22QT2) and 33QT1(33QT2) have diodes** that are used to calculate the temperature of the fuel adjacent to them. The FQIC **regularly monitors these diodes** and uses the voltage drop across them to calculate the fuel temperature. The fuel temperature for each wing tank cell is shown on the System Display **(SD)** FUEL page of the ECAM.

***** ON A/C 101-150***

A set of fuel probes is installed in each fuel tank. Each fuel probe has an electrical capacitance **value which** changes **in relation to the change in** depth of the fuel in its tank. The FQIC regularly measures the **electrical capacitance values** of all the fuel probes. **It then uses each set of probe capacitance values to find the** volume of fuel **in a** tank.

The **fuel probe 92QT1(92QT2) and 93QT1(93QT2) includes a temperature sensor** at its lower end. The temperature sensor has an **electrical resistive element,** the value **of which is in** relation to the temperature of the fuel adjacent to it. The FQIC regularly monitors the **temperature sensor** and uses its resistance value to calculate the fuel temperature. The **fuel temperature for each wing tank** is shown on the System Display (SD) FUEL page of the ECAM.

The **electrical capacitance-value** of the probe changes in relation to the depth of fuel **in the tank. When the probe is dry, its capacitance value is low,** but as fuel moves up the probe, **its capacitance value increases.**

The FQIC continuously **measures the capacitance value.**

FQIC contains the Built-In Test Equipment (BITE) that lets it test and monitor:

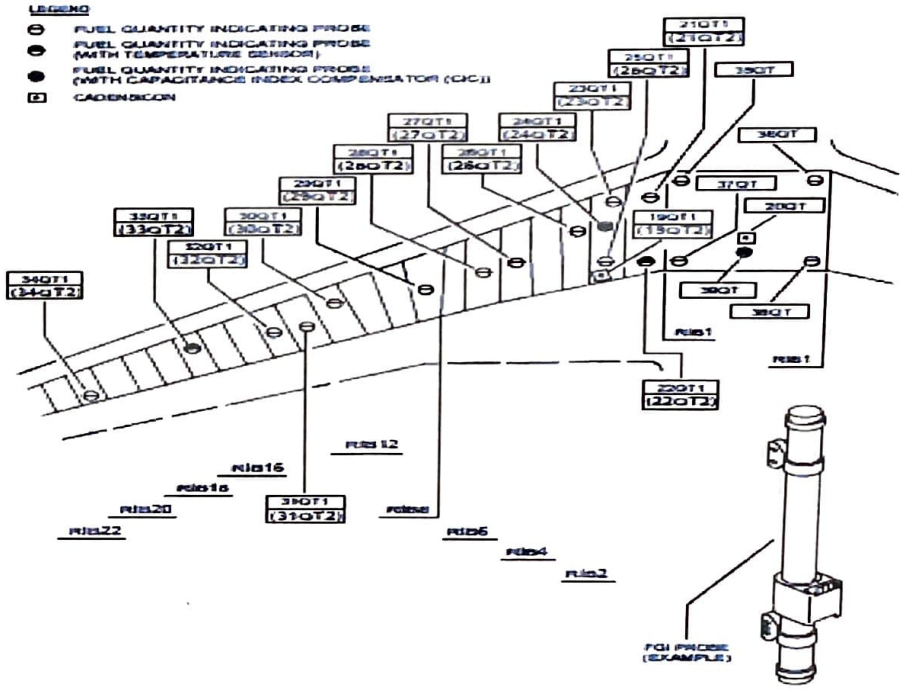
· the Fuel Quantity Indicating System **(FQIS)**

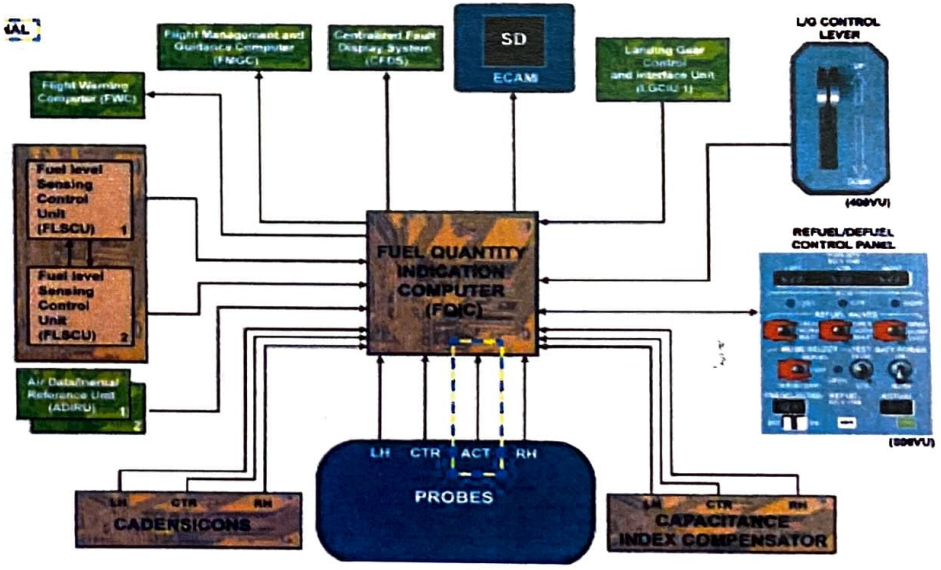
· the Fuel Level Sensing System **(FLSS)** (Ref. AMM D/O 28-46-00-00) .

The FQIC does BITE test of the **FQIS at aircraft power-up and then continuously** whilst the **FQIC is energized.** The FQIC does the BITE test of the FLSS at aircraft power-up for the sensors that are **fully in fuel or fully out of fuel.** For the sensors that **cannot be tested,** the FQIC does the BITE test of these sensors when the fuel is **next at the correct level.** The FLSS BITE test is only done when the aircraft is on the ground.

All the **FQIS failures** are sent to the Centralized Fault Display System **(CFDS).**

The FQIC has **two channels, channel 1 and channel 2.** One channel is the master channel and the other channel is the slave channel (the master channel is always **the primary channel). Channel 1 and channel 2 do the FQIS BITE,** but the **FLSS BITE is only done** by the **master channel.** The BITE test results can be found on **the FQIC STATUS and FLSS** STATUS pages of the MCDU. The system **uses FQI probes, Compensator probes and Cadensicons** within each tank to continuously measure the quantity of usable fuel in that tank. All interfacing and calculations are performed by the **Fuel Quantity Indication Computer (FQIC).**





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FQIC:-The Fuel Quantity Indication Computer (FQIC) does the fuel mass calculations and controls the whole system by using various interfaces.
PROBES:-A set of capacitance probes in each tank sends a signal to the computer in relation to the fuel level in the tank. There are **5 probes in the center** tank and 14 per wing tank. A single probe failure does not affect the system indication. In each tank inner cell, **fuel probe No. 2** and in each outer cell fuel probe **No. 13 have diodes** that give the fuel temperature to the FQIC for indication on the ECAM system display.
CAPACITANCE INDEX COMPENSATOR:-One probe with a Capacitance Index Compensator (CIC) is **installed inside each tank** such that under normal operational conditions it is always fully submerged in fuel and thus the **permittivity of the fuel** can be determined. The Capacitance Index Compensator has a capacitance in proportion to the **dielectric constant of the fuel**. The capacitance value is a result of the density of the **fuel between the plates**. The fuel density changes with temperature and type of fuel. In the **case of cadensicons** failure, the fuel mass can be calculated from a density value as assumed from the **dielectric constant value**.
.CADENSICONS:-The cadensicons give a signal to the computer in proportion to the density and the dielectric constant of the fuel held in each tank. The fuel mass is **calculated from this density value.**
FLSCU:-The Fuel Level Sensing Control Units (FLSCU) are mainly used:-to **shut the related refuel valve** when the high level is **reached in each tank,**
- to **start the BITE test of the high level sensors** and their related circuits, by using the **TEST switch on the refuel/defuel control panel.**
High-level sensors in each tank send a signal to the FQIC, via the FLSCU.
The test is started via the FQIC and the FLSCU. Sensor and system status is sent **from the FQIC to the CFDS.**

OPERATIONAL PRINCIPLE:- The FQIS is a positive DC capacitive system. In such a system the fuel probes (which are the sensors) operate as capacitors. The dielectric of the capacitors is:
- fuel if a fuel probe is **covered with fuel**
- air if a fuel probe is **not covered with fuel.**
Each fuel probe operates as a **variable capacitor** with a **capacitance value** related to the **ratio of the fuel probe covered in air or fuel.** This is because the permittivity of the fuel is approximately **two times that of air.** Thus the fuel is a component part of the **electrical FQIS.** If water (and/or other unwanted materials) gets into a fuel-tank, **it can cause problems.** Example, it can cause a partial or a complete short circuit between the **two concentric tubes of the fuel probe.** Interval is proportional to the **density of the adjacent fuel.**

. It is very important that the **water in each fuel tank is kept to a minimum.** A failure to do so can cause the problems that follow:
- water contamination
- microbiological contamination
- chemical contamination etc ,etc

In each tank the density of the fuel is measured by **using a cadensicon,** which measures only its respective tank. The signals have a continuous 30 seconds time average applied to remove fluctuations.
If the **cadensicon signal is not** available or invalid (all failed or out of range in water) the **Capacitance Index Capacitor (CIC) signal is used.**
One probe has a CIC at its lower end. The CIC has a specific function:
- to measure the dielectric constant, because most of the time it is fully covered by remaining fuel in tank.

The FQIC uses the dielectric constant to calculate the fuel volume in the tanks. The electrical capacitance of each probe is proportional to the height of fuel around the probe. One CIC probe is positioned in the tank (always fully submerged in fuel under normal operational conditions) measuring the permittivity of the fuel (K, also called the dielectric).
NOTE: The ECAM displays the **Fuel on Board (FOB) with two amber** dashes as a degraded display, as long as the **accuracy is not degraded beyond 5%.**

28-15-00 - INTERCELL TRANSFER

the FOB indication on the ECAM EWD is also shown amber and half boxed.
The **inter cell transfer system** is controlled automatically by the **FLSS and the FQIC.** When one of the **two low level sensors** 15QJ1/16QJ2) **becomes dry,** the FLSCU1/2 will send an **open** signal to the two actuators 9QP and 10QP. When one of the two low level sensors 16QJ1/15QJ2 becomes dry, the FLSCU1/2 will send an **open signal** to the two actuators 11QP and 12QP. When **open the intercell transfer valves stay latched open until the next refuel operation.** At the start of a refuel operation the inter cell transfer valve actuators are **de-latched by the FQIC**

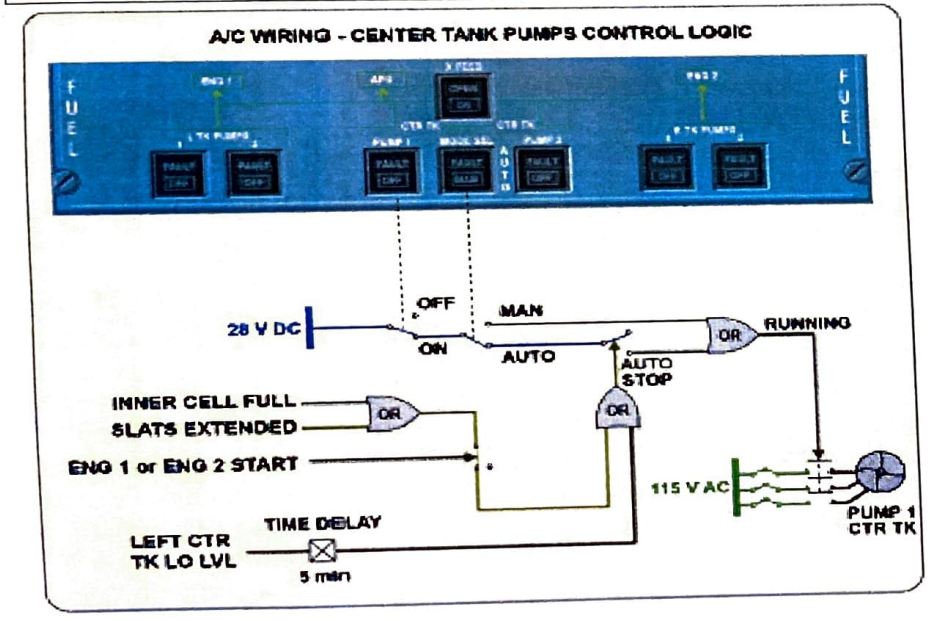
If **both** intercell transfer valves in one tank fail to open when commanded:

- the Fuel Quantity Indication (FQI) for the related **outer cell goes amber** in color and is shown **boxed.** This is to indicate that the **fuel in outer cell** is unusable
- the **Fuel On Board (FOB)** indication on the SD FUEL page is shown amber and boxed. This to indicate that the **FOB is not fully usable.**

INDICATION		COLOR	VALVE OPERATION
LEFT	RIGHT		
		NONE	BOTH VALVES CLOSED
▶	◀	AMBER	BOTH VALVES FULLY OPEN BUT AT LEAST ONE SHOULD BE CLOSED
▷	◁	GREEN	ONE OR MORE VALVES IN TANK IS FULLY OPEN
▷	◁	AMBER	ONE VALVE IN OPERATION
XX	XX	AMBER	DATA NOT AVAILABLE

TASK	AMM REFERENCES
Check the Fuel Quantity Indicating Computer Status	28-42-00-040-002-A
Operational Test the Fuel Quantity Indicating-System	28-42-00-710-001-A
Status Report (BITE)	28-42-00-740-001-A
Interrogation of the FQIS Input Parameters Pages	28-42-00-740-003-A
Test of the Tank High-Level Sensing-System	28-46-00-710-001-A
To Set the LH Wing Transfer Valve Open for Flight	28-15-00-040-001-A
To Set the RH Wing Transfer Valve Open for Flight	28-15-00-040-002-A
Functional (BITE) Test of the Intercell Transfer Valves	28-15-00-740-002-A
Operational Check of Individual Transfer Valves to Ensure Valve Shaft Rotates Valve to Open Position	28-15-00-710-002-A

A/C WIRING - CENTER TANK PUMPS CONTROL LOGIC



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Center Tank Pumps Logic:-

The center tank pumps have two modes of operation:–manual or automatic

In manual mode (MODE SEL P/B switch released out), the operation of the pumps is controlled by the CTR TK PUMPS P/B switches.

In automatic mode (MODE SEL P/B switch pushed in) the center tank pumps are controlled by the Fuel Level Sensing Control Unit depend on, slats position, wing and center tank low level sensors. If the CTR TK PUMPS P/B switches set to ON:-

During engine start, regardless of the slats position, the center tank pumps will operate for two minutes to scavenge any water in the tank before takeoff.

On ground, before takeoff, when slats are extended, the center tank pumps will stop and the fuel will be supplied by the wing tank pumps.

During climb, when slats are retracted below 16 the center tank pumps will start and the higher pressure will give priority to the center tank pumps.

The pumps will now operate untill center tank low level plus five minutes is obtained. Fault inhibit relays do not let the FAULT annunciators come ON during the five minute period.,

FUEL SENSOR FUNCTION:- All the sensors are similar.

High Level Sensors:-Installed near the top of each fuel tank. When the sensor becomes wet the FLSCU signals the associated tank refuel solenoid valve to close, and will illuminate the "HI LEVEL" light on the refuel panel.

Low Level Sensors:-in the center tank (130 kg), when dry, they will signal the center tank boost pump to stop, with a time delay of 5 minutes. In the wing tank (750 kg), when dry, they will open LH and RH Transfer valves simultaneously. If the sensor is exposed to air for more than 30 seconds, **"FUEL LO LEVEL"** warning will be indicated on the ECAM display.

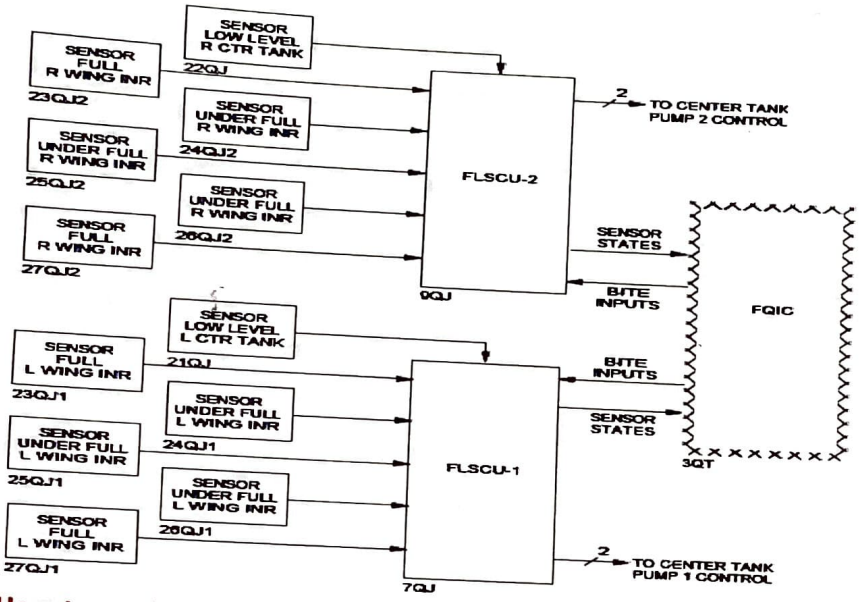
IDG Low Level Sensors:- will stop IDG fuel return when the fuel level is below 280kg.

Full Level Sensors:-in the left and right inner cells, controls the operation of the center tank pumps when "AUTO" is selected. They will stop the center tank pumps when covered in fuel.

Under full Level Sensors:- in left and right inner cells, controls the operation of the center tank pumps when "AUTO" is selected. When dry the center tank pumps start again if there is no low level in the center tank. The difference between full / under full is approximately 500kg.

Overflow Level Sensor:- in the Vent Surge tanks, will signal the respective IDG fuel return valve to close.

Temperature Sensors:- inner cell (52.5 C) and/or outer cell (55 C) will signal the respective IDG fuel return valve to close if the specified temperature is exceeded.



. How to read the input parameter tables for A320 aircraft:-

(1) To get the FQIC input parameter table follow the instructions as detailed in **AMM 28-42-00-740-003** - Interrogation of the FQIS Input Parameters Pages

(2) Print out the FQIS discrete input parameters, and make a note of the Individual fuel tank FQI

(3) Use information above confirm the status of the Level Sensor - Determine whether the Level Sensors should be WET (or NOT DRY) or DRY (or NOT WET)

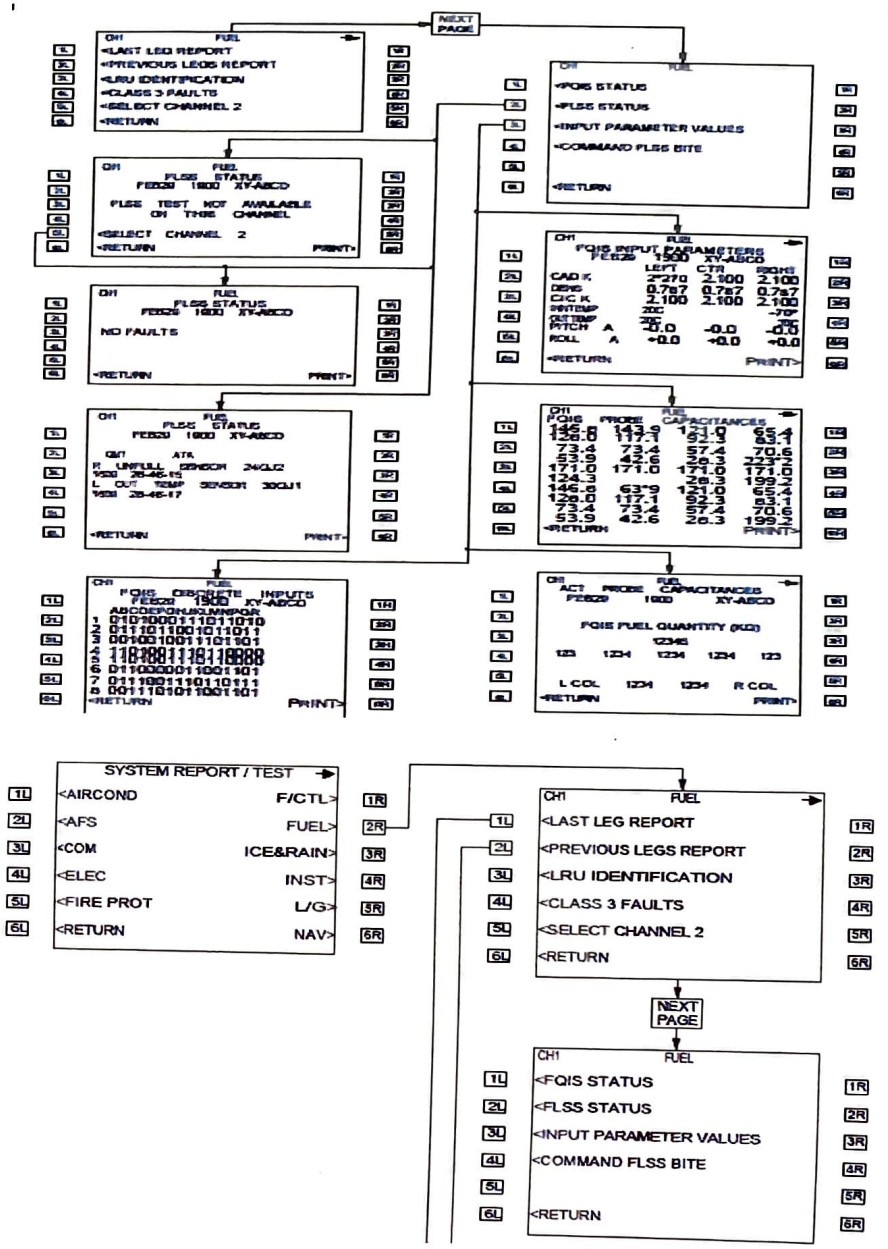
(4) Use information in the TSM, ch 28-42-00 P Block 301(Also refer to TSM task TSM TASK 28-46-00-810-818), to identify the locations on the FQIS input parameters of the individual level sensors e.g. Location 4P 16QJ2 WET (LS5/1)

(5) Confirm the status of the level sensor as seen by the FQIS input parameter. The status of the level sensors, when indicating "1" are as follows:LS7

FLSCU2 6QJ - DRY – Dummy Sensor

NOTE 1: Default value is "0". For High level sensor sensors default values is "0", which is WET. The high level sensors will not be powered until the refuel panel is open, Unless these conditions are met the input parameters will indicate that the high level sensors are WET.

NOTE 2: The High Level sensors will be de powered, and show "WET" status if refuel panel is not open



ME-29 Hydraulic Power

FAULT MESSAGE	POTENTIAL CAUSES
HYD B ELEC PUMP LO PR	LO PR:- pump outlet pressure ≤1 450 PSI
(resets if pressure ≥1 750 PSI)	
*HYD B ELEC PUMP OVHT.	TEMPERATURE of motor increases to 162 deg.C
*Switch operates and sends signals to the overhead panel and ECAM	
*HYD B RSVR LO AIR PR	When the reservoir air pressure ≤ 22 PSI (the alert resets if pressure ≥ 25 PSI).
* When the reservoir air pressure ≤ 30 PSI (detected in flight but only displayed on ground after landing).	
HYD B RSVR LO LVL	FLUID quantity < 2.4 l
HYD B RSVR OVHT.	FLUID temperature ≥93 °C (resets if temperature ≤88 °C).
HYD B SYS LO PR.	SYSTEM pressure ≤ 1 450 PSI (reset if pressure ≥ 1 750 PSI)
HYD B+G SYS LO PR	GREEN AND BLUE systems pressure ≤1 450 PSI (resets if pressure ≥1 750 PSI).
HYD B+Y SYS LO PR	BLUE AND YELLOW systems pressure ≤1 450 PSI (resets if pressure ≥1 750 PSI).
G ENG 1 PUMP LO PR	PUMP outlet pressure ≤1 750 PSI (resets if press ≥2200PSI).
HYD G RSVR LO AIR PR.	RESERVOIR air pressure ≤22 PSI (resets if air press ≥25 PSI).
HYD G RSVR LO LVL	FLUID quantity < 3.5 l
HYD G RSVR OVHT.	FLUID temperature ≥93 ° C
(resets if temperature ≤88 °C).or when the fluid temperature ≥98 °C(NEO)	
HYD G SYS LO PR	SYSTEM pressure ≤ 1 450 PSI (reset if pressure ≥ 1 750 PSI)
HYD G+Y SYS LO PR	SYSTEM pressure ≤ 1 450 PSI (reset if pressure ≥ 1 750 PSI)
HYD RAT FAULT	The RAT is not fully stowed. Or
Pressure is present in the RAT stowing actuator, or RAT pump is not available	
HYD Y ELEC PUMP LO PR.	LO PR:-yellow system pressure ≤1 450 PSI
Y ELEC PUMP pb at ON ,Y ENG PUMP and PTU not available.	
HYD Y ELEC PUMP OVHT	temperature of the motor increases to 162 deg.C
The switch operates, sends signals to overhead panel and ECAM	
Y ENG 2 PUMP LO PR.	PUMP outlet pressure ≤1 750 PSI
(resets if pressure ≥2 200 PSI).(PTU OPERATIVE)	
HYD Y RSVR LO AIR PR.	RESERVOIR air pressure ≤ 22 PSI (resets if pressure ≥ 25PSI).
HYD Y RSVR LO LVL	FLUID quantity < 3.5 l
HYD Y RSVR OVHT	FLUID TEMPERATURE ≥93 °C (resets if temperature ≤88 °C).
HYD Y SYS LO PR	SYSTEM pressure ≤ 1 450 PSI (reset if pressure ≥ 1 750 PSI)
HYD PTU FAULT	On ground, PTU does not run if the differential pressure is higher than 650 PSI between G and Y system
Or In flight, PTU at AUTO position does not run when G or Y reservoir level is low, and G or Y system pressure is low. This warning is triggered, if the last engine is started within 40 s following the end of the cargo doors operation. In this case, reset the warning by switching the yellow ELEC pump ON, then OFF	
PTU FAULT with (ENGINES RUNNING)= 1ST)= YELLOW ELEC PUMP "ON"-;WAIT 2 SEC, TURN Y ELEC PUMP "OFF" 2ND) =SET BRAKES,- BOTH ENG PUMPS "OFF" ,- Y ELEC PUMP "ON",-PTU P/B "OFF" THEN TO "AUTO", then -Y ELEC PUMP "OFF",-ENG PUMPS "ON" 3rd)=PTU FAULT **CAN BE CAUSED BY CARGO DOOR OPERATION AFTER ENG START IF NOT RESET G/Y PTU VLV CB- (N34) PTU FAULTS =CAUSED BY CARGO DOOR OPERATION WITHIN 30 SECs AFTER 2ND ENG START AND PTU ECAM FAILURE MESS. **THIS PROCEDURE WILL NOT RESET REAL PTU FALIURES OR HIDE FAULTS THAT DO EXIST IN PTU SYS	
PTU CONTINUOUS RUNNING= covered by MMEL item 29-23-01A. 1). Perform an internal leak check for both Yellow and Green systems as per AMM task 29-00-00-280-001 and -003. leak rate should be within AMM limits. 2). Check the amount of air in the Yellow and Green systems as per AMM task 29-00-00-210-001 and bleed the systems if there are any findings. 3). Check the nitrogen pre charge of Yellow and Green hydraulic power accumulators as per AMM task 29-10-00-200-008.	
YELLOW HYD SYS NEEDS SERVICED-=CLOSE CARGO DOORS	
HYD LO PRESS WARNING=ALL 3 SYSs NORM PRESS SWs, ARE SET AT 37 PSI	
HYD RES LO PRESS MESSAGE =RUN ENG TO PRESS RESV (PROBLEM OCCURS AFTER WORKING HYD SYS	

AMM REFERNCE	MAINTENANCE TASK
29-23-00-710-002-A	Check of Power Transfer Unit (PTU) Green to Yellow
29-23-00-710-003-A	Check of Power Transfer Unit (PTU) Yellow to Green
29-23-00-710-004-A	Ops Test of Power Transfer Unit (PTU) with EDP
29-23-00-710-006-A	Operational Check of PTU Inhibition Logic
29-23-00-710-802-A	Functional Check of Thermal PTU Inhibition Logic

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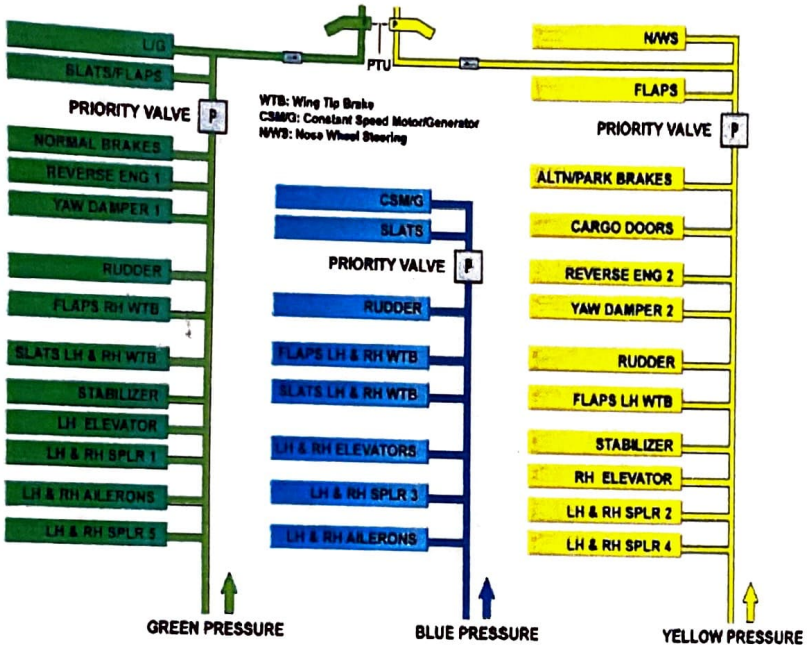
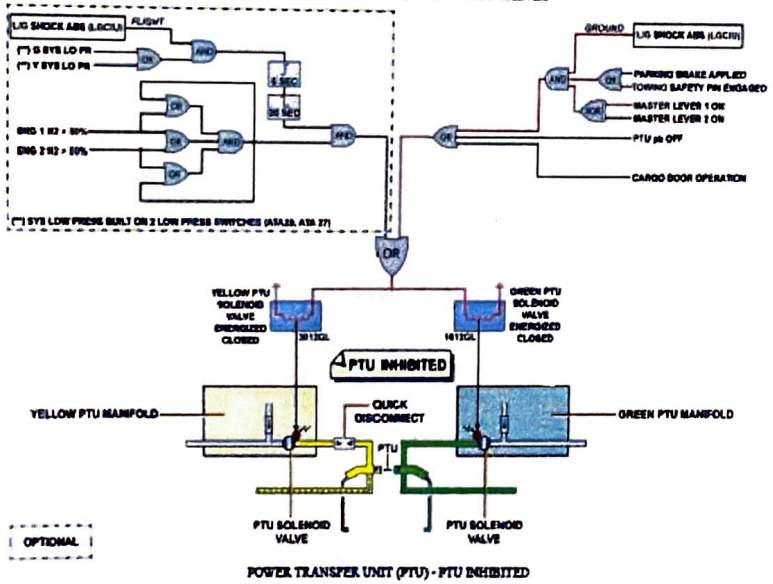


GREEN, BLUE, YELLOW USERS & PRIORITY VALVES



POWER TRANSFER UNIT (PTU) - PTU INHIBITED

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PTU INHIBITED:-The PTU operation is inhibited:-(a) During cargo door operation, (b) If the PTU P/B is switched OFF, (c) When the A/C is on ground, with one engine running and (d) if the parking brake is set on or the nose wheel steering is disconnected for towing (example: First engine start up during push back).
In flight, if the PTU is not able to pressurize a hydraulic failed system (G SYS LO PR or Y SYS LO PR) within 6 seconds, either due to external leakage or PTU failure, the PTU is automatically inhibited. This PTU inhibition logic is activated if both engines are running and remains activated as long as one engine is running. The 20s relay has been installed for the deactivation of the PTU inhibition logic. Once the PTU has been automatically inhibited, the logic is "de-latched" and PTU no longer inhibited 20 seconds after one of the following are met:- (a)A/C on ground OR,
-(b)Both engines stopped,
-(c))affected hydraulic system does not longer detect a low-pressure condition.
The FAULT light of the PTU P/BSW comes on when the sensors in the hydraulic systems detect one of these conditions:

- **Low fluid contents in the reservoir (Green or Yellow systems)**
- **Low air pressure in the reservoir (Green or Yellow systems)**
- **Fluid temperature too high (Green or Yellow systems).**

The FWC also does a check of the PTU during the start of the engines. When the master switch of the engine 1 (2) is ON and the master switch of the engine 2 (1) is OFF, the PTU cannot operate if: (a) The yellow electric pump is in operation to close the cargo doors.
or:-(b) The aircraft is on the ground, only one engine is in operation and the parking brake is ON or (c) The aircraft is on the ground, only one engine is in operation and a towing arm is attached (NWS DISC is ON) or:- (d) PTU P/BSW on the panel 40VU is set to OFF.
When the master switches of engine 1 and engine 2 are in the ON position, the PTU can operate. If there is a difference between the Green and Yellow hydraulic systems of more than 650 psi for more than 4 seconds, the ECAM shows a PTU FAULT indication.

EXTERNAL LEAKS & CAVITATION CONDITION

Check External Leaks of Hydraulic Components= AMM-29-00-00-790-001-A
To make sure that, external leaks, leakage and stains of the hydraulic components are in the specified limits.
NOTE: The definitions of the terms used in this procedure are:-A leak is the quantity of fluid that comes out of a component that is sufficient to become a drop or drops, or will possibly become a drop (approximately 20 drops = 1 cc, 75600 drops = 1 gallon)

If you do the check of external leaks because a complete loss of the hydraulic system has occurred and the:-

· RSVR LO LVL warning on the upper ECAM DU of related hydraulic system is ON

➢ Engine driven pump is operated for more than 5 minutes.

(a) You must do the check of the Green and/or Yellow hydraulic system after operation in a possible of the engine pump (AMM=TASK 29-00-00-280-006)

TASK 29-00-00-280-006-A

Check of the Green or Yellow Hydraulic System after Engine Pump Failure or Operation in a Possible Cavitation Condition - with Ground Cart Available

NOTE: A cavitation condition of the engine pump is possible when the engine pump operates with the engine pump fire-valve closed (if you set the ENG 1 (2) FIRE P/BSW on the Eng/APU fire panel), or with no fluid in the reservoir (ECAM HYD system page). This procedure can also apply if there is a indication of particles (from a defective EDP) released in the system (e.g. indication found during trouble shooting or while examine pump low pressure or overheat).

Do a check of the engine pumps for a possible cavitation condition

NOTE:- Two procedures are included here to do a check after an engine pump operation for more than 10 minutes in a possible cavitation condition. Each procedure is applicable for a different set of conditions

Only do the procedure that is applicable for the conditions you find.

Do the subsequent procedure if the engine pump has operated for more than 10 minutes:-

· With a closed engine pump fire valve, or With no fluid in the reservoir (ECAM HYD system page) or RSVR LO LVL warning on the upper ECAM DU and unknown fluid level.

NOTE: There are no time limits if The engine pump is set to OFF (ENG 1 (2) PUMP FAULT/OFF P/BSW on panel 40VU), with The engine-pump fire valve open and there is fluid in the reservoir. Do the subsequent procedure, after an engine pump operation for more than 10 minutes:- With an open engine pump fire-valve, and With fluid in the reservoir (index above the minimum gage able level on the ECAM HYD system page) although the RSVR LO LVL warning on the upper ECAM DU

29-31-00 - HYDRAULIC FLUID QUANTITY INDICATING

P35	121VU HYDRAULIC/HYD/QTY/IND
N32	121VU HYDRAULIC/LOW/LVL/IND
29-31-00-710-001-A	Functional Check of Reservoir Low Level Warning
29-34-00-710-001-A	Ops Test of Reservoir Low Air Pressure Warning

If the low level switch does not operate, the SDAC uses the data from the contents transmitter to start low level warning procedure. The warning is generated when the transmitter data show that the contents are below the low level switch threshold. The SDAC makes the warnings occur when the content of the reservoirs are 2.5 l (Green And Yellow reservoirs) or 1.8 l (Blue reservoir). In this case, there will be no FAULT indication on the overhead panel.

29-32 - HYDRAULIC FLUID PRESSURE INDICATING

The pressure switches (1074GK, 2074GJ and 3074GD) downstream of the engine pumps and downstream of the Blue electric pump monitor the output of the pumps.

The pressure switches (1151GN, 2151GN, 3151GN) on the HP manifolds of the three systems monitor the pressure in the systems. When the pressure is above the low pressure warning threshold 1450 psi the switch sends a signal to the flight control system. The Green and Yellow system switches also send signals to the auto flight system. Green system switch also sends a signal to the brake system.

29-33-00 - HYDRAULIC FLUID TEMPERATURE INDICATING

The temperature transmitters monitor the temperature of the hydraulic fluid in the return line. When the temperature of the fluid gets to 92.8 deg.C the temperature transducers send an analog signal and the "OVHT" legend on the system display of the ECAM comes on in amber. When the temperature of the fluid goes higher than 95 deg.C the temperature switch in the transmitter closes. A discrete signal then goes through the SDAC and the FWC to the overhead panel.

29-34 - RESERVOIR PRESSURIZATION INDICATING

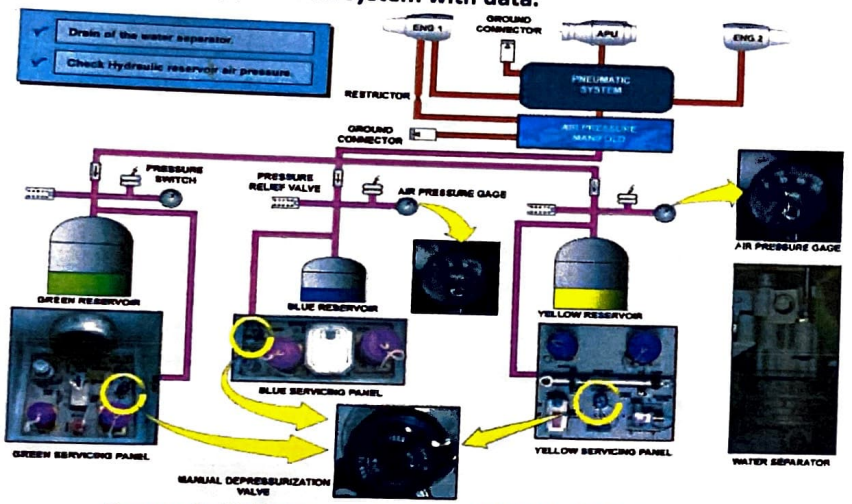
The reservoir pressurization indicating system monitors the internal pressure of the hydraulic reservoirs. If the pressure in one or more of the reservoirs is too low, the indicating system gives signals. The three reservoir air pressure-switches are the same and they are interchangeable.

The contacts of the pressure switch close when the pressure decreases to absolute (37psia) (relative (22 psig)). The contacts open when the pressure increases to absolute (40 psia)

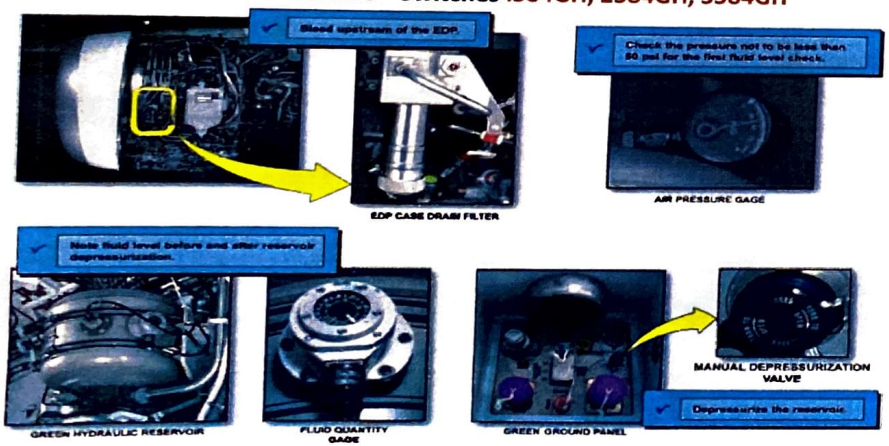
➢ SYS. MONITORING & INDICATION

SYSTEM PRESSURE MONITOR:- Pressure switches (1151GN, 2151GN, 3151GN) on the HP manifolds of the three systems monitor the pressure in the systems. When the pressure is above the low pressure warning threshold 1450 psi the switch sends a signal to the flight control system. The Blue and Yellow system switches also send signals to the auto flight system. The Green system switch also sends a signal to the brake system. When the pressure in the system falls below 1450 psi), the pressure switch operates and stops the signals to the flight controls (and auto flight / brake systems). At the same time the switch sends a signal to the FWC which give warnings.

SYSTEM PRESSURE INDICATION:-The three pressure transmitters (1065GN, 2065GN, 3065GN) measure the pressure in each system and send signals to the SDAC. The SDAC uses the data to give a digital display of the actual system pressure (with a resolution of 50 psi) on the ECAM display unit.
If the pressure falls to below 1450 psi the SDAC changes the color of the digital display from green to amber. These three transmitters also send information to the flight control system. The pressure transmitter 3068GN is for the brake system and only supplies that system with data.



Reservoir Air Pressure—**Switches l384GH, 2384GH, 3384GH**



SERVICING - BLEEDING

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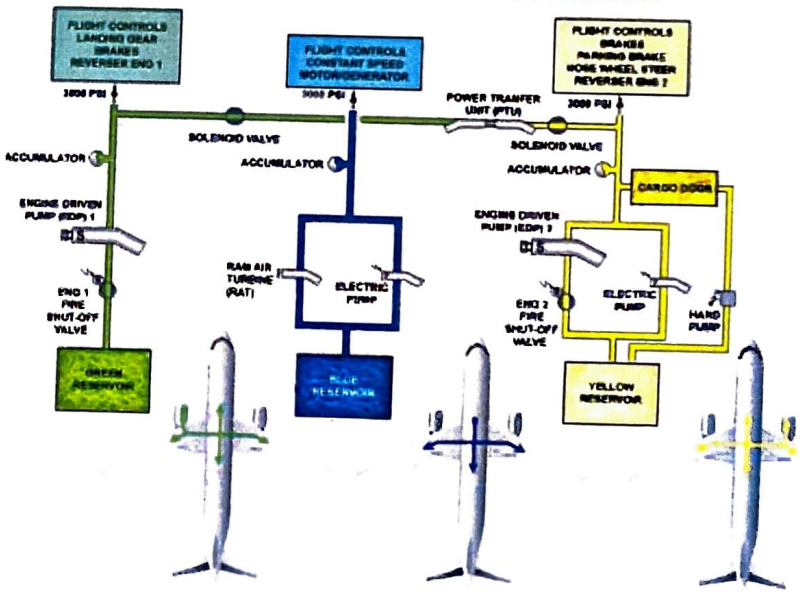
Indication on Triple Pressure Indicator=AMM 32-44-00-00

- ZTP mode:- Zero Torque Pressure?

function is to avoid depleting the brake accumulator too quickly when the hydraulic power (green and yellow) is not available and the brake pedals are used.When the green and yellow hydraulic powers are not available, the braking system is in emergency mode and the hydraulic power is supplied by the brake accumulator. If the brake pedals are cycled in that configuration it will lead to empty the brake accumulator.
In order to minimize the loss of hydraulic volume in the brake emptying/refilling operation the ABCU continues to signal the alternate brake selector valve 99GG open and to energize the direct drive valve to keep the demanded pressure equal to the Zero Torque Pressure even if the pedals are fully released.
This ZTP mode is activated when the aircraft is on ground, the pedals are released, the green and yellow hydraulic powers are unavailable, the parking brake is OFF and the towing signal on the NLG electrical box 5GC is not present.
If any of these conditions disappears then the ZTP mode is over.
The brake pressure transducers 100GG and 101GG are sending the brake pressure indication from the alternate braking system to the ABCU 95GG and the BSCU 10GG but they are also the ones sending the information to the Triple Pressure Indicator 60GG. As a consequence, the triple indicator will always indicate a 240 psi pressure when the ZTP mode is activated.



ME-30 Ice and Rain Protection

FAULT MESSAGE	POTENTIAL CAUSES
ANTI ICE ALL PITOT.	HEATING systems of the CAPT, F/O and STBY pitot probes are failed.
In the case of simultaneous pitot icing and in the same amount, ADR 1, ADR 2, and ADR 3 speeds will be in agreement, but incorrect.	
*ANTI ICE CAPT PITOT OR L(R) STAT OR AOA	HEATING system of the corresponding probe is failed.
ANTI ICE CAPT + F/O PITOT	HEATING systems of the CAPT and F/O pitot probes are failed.
ANTI ICE CAPT + STBY PITOT	HEATING systems of the CAPT and STBY pitot probes are failed.
ANTI ICE CAPT PROBES	CAPTAIN probe heat computer is failed.
*ANTI ICE F/O PITOT OR L(R) STAT OR AOA	HEATING system of the corresponding probe is failed.
ANTI ICE F/O PROBES	F/O probe heat computer is failed.
*ANTI ICE STBY PITOT OR L(R) STAT OR AOA	HEATING system of the corresponding probe is failed.
ANTI ICE STBY PROBES	STANDBY probe heat computer is failed.
ANTI ICE CAPT(F/O) TAT	HEATING system of the corresponding probe is failed.
ENG 1(2) CTL FAULT (OPEN)	NAI control system is failed.
ANTI ICE ENG 1(2) CTL FAULT (ENG 1(2) A.ICE MON FAULT)	NAI control system is failed.
ANTI ICE ENG 1(2) OVER PRESS.	PRESSURE regulation is lost on both NAI valves.
ENG 1(2) VALVE CLSD.	ANTI ICE VALVE is abnormally closed.
ENG 1(2) VALVE OPEN.	ANTI ICE VALVE is abnormally open.
ANTI ICE F/O+STBY PITOT	HEATING F/O and STBY pitot probes failed.
ANTI ICE L + R WINDSHIELD	HEATING system of both windshields is failed.
ANTI ICE L(R) WINDOW	HEATING system of the left(right) cockpit window is failed.
ANTI ICE L(R) WINDSHIELD.	HEATING system of the left(right) windshield is failed.
ANTI ICE L(R) WINDSHIELD(WINDOW) (WHC) =If the air conditioning packs are OFF with the OAT above 40 °C, and/or the windshield is under direct sunlight, a spurious ANTI ICE L(R) WINDSHIELD(WINDOW) may trigger. In that case, select both air cond packs to ON and wait at least 5 minutes for the cockpit temperature to decrease. After, pull, then push the C/B of the affected WHC ;- X13 on 122VU (WHC1);-W13 on 122VU (WHC2).	

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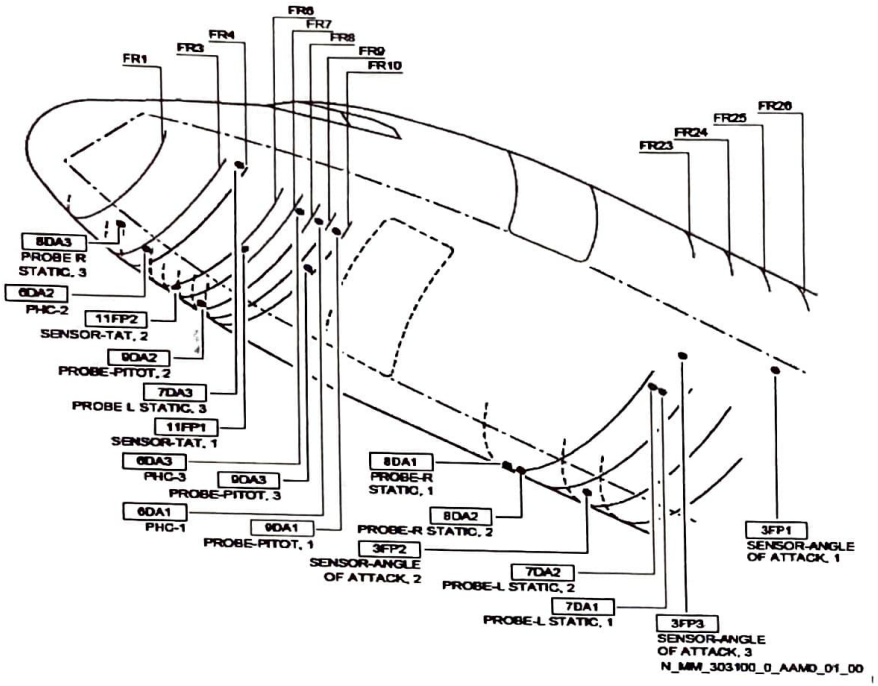
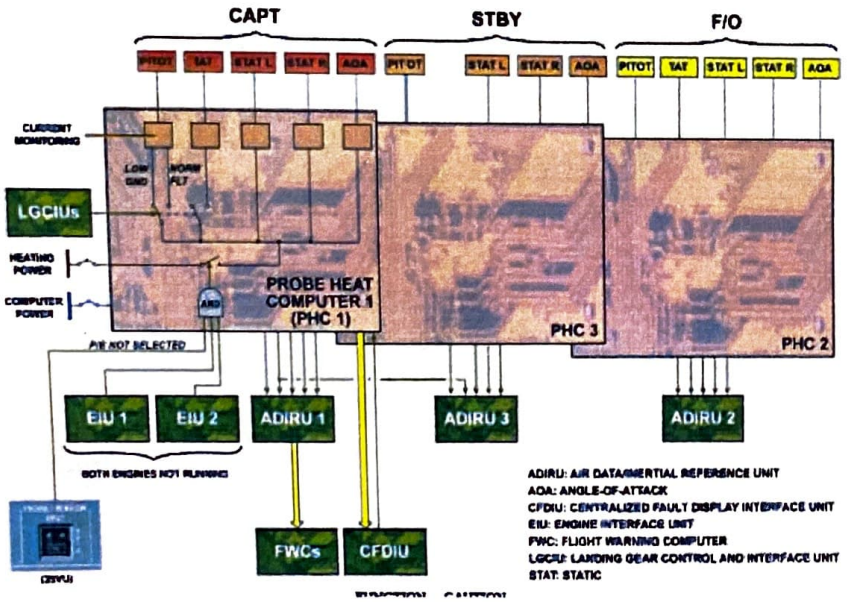
WING A.ICE L(R) VALVE OPEN (FAILURE IN FLIGHT)	WING ANTI ICE pb-sw is set to OFF and one wing anti ice valve remains open, in flight.
WING ANTI ICE L(R) HI PR.	WING ANTI ICE pb-sw is set to ON and the pressure sensor (downstream of the valve) indicates a high pressure in the duct.
WING A.ICE L(R) VALVE OPEN (FAILURE DETECTED ON GRD)	WING ANTI ICE pb-sw is set to OFF and one wing anti ice valve remains open, on ground.
WING A.ICE OPEN ON GND	AIRCRAFT is on ground and the wing anti ice valves remain open for more than 35 s
After the WING ANTI ICE pb-sw is set to ON.	
WING A.ICE SYS FAULT	WING ANTI ICE pb-sw is set to ON and one wing anti ice valve remains closed.
WING A.ICE SYS FAULT	WING ANTI ICE pb-sw is set to ON and one wing anti ice valve remains closed.

Probe Heat Computer (PHC-1) Pwr-up Test=2 Sec	
D04	49VU ANTI ICE/PROBES/AOA/1
D03	49VU ANTI ICE/PROBES/PHC/1
D02	49VU ANTI ICE/PROBES/PITOT/1
Z13	122VU ANTI ICE/PROBES/1/STATIC
Z12	122VU ANTI ICE/PROBES/1/TAT
Probe Heat Computer (PHC-2) Pwr-up Test=2 Sec	
Y15	122VU ANTI ICE/PROBES/2/TAT
Y14	122VU ANTI ICE/PROBES/2/PITOT
Y13	122VU ANTI ICE/PROBES/2/AOA
Y12	122VU ANTI ICE/PROBES/PHC/2
Y11	122VU ANTI ICE/PROBES/2/STATIC
Probe Heat Computer (PHC-3) Pwr-up Test=2 Sec	
Y16	122VU ANTI ICE/PROBES/PHC/3
Z16	122VU ANTI ICE/PROBES/3/PITOT
Z15	122VU ANTI ICE/PROBES/3/AOA
Z14	122VU ANTI ICE/PROBES/3/STATIC
*AOA FAULT=RESET ALL 5 CBs ASSOCIATED W/WHC SYS 1(2)	





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Monitoring:-The PHC monitors heating of the static probes, AOA sensor, pitot probes and TAT sensor. Current detection with a preset threshold is provided for monitoring purposes.

Low heating or overcurrent or heating loss or discrepancy between the ground and flight information sent by the LGCIUs triggers a warning.

Monitoring of the TAT sensors is inhibited on the ground.

A monitoring system activates a warning when heating is **incorrect.**

NOTE: - The PHC 1 controls the Captain and left systems. - The PHC 2 controls the First Officer and right systems. - The PHC 3 controls the Standby systems.

Window Heat Computer (WHC-1)	
X14	122VU ANTI ICE/WINDOWS/L
X13	122VU ANTI ICE/WHC/1
*AF10	123VU ANTI ICE/L/WHSLD
Order of Reset =1St AF-10,2nd X-13, 3rd X-14. Pwr-up Test=5 Sec	
Window Heat Computer (WHC-2)	
W14	122VU ANTI ICE/WINDOWS/R
W13	122VU ANTI ICE/WHC/2
*AF03	123VU ANTI ICE/R/WHSLD
Order of Reset. =1St AF-03,2nd W-13, 3rd W-14 Pwr-up Test=5 Sec	

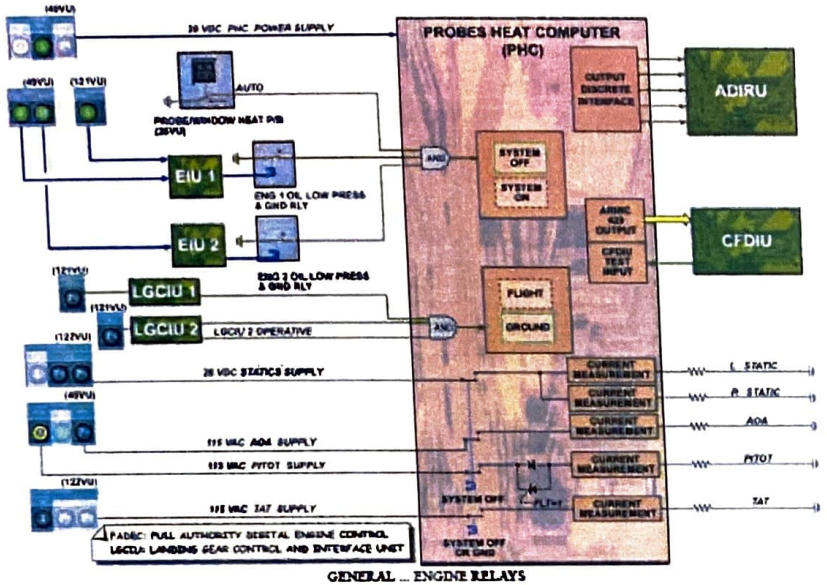
MAINTENANCE TASK	AMM REFERENCE
Check of the Operation of the Probe Heating Channel	30-31-00-040-001-A
ADRS, Heaters and Failure Alerts related to Probes	30-31-00-040-002-A
Operational Test of the Probe Ice Protection	30-31-00-710-001-A
Operational Test to Read the CLASS 3 FAULTS	30-31-00-710-002-A
Test of Heating of the Angle of Attack Sensor	30-31-00-710-802-A
Deactivation of the Window Heat Computer (WHC)	30-42-00-040-001-A
Reactivation of the Window Heat Computer (WHC)	30-42-00-440-001-A
Ops Test of Windshield Anti-Icing and Defogging	30-42-00-710-001-A
Operational Test to Read the CLASS 3 FAULTS.	30-42-00-710-002-A

POWER SUPPLY:-The Probe Heat Computer (PHC) is supplied with 28 VDC. The static ports are supplied with 28 VDC; the Angle-Of-Attack (AOA) sensor, TAT sensor and pitot probe are supplied with **115 VAC.**

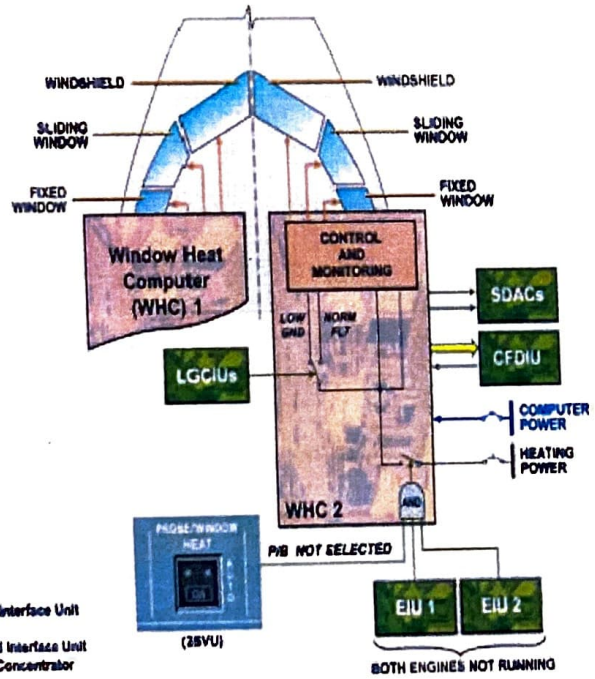
CAUTION FOR PHC C/B OPENED:-If you pull the PHC power supplied C/B, the related probes and static ports will be fully heated.

CAUTION FOR EIU C/B OPENED:-If you pull the EIU power supplied C/B, the related engine oil low-pressure and ground relays are **de-energized,** the AOA probes and static ports will be heated and as the aircraft is on ground, the Pitot probes receive **low heating** only and the TAT sensor heating is **inhibited.**

CAUTION FOR LGCIU C/B OPENED:-If you pull the LGCIU power supplied C/B, the related probes and static ports will be **fully heate**



GENERAL ... ENGINE RELAYS



CFDIU: Centralised Fault Display Interface Unit
EIU: Engine Interface Unit
LGCIU: Landing Gear Control and Interface Unit
SDAC: System Data Acquisition Concentrator

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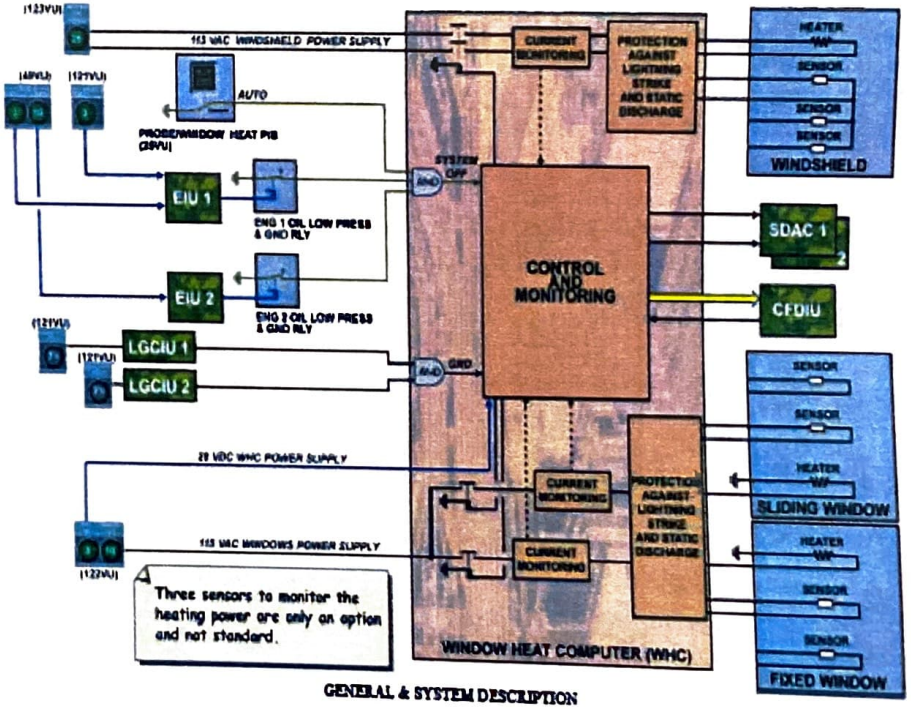
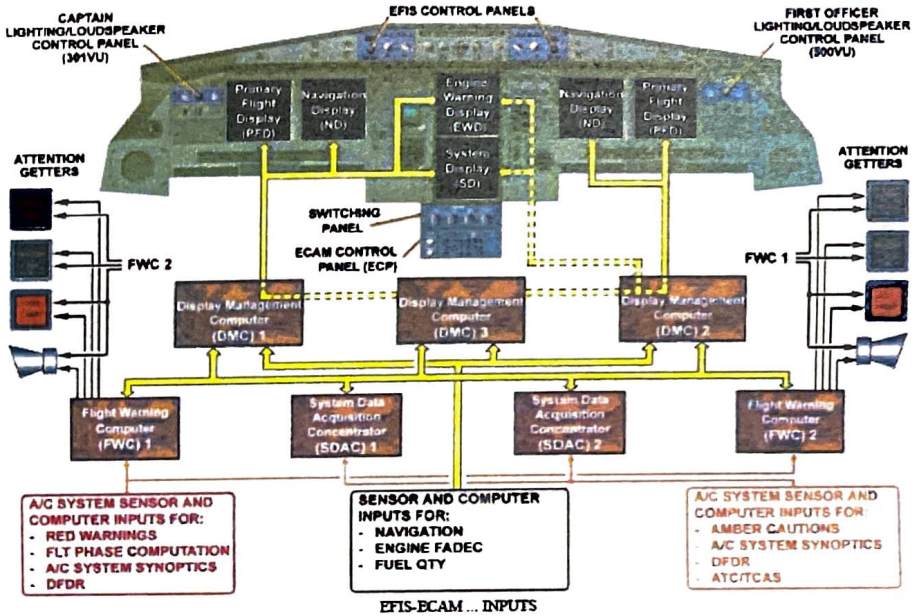
WHC:-There are **two WHCs:**
· one for the right side identified WHC2,
· one for the left side identified WHC1.
When the A/C is on ground, engines running, the LGCIUs send "ground" signal to WHC, which sends "low level heating" for the windshield. Temperature regulation, overheat protection and fault indication are given by each WHC. In case of a windshield or window heating fault, the WHC sends an output signal to the ECAM via the System Data Acquisition Concentrator (SDAC). The WHCs also transmit fault messages to the Centralized Fault Display Interface Unit (CFDIU).
CAUTION:-Pulling the Engine Interface Unit (EIU) power supply C/Bs causes the unwanted heating of the windshield and the side windows
CAUTION FOR LGCIU C/B OPENED:-If you have to pull the Landing Gear Control and Interface Unit (LGCIU) power supply C/Bs or before you lift the aircraft on jacks you have to accomplish the Flight Configuration Precautions, this prevents unwanted heating of the windshield and side windows..
CAUTION FOR EIU C/B OPENED:-If you have to pull the EIU power supply C/Bs, the related engine OIL LOW PRESS and GND RLYs are de-energized, this will cause windshield and windows to be heated.



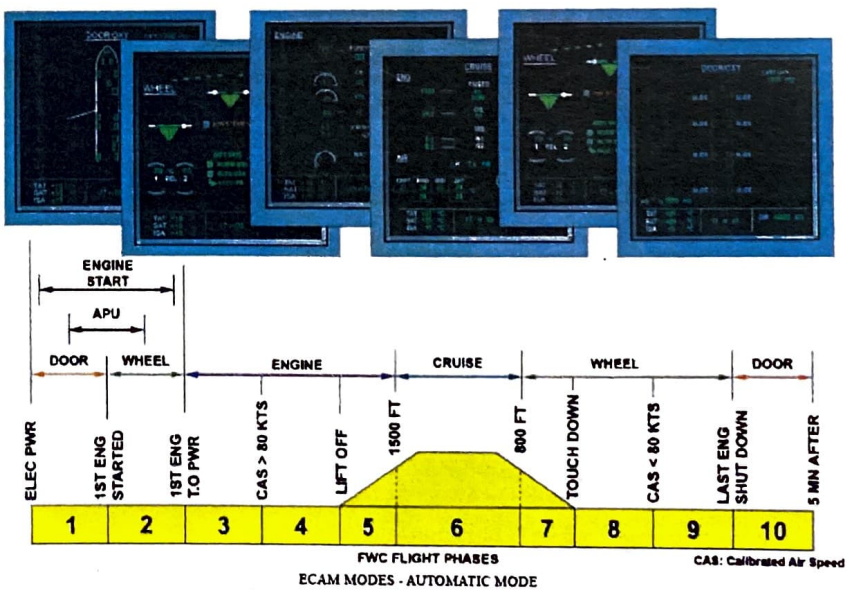
GENERAL & SYSTEM DESCRIPTION

ME-31 Indicating/Recording Systems

FAULT MESSAGE	POTENTIAL CAUSES
*EIS DMC 1,(2),(3),FAULT	DMC 1, or DMC 2, or DMC 3 is failed.
DMC 1(2,3) FAULTS=) "EIS DMC 1(2,3) RESET	
EIS DMC/FWC COM FAULT	ONE OF FWC detects the loss of both DMC1/3 and DMC2/3 busses.
FWS FWC 1 FAULT	EITHER FWC 1 or, FWC 2 is failed.
FWS FWC 2 FAULT	EITHER FWC 1 or, FWC 2 is failed.
FWS FWC 1(2) FAULT (FWC)= Pull, then push, the C/B of the affected FWC:;- FWC 1 (F01 on 49VU);- FWC 2 (Q7 on 121VU).;-Wait 50 s after pushing the C/Bs.	
*FWS FWC 1+2 FAULT.	BOTH FWC 1 and FWC 2 are failed.
*Or when the communication between the FWC and the EIS is lost. *ECAM Cautions and Warnings, aural warnings, master caution and warning lights are lost. ECAM system pages are still available*	
FWS OEB/FWC DISCREPANCY	FWC1 and FWC2 do not have the same OEBs listed in their OEB reminder database.
FWS SDAC 1,(2) FAULT	EITHER SDAC 1 or, SDAC 2 is failed.
*FWS SDAC 1+2 FAULT	BOTH SDAC 1 and SDAC 2 are failed..
*Amber cautions are lost. Aircraft status on the ECAM STATUS page is lost. Only red warnings, engine and fuel parameters, and slat/flap positions are available on the upper ECAM DU	
RECORDER DFDR FAULT	DFDR is failed.
RECORDER SYS FAULT.	FDIU is failed.
FDIU FAULT- APPLIES (FDIU IS PART OF DFDR SYS	
➢ CLOCK PROBLEMS NORMALLY RESET VIA CFDIU SUPPLY CB (J18)	
➢ PRINTER WILL NOT STOP PRINTING-PULL K15 (AIDS/DMU)	
➢ DISPLY UNIT -DIAGONAL LINE: SELECT DMC3	



EFIS-ECAM ... INPUTS



ECAM MODES - AUTOMATIC MODE

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EIS-ECAM:- Electronic Instrument System (EIS)

The Electronic Instrument System (EIS) is shown on 6 identical Liquid Crystal Display (LCD) units and controlled through the EIS control panels. The Electronic Centralized Aircraft Monitoring (ECAM) displays are identical and controlled through the ECAM Control Panel (ECP). The Electronic Flight Instrument System (EFIS) displays are controlled by the EFIS control panels and the lighting/loudspeaker control panels.

DMC:-The Display Management Computers (DMCs) are data concentrators and receive data from aircraft sensors and systems. They send them to the Display Units (DUs). The DUs compute and display the images on each unit.
In normal operation DMC1 drives the CAPT Primary Flight Display (PFD), the CAPT Navigation Display (ND), Engine/Warning Display (EWD) and System Display (SD).
In normal operation DMC 2 drives the F/O PFD and ND DUs.
If DMC 1 fails, it is automatically replaced by **DMC 2** for ECAM only.
DMC 2 cannot drive the CAPT PFD and ND; a manual switching to DMC 3 is required. DMC 3 can drive any of the six DUs. DMC 3 is a hot spare awaiting the failure of DMC 1 or 2 and can be switched to drive the DUs linked to the failed DMC. Data loading of the DMC 1 is possible with Portable Data Loader (PDL).
The 3 DMCs are identical and interchangeable.

FWC:-The Flight Warning Computers (FWCs) monitor the aircraft systems. Each FWC generates all warning and caution messages, supplies the attention getters, computes the flight phase and provides aural warnings.

SDAC:-The System Data Acquisition Concentrators (SDACs) receive various signals from the aircraft systems and send them to the FWCs and to the DMCs.

CENTRALIZED FAULT DISPLAY SYSTEM:-The CFDS is a centralized maintenance aid system which gives the maintenance technicians a means to read the maintenance information related to most of the aircraft systems and to initiate the tests of these systems from the cockpit.
The CFDIU is connected to most of the electronic systems (BITE) of the aircraft and stores failure information from these systems in memory.
It also serves to initialize tests in each system.
A320 family:-AMM TASK 31-36-00-740-008 – Access to the Parameter Call-Up menus
- The Alpha Call-up list is accessible under AMM 31-36 or 31-37
- The EQ codes list is accessible under AMM 31-36 or 31-37

It is recommended to use the ACMS parameter callup functions intensively as being an efficient means for system T/S.

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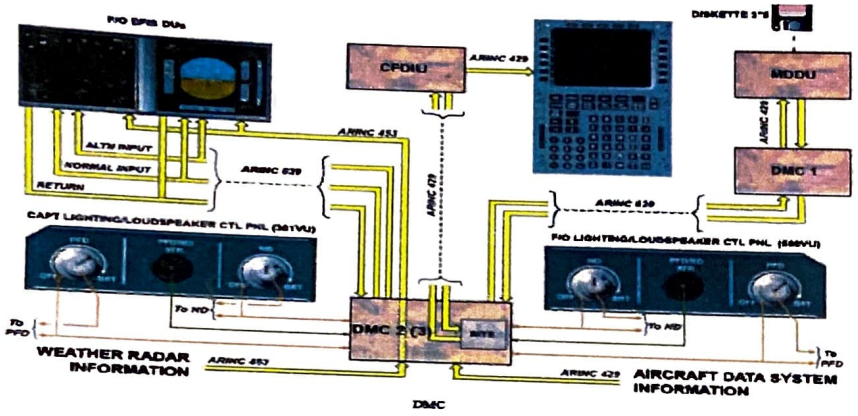
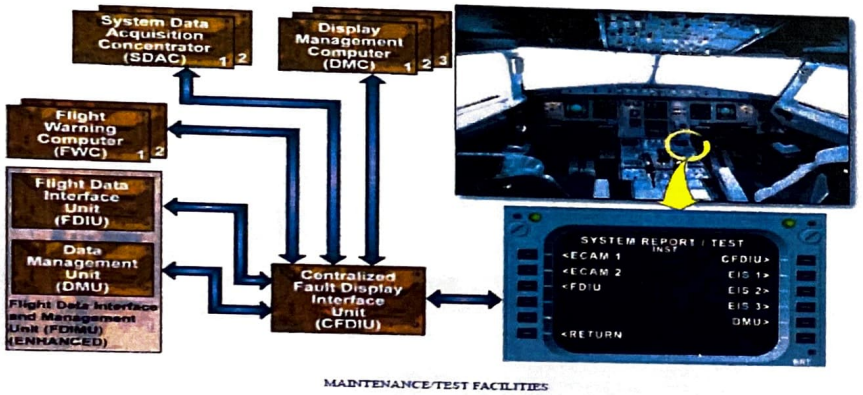
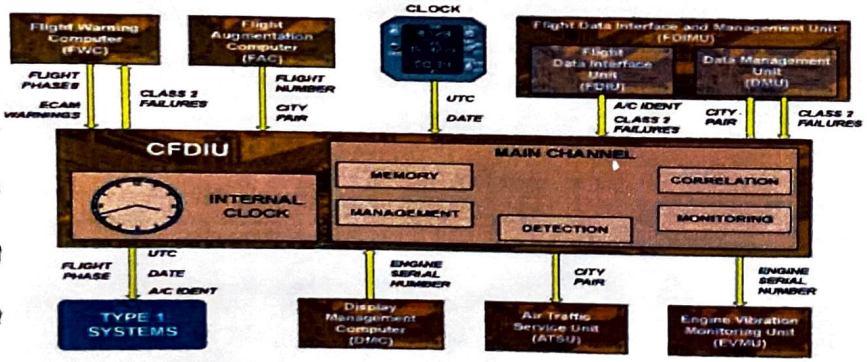
CENTRALIZED FAULT DISPLAY SYSTEM Pwr-Up Test=60 Sec	
B01	49VU AUTO FLT/MCDU/1
J21	121VU PTR/SPLY
J18	121VU CFDS/CFDIU/SPLY
J17	121VU CFDS/CFDIU/BACK/UP
N20	121VU AUTO FLT/MCDU/2
DISPLAY MANAGEMENT COMPUTER DMC-1 Pwr- Up Test=4 Sec	
E11	49VU EIS/DMC1/SPLY
E09	*49VU EIS/DMC1/SWTG
DMC 1(2,3) FAULTS=Reset DMCSPLY CBs i.e. E11,or Q08,or Q09	
DISPLAY MANAGEMENT COMPUTER DMC-2 Pwr- Up Test=4 Sec	
Q08	121VU EIS/DMC2/SPLY
R08	*121VU EIS/DMC2/SWTG
DISPLAY MANAGEMENT COMPUTER DMC-3 Pwr- Up Test=4 Sec	
E07	*49VU EIS/DMC3/SWTG
Q09	121VU EIS/DMC3/SPLY
DMCs WILL NOT SWTG (OR STWG as MSG)=Reset SWTG CBs	
SYSTEMDATA ACQUISITIONCONCENTRATOR (SDAC)-1 Pwr- Up Test=5 Sec	
F05	49VU SDAC/1 AND 2/28VDC/ESS BUS
F04	49VU SDAC/1/SPLY
F02	49VU SDAC/1/26VAC SYNC/AC ESS BUS
Q03	49VU SDAC/1/26VAC SYNC/AC ESS BUS
P35	121VU HYDRAULIC/HYD/QTY/IND
SYSTEMDATA ACQUISITIONCONCENTRATOR (SDAC)-2 Pwr- Up Test=5 Sec	
F05	49VU SDAC/1 AND 2/28VDC/ESS BUS
F03	49VU SDAC/2/26VAC SYNC/AC ESS BUS
Q06	121VU EIS/SDAC/2/SPLY
Q05	121VU EIS/SDAC/2/BUS1/26VAC SYNC AC
Q02	121VU EIS/SDAC/2/BUS1/26VAC SYNC AC
FLIGHT WARNING COMPUTER (FWC)-1 Pwr- Up Test=50 Sec	
F01	49VU FWS/FWC1/SPLY RESET #1-WAIT 1 MIN
FLIGHT WARNING COMPUTER (FWC)-2 Pwr- Up Test=50Sec	
Q07	121VU EIS/FWC2/SPLY RESET #1 -WAIT 1 MIN
Wait 50 seconds after you close the C/Bs for Pwr- Up Test	
TO BITE FWC -USE OVERHEAD FADEC POWER ON P/Bs	





MAINTENANCE/TEST FACILITIES



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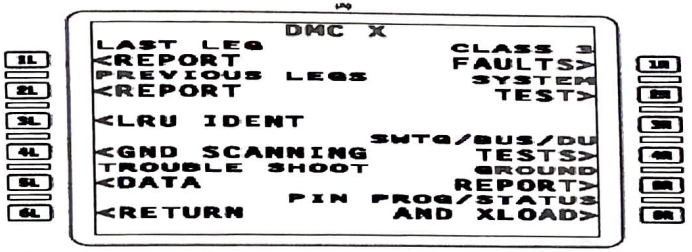
EIS - TEST/BITE



EIS - TEST/BITE A menu is offered proposing:_	
LAST LEG REPORT by the key 1L;	CLASS 3 FAULTS by the key 1R
PREVIOUS LEGS REPORT by the key 2L	SYSTEM TEST by the key 2R
LRU IDENT by the key 3L	SWTG/BUS/DU TESTS by key 4R
GND SCANNING by the key 4L	GROUND REPORT by the key 5R
TROUBLE SHOOT DATA by the key 5L	GROUND REPORT by the key 5R
RETURN to main DMC menu by key 6L	PIN PROG/Stu/X LOAD by key 6R

. The DMC menus also enable the flight and maintenance crew to perform overall system tests, easily readable and interpretable.

· **Display test:**-the ground, on request from the MCDU, a test pattern is displayed on the DUs. This test pattern enables the maintenance crew to assess the condition of the DUs for ageing and display quality, thus providing at a glance a confidence check of the Display Units.

· **Data Bus test:**-On the ground, this test is available, to check the links DMC to DU or DU to DMC, or the related input ports.

· **DU Backlight status test**:-This test allows to check the good working conditions of the bulbs of the light box assembly.

· **DU Brightness test:**-This test allows to check the good working conditions of the brightness control system of the DU.

· **System test:**-On the ground, on request from the MCDU, the DMC performs the functional tests of all the internal functions of the system (DMC, DUs, DMC-DUs links).

· **Switching test:**-On the ground, on request from the MCDU, the DMC performs the functional tests of all the **switching functions** of the system (DMC, DUs, DMC-DUs links and switching links).

DATA bus test:- to switch the EIS DMC selector to NORM, when the test is related to the DMC1 or the DMC2. The DMC3 needs some special attention: to have the DMC3 active the selector switch should be set to **CAPT3**

DMC switching test:-This test must be performed on DMC 1, DMC 2 and DMC 3.The reconfiguration devices and the switching stages inside the DMC and DU are tested

ATA 31 INDICATING MAX POINTER RESET (N1, N2 & EGT)

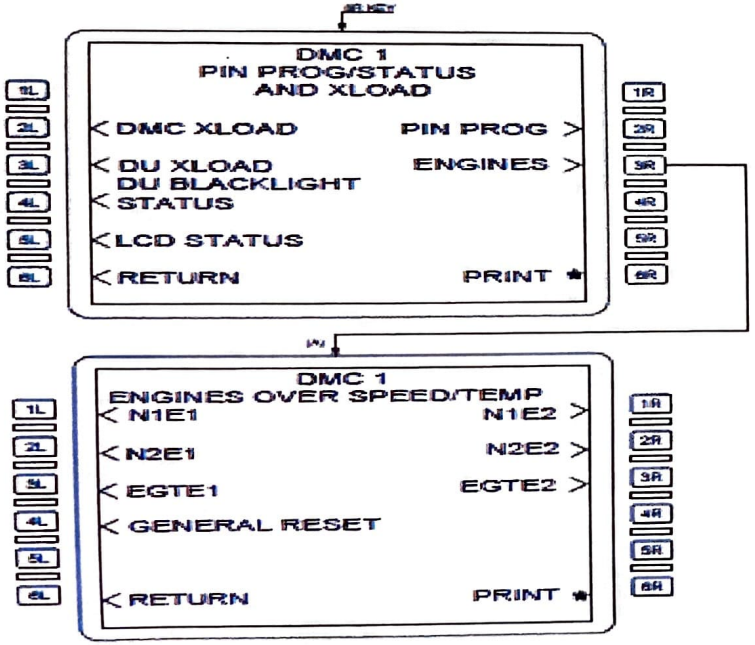
➢ **ECAM DU : ENG 1 (2) N1(N2/EGT/FF) DISCREP ANCY**

Max pointer Reset (N1, N2 & EGT) The Max pointers for N1, N2 and EGT can be reset using the **CFDS menu INSTRUMENTS.** The menu for the EIS 1,2,3,(DMC 1,2,3) must be select. The memory cells which store the possible exceedance are reset either by pressing the **GENERAL RESET** line key or automatically at next take off.

Read–out/Reset of the Engine Red Line Exceedances :-

The DMC connected to the **upper ECAM DU** monitors primary parameter indications of **both engines.** Should an exceedance occur, the DMC memorizes in its **BITE memory** the maximum value reached during the Last Flight Leg The values of the **N1, N2, EGT red lines** and transitory over limit values are stored in 2 independent tables, one per engine. Read out of this engine parameter exceedance can be performed via the DMC MCDU menu. With the function engines the parameters can be selected either for engine 1 or 2.

NOTE: A RESET OF THE RED LINE LIMITS HAVE TO BE PERFORMED ON ALL 3 DMCS.



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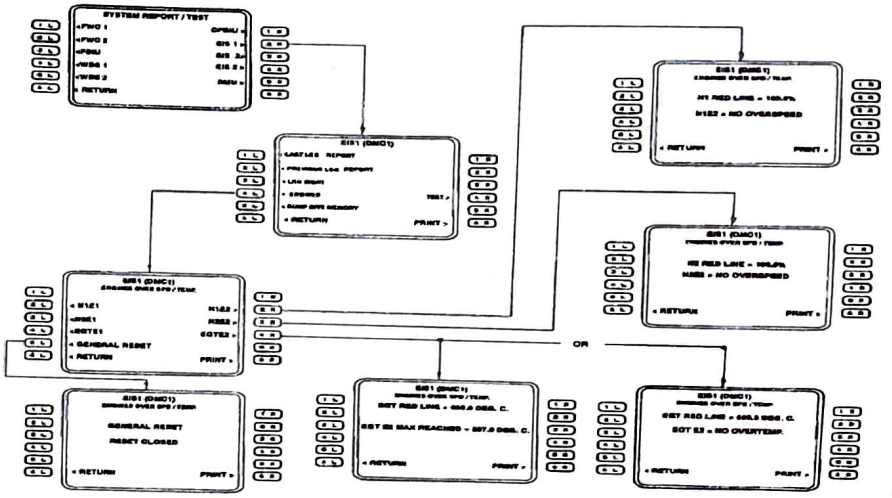

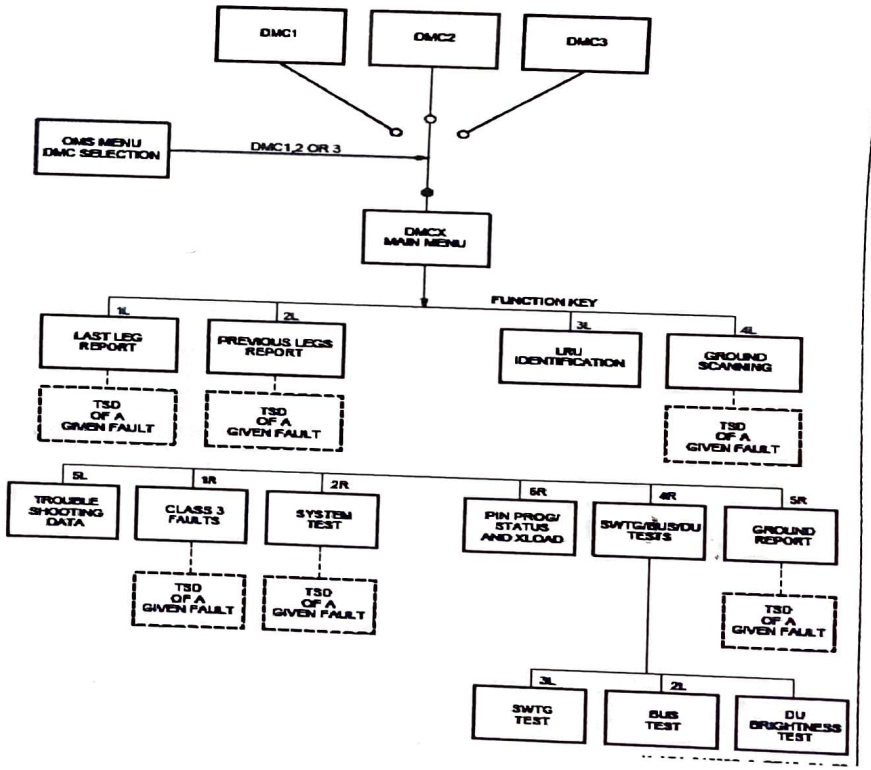

ME-32 Landing Gear

FAULT MESSAGE	POTENTIAL CAUSES
BRAKES ALTN BRK FAULT	ALTERNATE braking function is lost.
*BRK ALTN L(R) RELEASED.	BRAKES of one gear is released..
* It is detected when the landing gear is down locked, at least one engine is running, and alternate braking is active.	
BRAKES-N/WS MINOR FAULT	MINOR fault of -N/WS steering is detected.
BRAKES A/SKID N/WS FAULT OR ANTI SKID N/WS OFF	There is a loss of normal brake system associated with Y HYD SYS LO PRESS,
Or Both BSCU channels are failed, or- A/SKID & N/W STRG sw is set to OFF	
*BRAKES AUTO BRK FAULT	AUTOBRAKE is failed, after being armed.
The AUTO BRK FAULT alert may be due to a failure of the autobrake mode itself, or to a brake released condition.	
* *NORM BRK is inoperative in case of failure causing the AUTO BRK FAULT caution to trigger with a switch to alternate braking (failures affecting the BSCU, the Normal Selector Valve, the Normal Servo Valve, or brake pedal transmitter unit).)*	
*BRAKES BRK Y ACCU LO PR	YELLOW accumulator is in low pressure.
. The yellow electrical pump can be used to pressurize the accumulator.	
*If the accumulator pressure is still low, chocks are required before Engine 1 shut down. This message is replaced on ground by BRAKES PARK BRK LO PR if parking brake is on and yellow hydraulic system pressure is low	
#BRAKES SYS 1 FAULT	ONE BSCU channel is failed.
#BRAKES SYS 2 FAULT	ONE BSCU channel is failed.
#BRAKES SYS 1(2) FAULT or BRAKES BSCU CH 1(2) FAULT (BSCU) =- Set PARK BRK handle to ON;-towing bar is disconnected;-Set A/SKID & N/W STRG sw to OFF;-Set A/SKID & N/W STRG sw to ON* IF UNSUCCESSFUL:;- Pull C/Bs M33 and M34 on 121VU for BSCU channel 1;-Pull C/Bs M36 and M35 on 121VU for BSCU channel 2;-Push C/Bs.	
*BRAKES HOT	ONE BRAKE temperature is above 300 °C.
* The alert disappears when the highest brake temperature is below 290 °C.	
BRAKES NORM BRK FAULT	NORMAL braking function is lost.
BRAKES NORM+ALT FAULT.	NORMAL and alternate braking functions are lost. The parking brake is still available.
BRAKES PARK BRK FAULT.	DISCREPANCY between the position of the parking brake handle and the applied parking brake pressure is detected.
BRAKES PARK BRK LO PR	PRESSURE in the yellow accumulator and hyd system is low and the parking brake is on.
BRAKES PARK BRK ON	PARKING brake is ON in flight.
BRAKES-N/WS MINOR FAULT	MINOR fault of the nose wheel steering system is detected.

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BRAKES RELEASED	BRAKE of one wheel is released..
It is detected when landing gear is down locked, at least one engine is running, and normal braking is active	
CONFIG PARK BRK ON	PARKING BRAKE is on when thrust levers are set at TO or FLX TO power position
L/G DOORS NOT CLOSED	ONE GEAR door is not uplocked.
*L/G GEAR NOT DOWN	L/G is not down locked and radio height is lower than 750 ft and both engines N1 lower than 75% .
* Warning appears, the red arrow on the instrument panel comes on.	
*L/G GEAR NOT DOWNLOCKED.	WHEN this warning appears, the red arrow on the instrument panel comes on..
*Warning appears, if the landing gear sequence is not completed after 30 s	
L/G GEAR NOT UPLOCKED.	ONE GEAR is not up locked and L/G is not selected down.
L/G GEAR UPLOCK FAULT.	ONE GEAR up lock is engaged with corresponding gear down locked.
*L/G LGCIU 1 FAULT	LGCIU 1is failed.
*LGCIU FAULTS-ONLY LGCIU 1 POWERS REMOTE PANEL.(STBY INDICATIONS)	
L/G LGCIU 2 FAULT	LGCIU 2 is failed.
L/G LGCIU 1(2) FAULT (LGCIU 1(2))= Depressurize the green hydraulic system before resetting the LGCIU:- ENG 1 PUMP OFF;- PTU OFF. When there is no green hydraulic pressure:;-To reset LGCIU 1:;- Pull C/B Q34 on 121VU, then C09 on 49VU;-Wait for 15 s , then push the C/Bs.;- To reset LGCIU 2 Pull C/B Q35 on 121VU;-Wait for 15 s , then push the C/B.	
*L/G LGCIU 1+2 FAULT.	BOTH LGCIU'S are failed.
* Normal landing gear control and position indications are lost. LDG GEAR lights on LDG GEAR control panel remain available if LGCIU 1 is electrically supplied.	
L/G SHOCK ABSORBER FAULT (SHOCK ABSORBER EXTENDED ON GROUND)	ONE SHOCK ABSORBER is not compressed after landing.
L/G SHOCK ABSORBER FAULT (SHOCK ABSORBER NOT EXTENDED AFTER LIFTOFF)	ONE SHOCK ABSORBER is not extended when airborne.
L/G SYS DISAGREE.	LGCIU 1 and LGCIU 2 detect a discrepancy between the landing gear positions.
WHEEL HYD SEL FAULT	NOSE WHEEL steering system is failed.
WHEEL N/W STRG FAULT	BRAKE normal selector valve is failed, or the NWS selector valve is at open position.
BSCU-NOSE WHEEL STEERING PROBLEMS =CYCLE NOSE WHEEL STEERING SW. IF NOSE WHEEL STEERING SW DOES NOT FIX TRY TO RECYCLE CBs	

BSCU FAULTS=IF A/C NOT MOVING TURN NWS SW AND ANTI-SKID SW OFF THEN ON. IF NO HELP RESET BSCU CBs.
T/O WARNING CONFIG HORN WILL SOUND WHEN BTMU IS ON MEL.

Landing Gear Control and Interface Units (LGCIU) Pwr- Up Test=1 Sec	
➢	IF LGCIU MESSAGE IS LATCHED-RESET FWC AFTER LGCIU
C09	49VU L/G/LGCIU/SYS1/NORM
Q35	121VU HYDRAULIC/LGCIU/SYS2
Q34	121VU HYDRAULIC/LGCIU/SYS1/GRND SPLY
During normal A/C ops, the LGCIUs are continuously supplied with power and are continuously providing information to the other A/C systems, but only one LGCIU controls the extension / retraction sequence at any one time.	
LGCIU Changeover= Control of the L/G system automatically changes over to the other LGCIU on (1). Each de-selection of DOWN of the L/G Control Lever. (2). Detection of a 'control fault' in the LGCIU L/G system which is in control of the L/G Extension and Retraction Sequence. (3). Loss of power supply, including circuit breaker reset.	

Two types of LGCIUs:

LGCIU part number 80-178-02-880xx: Manufacturer=Crane

LGCIU part number 664700500A4x: Manufacturer=Ultra

On ULTRA: not a real time monitoring and not updated while LGCIU is in interactive mode. Shows faults previously recorded on ground (i.e ground report). whereas On CRANE: real time results of continuous monitoring.

LGCIU interactive mode refer to AMM 32-69-00 PB 001.

Refer to TSM 32-31-00 PB 301 for additional information on each available fault code. Refer to TSM 32-31-00 PB 301 for TSD decoding guidelines.

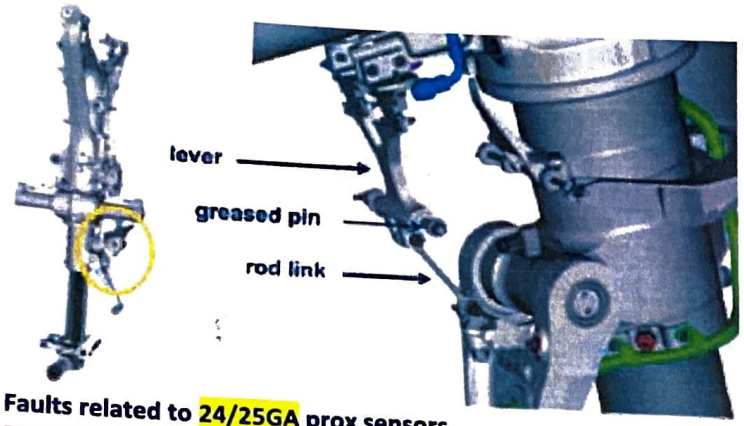
The installation of the sensors is described in AMM 32-31-73-400-005 for NLG sensors and AMM 32-31-73-400-001 for MLG sensors.

Proximity Sensor FIN		
LGCIU-1	LGCIU-2	SENSOR LOCATION
08GA	10GA	RH GEAR UP LOCK
09GA	11GA	LH GEAR UP LOCK
12GA	13GA	NOSE GEAR UP LOCK
14GA	16GA	RH GEAR DOWN LOCK
15GA	17GA	LH GEAR DOWN LOCK
18GA	19GA	NOSE GEAR DOWN LOCK
20 GA	22 GA	RH SHOCK ABSORBER
21 GA	23 GA	LH SHOCK ABSORBER
24 GA	25 GA	NOSE SHOCK ABSORBER
26 GA	28 GA	RH DOOR UPLOCK
27 GA	29 GA	LH DOOR UPLOCK
30 GA	31 GA	NOSE GEAR DOOR UPLOCK
32 GA	34 GA	RH DOOR FULLY OPEN
33 GA	35 GA	LH DOOR FULLY OPEN
36 GA	38 GA	NOSE RH DOOR FULLY OPEN
37 GA	39 GA	NOSE LH DOOR FULLY OPEN
44 GA	46 GA	RH BOGIE ALIGNMENT
45 GA	47 GA	LH BOGIE ALIGNMENT
**	05MJ	FWD CARGO DOOR LOCKING SHAFT
30WV	**	FWD CARGO DOOR SAFETY MECHANISM
**	12MJ	AFT CARGO DOOR LOCKING SHAFT
32WV	**	AFT CARGO DOOR SAFETY MECHANISM
28WV	**	FWD CARGO DOOR LOCKING HANDLE
34WV	**	AFT CARGO DOOR LOCKING HANDLE
37CV	39CV	LH FLAP ALIGNMENT
38CV	40CV	RH FLAP ALIGNMENT

Shock Absorber sensors, Gear Down lock sensors and Door Open sensors FIN 18GA, 19GA, 24GA, 25GA, 36GA, 37GA, 38GA and 39GA for the NLG (AMM Inspection task 32-31-73-200-002) & FIN 14GA, 15GA, 16GA, 17GA, 20GA, 21GA, 22GA, 23GA, 32GA, 33GA, 34GA and 35GA for the MLG (AMM inspection task 32-31-73-200-001).
Note : For Shock Absorber sensors FIN 20GA, 21GA, 22GA, 23GA, 24GA and 25GA, jacking of the aircraft will be required.

Test and Inspection:- AMM installation tasks, in all cases, a BITE test as per AMM TASK 32-69-00-740-001 will be required. Then, for certain sensors an inspection may also be required to validate the correct. positioning of the sensor and associated target (regardless of whether the target has been replaced or not).

When Fault MSG as:-NLG S/ABS PROX SNSR 24/25GA TGT POS FAULT –
WEAR IN TARGET SUPPORT MECHANISM:- Issues related to the NLG Flight/Ground sensing mechanism (24GA and 25GA proximity sensors and targets support mechanism) are at the origin of a significant number of LGCIU faults (e.g. E/W L/G SYS DISAGREE, L/G LGCIU FAULT or L/G SHOCK ABSORBER FAULT).
In service experience shows that NLG Flight/Ground sensing mechanism can be affected by various mechanical issues that can lead to detection faults (e.g. wear/hard points in the targets support kinematics, corrosion, loose bolts, damage, etc.).
When a fault is the consequence of such mechanical issues, warnings on ECAM are usually associated with the following LGCIU fault messages on CFDS: N LG EXT PROX SNSR (24GA) TGT POS and/or N LG EXT PROX SNSR (25GA) TGT POS.



Faults related to 24/25GA prox sensors

Review of in-service experience has confirmed that wear can develop on several parts of the 24/25GA target support mechanism generating excessive free play. Free play in the mechanism has a direct impact on the position of the targets and can lead to lose the 'TARGET NEAR' signal when the NLG shock absorber is in the fully extended position (i.e. in flight).

The most affected parts are the lever (GA67299) bushes. Excessive wear can also be observed on the rod link attachment bolt NAS6604D18.

An inefficient greasing coupled with external contamination can also act as an aggravating factor of wear development at the lever joint. Indeed, old grease can remain in the joint and collect pollution which has an abrasive effect on lever bushes.

A recovery procedure for 24/25GA prox sensors check/rigging on wheels (without A/C jacking) has been defined and tested.

TSM 32-31-00-810-868-A= NLG Shock Absorber does not extend (L/G will not retract)

AMM TASK 32-21-00-210-802-A=General Visual Inspection of the Flight/Ground Sensing Mechanism

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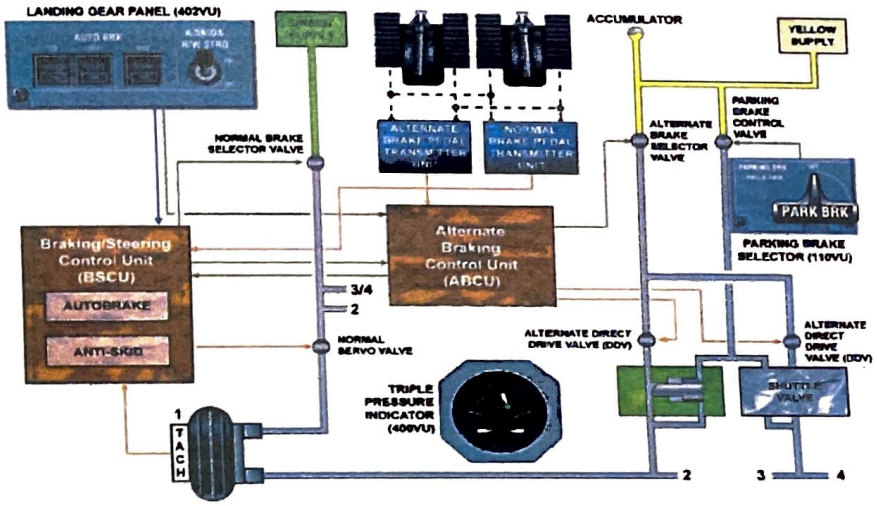


The Braking/Steering Control Unit (BSCU) has two power supply units, one for each systems. At each power up the system supplied first takes the control. If both systems are powered up at the same time, system 1 has priority.

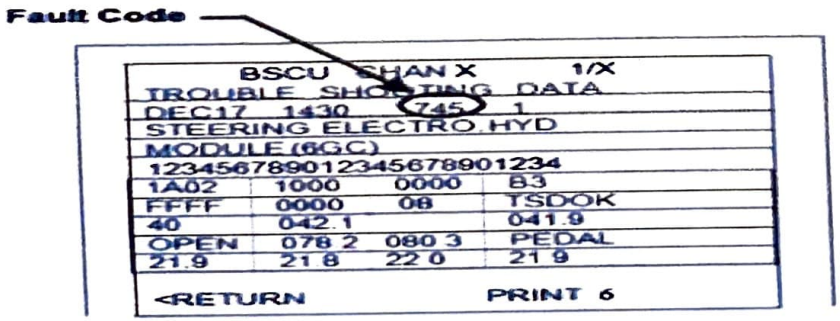
At each extension of the L/G, the system on command will go to standby and the other system will take over the control. If there is a disagreement between the control and the monitoring channels, the related system is disengaged and the system in standby takes over.

BRAKES AND STEERING	
BSCU STD on VT-WAF to VT-GOT(CEO) = L4.9B & VT-WGA to VT-WGZ(NEO) = L4.10	
M36	HYDRAULIC/BRAKING AND STEERING/ SYS2/SPLY
M35	HYDRAULIC/BRAKING AND STEERING/ SYS2/CTL
M34	HYDRAULIC/BRAKING AND STEERING/ SYS1/CTL
M33	HYDRAULIC/BRAKING AND STEERING/ SYS1/IND AND/SPLY
1ST A/SKID & NOSEWHEEL switch is at OFF then Reset CBs & then A/S Sw ON	
DO NOT RESET IN FLT:-POSSIBLE LOSS OF A/SKID PROTECTIONAT TOUCH DOWN.	

BRAKE SYSTEM WARNINGS	POTENTIAL CAUSES
NORM BRK FAULT=Normal braking failure is associated with a single or a dual channel failure on the normal braking system, combined with another failure on BSCU channel 1 or 2. Normal Braking fault. Or Green LP or Anti-skid fault or OFF, and Alternate breaking fault or yellow LP or Anti-skid fault or OFF AND yellow accumulator low pressure.	
ALTN BRK FAULT=In case of alternate left and right brake release fault, the failure is shown amber on the displays.	
NORM+ALTN FAULT=In the case of a dual failure of the normal braking and the alternate braking systems, The conditions, which trigger this warning, are:- - A normal braking fault, or,- a green low pressure, or,- an anti-skid fault or selected OFF, and,-an alternate braking fault, or,-an anti-skid fault or selected OFF, or,- a yellow low pressure, and,- a yellow accumulator low pressure.	
BRAKES RELEASED=Brake release fault when green HP is available, and no failure on the normal braking circuit.	
ALTN L(R) RELEASED= In case of alternate left (or right) brake release fault. This message warns the crew that the braking will be asymmetric in case of normal braking failure.	
BRK Y ACCU LO PR= If the pressure of the brake yellow accumulator is low,	

BSCU fault code and the maintenance procedure to facilitate correct and expeditious trouble shooting of the braking and steering system.
Note: With the Common BSCU 2 pages for each TSD (only one page is displayed at a time on the MCDU screen, push the NEXT PAGE button to display the second d*page) FAULT CODE LOCATION ON BSCU TSD PAGE:-

COMMON BSCU



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BRAKE SYSTEM:-

SELECTOR VALVE:-The selector valve is an on/off valve. When normal braking is applied, the BSCU first energizes the selector valve, this lets full green pressure supply the normal servo valves.

NORMAL SERVOVALVES:-The normal servo valve has a dual function: it regulates braking pressure, which depends on BSCU braking orders, and anti-skid control pressure delivered to the brakes. This servo valve with direct control laws is fully closed when there is no braking order. They are located on the MLG strut.

ABCU:-The ABCU controls and monitors the alternate braking system with and without anti-skid protection. The ABCU is automatically activated if:
- the anti-skid is faulty,
- the A/SKID switch is selected to OFF (BSCU OFF)
- the BSCU is not serviceable (both system 1 & 2 have failed),
- the normal braking has failed,
- the pressure downstream the selector valve drops below a given threshold,
- only the batteries supply the A/C.

LANDING GEAR PANEL:-A landing gear panel is composed of a toggle switch for anti-skid and nose wheel steering function inhibition. There are also three P/BSWs for AUTO-BRAKE selection. The BSCU and ABCU receive inputs from the landing gear panel.

TRIPLE INDICATOR:-A triple indicator gives pressure indication. The top needle supplies the alternate breaking accumulator supply pressure. The bottom needles supply pressure (How much press)sent to the left and right brakes units (indication available only if ALTERNATE BRAKING is active or PARKING BRAKE is set to on).

WHEELS:-Each main wheel has multidisc carbon brakes. Each main wheel rotation speed given by a tachometer is sent to the BSCU for anti-skid computation.

SHUTTLE VALVES:-The shuttle valves give the hydraulic priority for brake supply to the parking brake.

PARKING BRAKE CONTROL VALVE:-The parking brake electrical control valve is operated by the parking brake handle. When it is open, a signal is sent to the BSCU and the ABCU in order to override all other braking modes.
If the normal braking system is available and, if the pedals are depressed when the PARK BRK is ON and the pressure commanded by the pedal deflection exceeds the pressure delivered by the park brake system, the normal system will send a complement of pressure to the normal set of pistons to reach the commanded value.

ACCUMULATOR:-The brake accumulator is supplied from the yellow hydraulic system and can provide pressure to the alternate brake system.

32-46-00 - BRAKES AND STEERING – BITE

Depending on the different phases of flight, the BSCU automatically triggers the tests as=(a) Power-up test, (b)Permanent test,(c)Functional test: in flight with the landing gear extended until touchdown of the main gear,
(d)Tachometer test:-rolling without brake application, (e) Permanent monitoring: during operation of the braking or steering system.

Power-up Test:-The BSCU has two types of reset: **long reset; short reset**

Long reset:-The conditions for triggering a long reset are :

· detection of energization subsequent to a 115V/400 Hz cut lasting 5 seconds or more, or switching of the A/SKID & NOSE WHEEL switch from **OFF to ON**

· and aircraft condition in STOP phase.

The STOP phase corresponds to:- MLG shock absorbers compressed &· engines shut down&· wheels at stop.

Short reset:- The conditions for triggering a short reset are :detection of energization subsequent to a 115V/400 Hz cut lasting less than 5 seconds or a 115V/400 Hz cut lasting more than 5 seconds out of the STOP phase or **switching of the** A/SKID & NOSE WHEEL switch from OFF to ON out of the STOP phase or an auto-reset or return power supply monitoring to OK.

Operation of the Functional Test:-The functional test starts as soon as the gears are locked down. Its purpose is to do the test of the hydraulic equipment under pressure and the electronic control components of the selected BSCU system.
It also monitors the availability of the automatic braking and of the nosewheel steering systems until the touchdown.
This is to meet the safety requirements of a **CAT III B landing.**
For this purpose, the BSCU sends four availability discretes to the two FMGCs.
The functional tests are performed by a single **system (SYS1 or SYS2),** selected by the BSCU. **At each flight, the BSCU changes** the system performing the tests.
The **functional test has three parts,** running on the active system:

(a) THE FUNCTIONAL TEST OF THE NORMAL BRAKING SYSTEM:- The functional test of the normal braking system consists in sending successive brake application/ release orders on the NORMAL system. These tests are in five successive sequences.

(b) THE FUNCTIONAL TEST OF THE ALTERNATE BRAKING:- The functional test of the alternate braking system consists in sending successive brake application/ release orders on the ALTERNATE system. These tests are in nine successive sequences.

(c) THE FUNCTIONAL TEST OF THE NOSEWHEEL STEERING SYSTEM:-. These tests are performed after the normal braking functional tests. During these tests the BSCU generates low amplitude reference angle signals and monitors the nosewheel steering response.

These tests are in five successive sequences, the fifth sequence being performed cyclically until the end of the test phase (Main Landing gear touch down).
Two types of tests are proposed:- This function is to be activated **after any maintenance action** on the aircraft. Its purpose is to check **correct operation of the BSCU and its peripherals.**

.

- LRU WIRING & BSCU TEST: this test launches the continuity electrical monitoring and permanent monitoring functions

-NORMAL BRAKING TEST: this test launches the continuity electrical monitoring, the permanent monitoring and the functional braking tests on the NORMAL system. Once the test has been selected, the BSCU indicates the conditions required to launch the test. Once these conditions have been met, you can launch the test by pushing the line key adjacent to the **START TEST indication.**
During the test, the IN PROGRESS indication is displayed.
After the test, several response indications can be displayed:

· **NO FAULT** DETECTED: test OK **OR ;** Fault detected : test not **OK, gives the** Class 1 and Class 3 fault messages **detected OR** TEST NOT **PERFORMED:** at least one of the conditions required is not fulfilled **OR** TEST TIME OUT.

SPECIFIC DATA:-This item has a front page showing four selections:

· **#**SERVOVALVE DATA **-#** PIN PROGRAMMING **#**DATA-STEERING DATA
SYSTEM DATA

1 SERVOVALVE DATA:-This page shows the drifts in the characteristics of each Normal brake servo valve. The drift values are in psi.

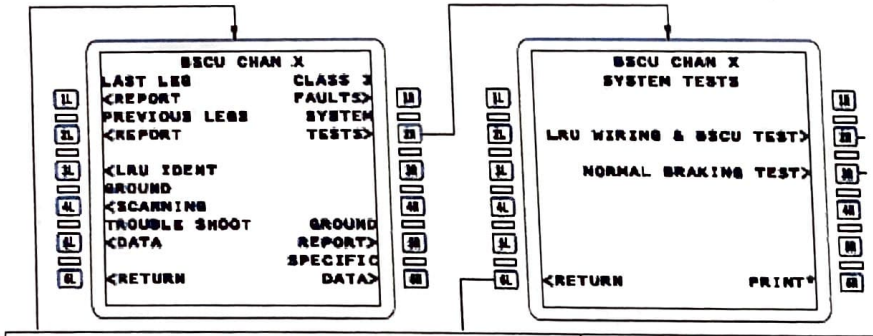
2 PIN PROGRAMMING DATA:-This page shows:

· the type of brake and diameter of the wheels installed on aircraft
· the type of automatic braking, type 1 corresponding to the standard configuration
· the status of the fans option, installed or not installed.

3 STEERING DATA This page gives following information:

· **STRSELV:** control of the nosewheel steering solenoid valve, OPEN or CLOSED,
· **ISTRSV:** nosewheel steering servovalve current in mA,
· **ANGCSG:** nose wheel controlled angle, in degrees,
· **RVDTCOM:** RVDT angle (Command channel), in degrees,
· **RVDTMON:** RVDT angle (Monitor channel), in degrees,
· **LVDT:** LVDT displacement, in mm,
· **SPOTCAP:** CAPT steering handwheel angle, in degrees,
· **SPOTFO:** F/O steering handwheel angle, in degrees,
· **NWSON or NWSOF:** NWS status

The line key adjacent to the **REFRESH** indication is used to **refresh the NWS parameter values,**



MAINTENANCE TASK	AMM REFERENCES
Check of BSCU after BRAKES N/WS MINOR FAULT	32-46-00-040-001-A
BITE Test of the BSCU	32-46-00-740-001-A
BITE Test of the BSCU - Ground Scanning.	32-46-00-740-002-A
BITE Test of the BSCU - LRU Identification	32-46-00-740-003-A
BITE Test of the BSCU - Steering Data	32-46-00-740-004-A
BITE Test of BSCU - Normal Braking TEST	32-46-00-740-005-A
Function Normal/Alternate and Steering Sys Grd	32-46-00-720-802-A
When Fault Msg. as :-BRAKE ACCUMULATOR PRESSURE LOSS:-	
Check of Parking/Emergency Brake Accumulator	32-44-11-200-001-A
Nitrogen Filling of the Yellow Hydraulic System,	12-14-32-614-002
Loss of the Brake-Accumulator Pressure P/B-OFF	TSM 32-44-00-810-808-A
Loss of the Brake-Accumulator Pressure P/B-ON	TSM 32-45-00-810-801-A
Loss of the Brake-Accumulator Pressure	TSM 32-43-00-810-835-A

BRAKE ACCUMULATOR not holding the pressure prior to departure. This often led operator to remove the accumulator which generates flight delay or cancelation.-Brake accumulator has two objectives:

- To allow 7 full brake application in emergency mode (alternate braking without antiskid) or To allow 12 hours with parking brake ON
- Insufficient pre-charge pressure may cause the bladder to fold back on itself and to wear out.

Typical damage are pin hole, longitudinal cut or friction wear.

A too high pre-charge pressure may result in the bladder to come into contact with the internal valve and create arc-shape tear or strips on the bladder.

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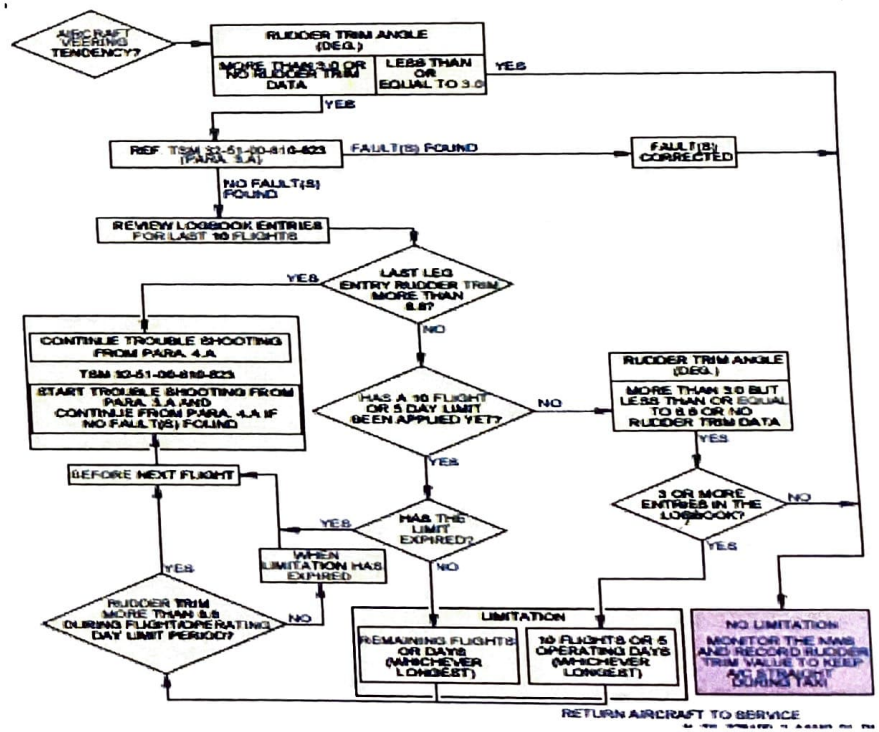
➢ AIRCRAFT VEERING TENDENCY DUE TO NWS SYSTEM OFFSET=

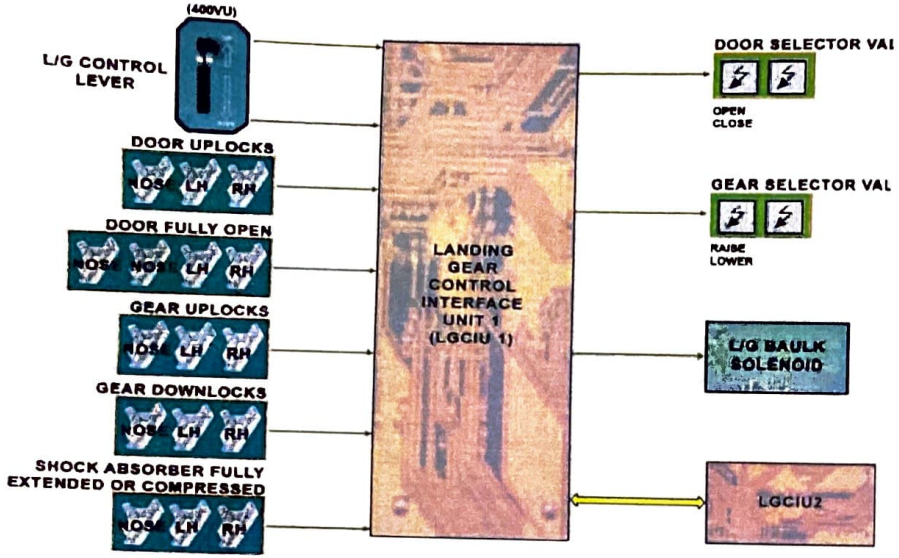
Aircraft veering issue during taxi operations with no steering input (rudder pedals and steering handwheels in neutral position).

➢ TSM 32-51-00-810-823-A,MEL 32-51-01.

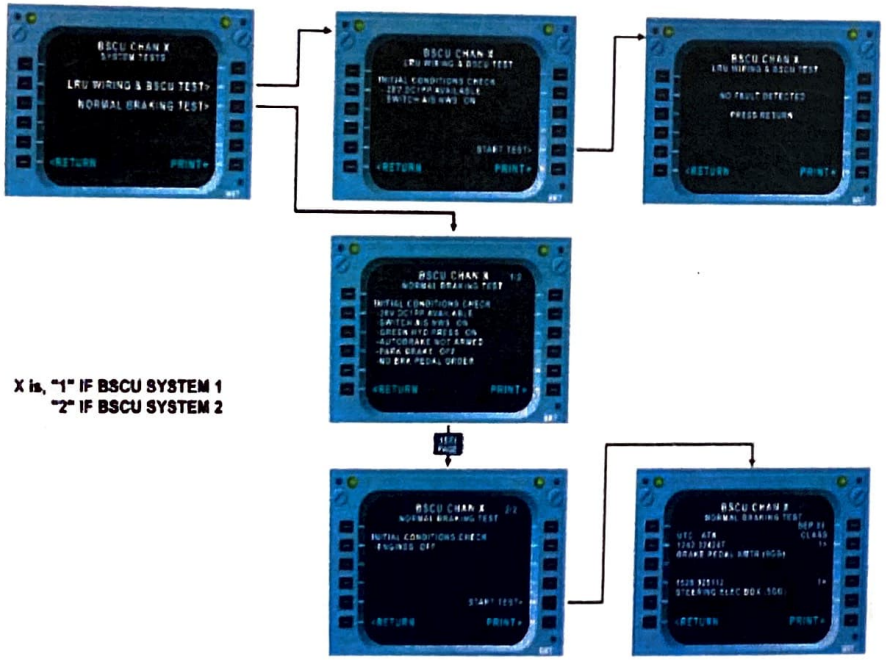
POSSIBLE CAUSES=NWS system may be the cause of abnormal veering tendency due to offset within the system:- 'Residual' steering order coming from handwheel in neutral position OR Excessive servo valve null bias (or drift) OR Incorrect COM RVDT 3GC adjustment.

NOTE:- A Nose Wheel Steering (NWS) angle of 0.5 degree (3 degrees rudder trim) or less is permitted. If more than 3 degrees of rudder trim was necessary to keep the aircraft straight during taxi, the cause could be due to side winds or runway camber. To make sure that the problem with the NWS system was not caused by external effects, it is necessary to let the aircraft return to service (after having done some checks) and monitor the aircraft at the next taxi operation. But, when there are 3, or more, aircraft log book entries in the last 10 flights this is an indication that there is a fault in the NWS system.

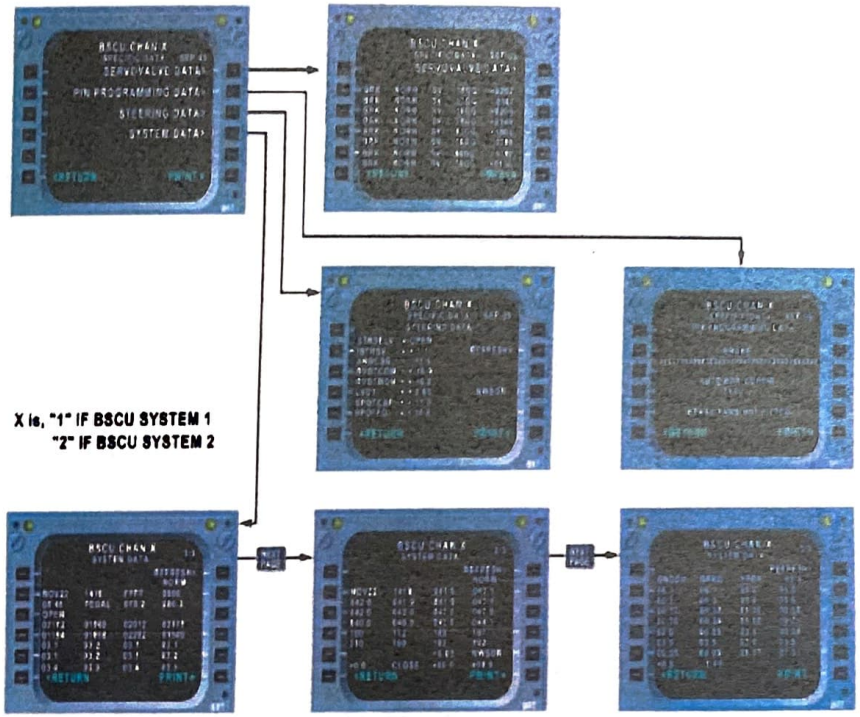




ALTERNATE AND PARKING/ULTIMATE EMERGENCY BRAKING SYSTEM



X is, "1" IF BSCU SYSTEM 1
"2" IF BSCU SYSTEM 2



X is, "1" IF BSCU SYSTEM 1
"2" IF BSCU SYSTEM 2

When Fault Msg. as:-INTERMITTENT BRAKE SYS 1(2) FAULT ECAM WARNING – NORMAL BRAKE SERVOVALVE FAULTS:-

TSM Task 32-42-00-810-957-A to T/S failure on the L/H side

TSM Task 32-42-00-810-958-A to T/S failure on the R/H side

These faults lead to **'BRAKE SYS 1(2) FAULT' ECAM** warning or in some case to **'NORM BRK FAULT' ECAM warning** triggering when it involved several servo valves or when the fault is confirmed by both BSCU Systems 1 & 2.

These warnings are associated with 'NORM BRK SERVOVLV(XXGG)' fault messages (XX depends on the servo valve position) and with BSCU fault code 33 (when the fault is in position #1) or fault code 34 (#2) or fault code 35 (#3) or fault code 36 (#4).

Investigations have shown that braking system is impacted by specific vibrations contributing to abnormal Servo valve behavior.

TSM Task 32-42-00-810- 805/806/807/808 depending on the impacted Servo valve position. The ECAM Cautions **'BRAKES SYS 1 FAULT'** and/ or **'BRAKES SYS 2 FAULT'** are GO IF. The ECAM Caution **'BRAKES NORM BRK FAULT'** is **NO GO.**

ME-34 Navigation

FAULT MESSAGE	POTENTIAL CAUSES
NAV ADR DISAGREE.	ONE ADR is faulty,
Or has been rejected by the ELAC and there is a speed or angle-of-attack disagree between the two remaining ADR.	
NAV ADR 1(2)(3) FAULT	ADR 1(2)(3) is failed.
*NAV ADR 1+2(1+3)(2+3) FAULT	TWO ADR'S are failed.
* Flight control normal laws are lost. Pitch alternate law preserves the neutral static stability. All protections, except maneuver protections are lost.	
*NAV ADR 1+2+3 FAULT.	THREE ADR'S are failed..
* This procedure requires to turn off the three ADRs, and to use Back Up Speed Scale (BUSS) and GPS altitude	
NAV ADR DISAGREE	WHEN the following conditions occur:-
- The ELAC rejected an ADR, or an ADR is faulty.-The speed or the Angle Of Attack (AOA) from the two remaining ADRs are different.	
NAV ADS-B RPTG 1(2) FAULT.	Automatic Dependent Surveillance-Broadcast (ADS-B) function is failed.
*NAV ALTI DISCREPANCY.	DIFF between the altitude displayed on the CAPT and F/O PFDs is greater than:- 500 ft,
*if STD BARO reference is selected:-250 ft, if QNH or QFE BARO reference is selected.	
NAV ATT DISCREPANCY	DIFF between the roll or pitch angle on the CAPT and F/O PFDs is greater than 5 °.
NAV HDG DISCREPANCY	DIFF between the headings on the CAPT and F/O on (PFD and ND) is greater than 5°.
NAV BARO REF DISCREPANCY	BARO reference is not the same on CAPT and F/O sides.
NAV IAS DISCREPANCY	SPEED displayed on the CAPT and F/O PFDs are different.
NAV TCAS STBY	FLIGHT crew sets the TCAS on STBY in flight.
NAV BARO REF DISCREPANCY.	Difference between CAPT and F/O sides
NAV CAPT(F/O)(STBY) AOA FAULT.	CAPT(F/O)(STBY) Angle Of Attack (AOA) sensor is failed.
NAV ATC/XPDR 1(2) FAULT	RELATED transponder fails.
NAV ATC/XPDR 1+2 FAULT	BOTH TRANSPONDERS fail.
NAV L(R) CAPT(F/O) STATIC FAULT.	LEFT(RIGHT) CAPT(F/O) static pressure probe is lost.
NAV FM/GPS POS DISAGREE	FM and GPS positions disagree when latitude (longitude) by more than 0.5 Nm

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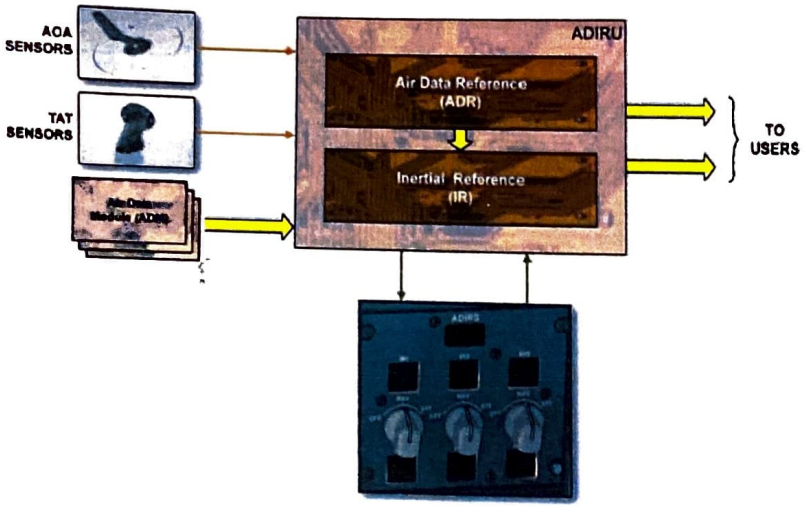
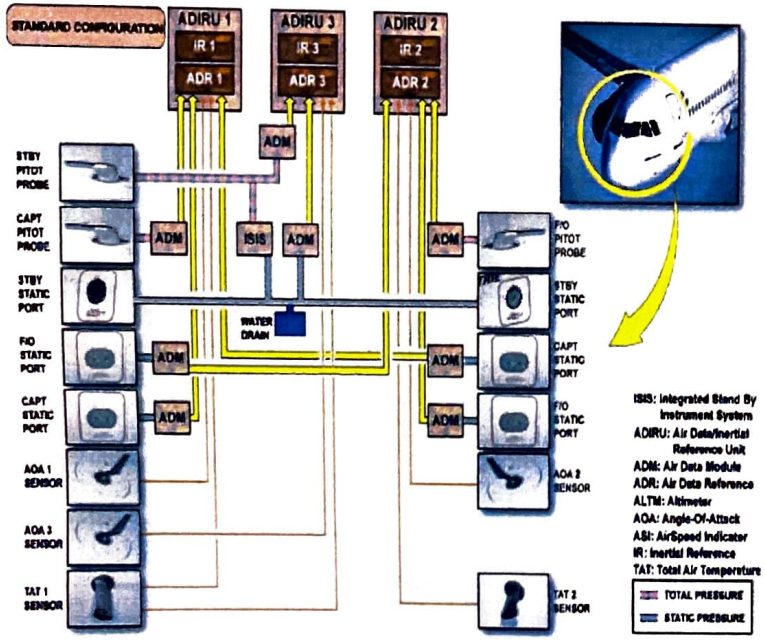
NAV GPS 1(2) FAULT .	GPS 1(2) is failed.
*NAV GPWS FAULT	GPWS fails..
This line remains displayed, even after the GPWS pb-sw has been switched OFF	
*NAV GPWS TERR DET FAULT.	ENHANCED TCF and TAD modes of the EGPWS.
Or the predictive function of the GPWS (FOR AIRCRAFT EQUIPPED with T2CAS or T3CAS) are inoperative. The basic GPWS mode 1 to mode 5 are still operative if SYS pb-sw lights FAULT or OFF are not illuminated.	
*Perform the following reset ;-Pull C/B P07 on 121VU,; Set GPWS SYS pb and GPWS TERR pb to ON,;- Wait 5 s, then push the C/B.	
NAV ILS 1(2)(1+2) FAULT	ILS 1(2)(1+2) is failed.
NAV IR DISAGREE	ONE IR is failed,
and the information received from the two remaining IRs is different.	
NAV IR NOT ALIGNED	A problem during IR alignment.
NAV IR 1(2)(3) FAULT	IR 1(2)(3) is failed.
NAV IR 1+2(1+3)(2+3) FAULT	IR 1+2(1+3)(2+3) are failed.
NAV LS TUNING DISAGREE.	TUNING of MMR 1 and MMR 2 are different.
NAV PRED W/S DET FAULT	PREDICTIVE function is lost.
NAV RA DEGRADED.	HEIGHT that RA 1 and RA 2 provide are significantly different.
NAV RA 1(2) FAULT	RA 1(2) is failed.
NAV RA 1 AND 2 FAULT	BOTH RA'S are failed.
NAV TCAS FAULT	An internal failure of the TCAS.
NAV TCAS FAULT (TCAS)= Pull C/B K10 on 121VU.;- Wait 5 s, then push the C/B.	
NAV TCAS STANDBY.	FLIGHT crew sets the TCAS on STBY in flight.
OVERSPEED:- VMO or MMO or VLE or VLE	- The aircraft speed/mach is greater than VMO
Or The aircraft speed is greater than VLE + 4 kt, with L/G not uplocked or L/G doors not closed, Or The aircraft speed is greater than VFE + 4 kt, with slats and/or flaps extended	
NAV BKUP SPD/ALT ON CAPT(F/O) PFD	BKUP SPD/ALT is activated on the CAPT PFD or on the F/O PFD and the AP and/or FD of the same side is engaged.
WINDSHEAR FAULT=-RESET FACs ON OVERHEAD	
GPWS INOP=(A) NAV RELATED-RESET #1 ILS (OK IN FLT) (B) RESET RAD ALT #1	
WX RADAR MAY BE LOST= IF AEVC COMP HAS FAILED AND BOTH SKIN VLVs IN OVERBOARD	

34-10-00 - AIR DATA/INERTIAL REFERENCE SYSTEM (ADIRS)



ADIRS Mode Selector Unit (MSU) (20VU)

ADIRS: Air Data/Inertial Reference System
ADIRU: Air Data/Inertial Reference Unit
AOA: Angle-Of-Attack
TAT: Total Air Temperature



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ADIRU 1 Pwr-Up Test= 5 Sec	
C-02	ADIRU1/28VDC
F-06	ADIRU1/115VAC (Probe)
F-07	ADIRU 1/AND AOA 1/26VAC.
ADIRU 2 Pwr-Up Test= 5 Sec	
N-04	ADIRU/2/28VDC
N-06	ADIRU/2/115VAC
N-08	ADIRU/2/26VAC AND AOA
N-10	ADIRU/2PWR/SHED
ADIRU 3 Pwr-Up Test= 5 Sec	
N-03	ADIRU/3/28VDC.
N-05	ADIRU/3/115VAC.
N-07	ADIRU/3/26VAC AND AOA.
N-09	ADIRU/3PWR/SWTG.
F-09	ADIRU3/PWR/SWTG
. IF ALL 3 ADIRUs WILL NOT= TAKE ALIGN AFTER ENG START= TRY:/PWR XFER- then MANUAL RE ALIGN- IF NO HELP AFTER 2 ATTEMPTS or PULL ADIRU #1,2,3 CBs FOR 30 SEC WITH RESET/REALIGN	
Before re-setting the ADIRU 1st Quick Align (ADIRU to Off then to NAV)(Wait 15 Secs). If no Help –Reset System Pull CBs wait for 15 sec & then Push the CBs	

AIR DATA/INERTIAL REFERENCE SYSTEM (ADIRS)

The Air Data/Inertial Reference Unit (ADIRU) comprises an Air Data Reference (ADR) system and an Inertial Reference (IR) system, both included in a single unit. The ADIRU uses inputs from external sensors: Angle Of Attack (AOA), Total Air Temperature (TAT), and Air Data Module (ADM). The ADIRUs are interfaced with the Air Data/Inertial Reference System (ADIRS) Mode Selector Unit (MSU).

PITOT PROBES:-Three Pitot probes provide total pressure to three Air Data Modules (ADMs), which convert this pressure into digital format: ARINC 429. ARINC words are then sent to the corresponding Air Data/Inertial Reference Unit (ADIRU).

STATIC PORTS:- Six static ports provide static pressure to five ADMs, which convert this pressure into digital format: ARINC 429. The two standby static ports provide an average pressure directly to the standby instruments, and to ADR 3 through a single ADM.

AOA SENSORS:-Each ADIRU receives Angle-Of-Attack (AOA) information from its corresponding AOA sensor. The AOA sensors are also called Alpha probes.

TAT SENSORS:-The three **ADIRUs** receive Total Air Temperature (TAT) information from two TAT sensors.

NOTE: The two TAT sensors are composed of two sensing elements.
ADIRU 3 receives the TAT from TAT sensor 1 one only.
NOTE:- There is no specific ADIRS battery.
WATER DRAIN:-The probes are installed in such a way that their pressure lines do not require a water drain, except for that of the standby static ports.

TASK	AMM REFERENCES
ADIRS Start Procedure	34-10-00-860-002-A
IR Alignment Procedure	34-10-00-860-004-A
Automatic IR Alignment Procedure	34-10-00-860-004-A01
IR Alignment Procedure Links between each FMGC and three Air Data/Inertial Reference Units (ADIRUs)	34-10-00-860-004-A02
Cleaning of the Pitot Probe Drain-Holes	34-10-00-170-004-A
Flushing of the Total Pressure-Lines	34-10-00-170-001-A
Flushing of the Static Pressure Lines	34-10-00-170-002-A
Draining and Flushing of Standby Pneumatic Circuits	34-10-00-170-003-A
ADIRS-Flight Control Accelerometers for Correct Ops	34-10-00-040-002-A
Check of the ADIRS CDU Brightness and Display	34-10-00-710-001-A
Test of the Angle of Attack Warning	34-10-00-710-007-A
Operational Five-Minute Time Delay of ADIRU2 and ADIRU3 Power Disconnect in Emergency Config.	34-10-00-710-009-A

The ADM performs various tests to detect its own faults (watchdog timer, RAM addressing, ROM, CPU, RAM, NVM, etc.) and failed input signals (check of programming pins).

34-20-00 - STANDBY NAVIGATION SYSTEMS

F12	NAV/STBY/INST
ISIS Reset	AMM 34-20-00-710-802-A

MMR SYSTEM :-The Multi-Mode Receiver (MMR) system is a navigation sensor with 3 internal receivers: MMR = ILS + GPS.
MKR PRINCIPLE:-The MKR system is a radio navigation aid, which indicates the distance between the aircraft and the runway threshold. The MKR system is normally used together with the ILS system during an ILS approach..
ILS PRINCIPLE:-The function of the ILS is to supply to the crew and airborne system users, signals transmitted by ground stations. A descent axis is determined by the intersection of a Localizer beam (LOC) and a Glide Slope beam (G/S) created by these ground stations at known frequencies. The ILS can measure and display angular deviations and it also receives the Morse audio signal, which identifies the ILS ground stations.

- Flight Management and Guidance Computers (FMGCs), for ILS auto-tuning and GPS position,& Air Data/Inertial Reference Units (ADIRUs) for GP-IRS hybrid position computation.
The Multi-mode Receivers are in the forward avionics bay 90VU. The Multi-mode Receiver antennas are installed on the upper fuselage for GPS function and in the radome for the G/S and LOC dual antennas.

34-36-00 PB 001 CONF 01 - ILS ((MMR)) -

*G12	NAV/MMR/1
*L07	COM NAV/MMR/2
* NAV MMR 1(2) FAULT= After 5 seconds, close the C/B.	
B02	AUTO FLT/FMGC/1
G10	COM/RMP/1
L02	COM NAV/RMP/2
M17	AUTO FLT/FMGC/2
34-36-00-740 003-A	BITE Test of the MMR
34-36-00-710-002-A	Operational Test of the GPS
34-36-00-710-003-A	Operational Test of the ILS
34-36-00-750-005-A	Correction of the Multi-Mode Receiver (MMR)
GPS PRIMARY' in WHITE is normal operation Stating that GPS is the PRIMARY mode of operation. The 'CLEAR' button on the MCDU will erase this message.	
Loss of the GPS primary navigation:-When the GPS navigation is lost for any reason, the navigation function is degraded and reverts to the traditional navigation function with IRS positions and radio positions if available (in this case the RNP (Required Navigation Performance) features are still available). Warnings are generated to indicate the loss of GPS PRIMARY navigation:	
Test for ILS1 and ILS2 access to the SYSTEM REPORT/TEST/NAV page, the ILS1 and ILS2 indications can be shown instead of the MMR1 and MMR2 indications. In this case, you must do the following steps:make sure that the the engines are shut down ,open CFDIU SUPPLY circuit breaker J18,open CFDIU BACK UP circuit breaker J17 make sure that MMR1 and MMR2 circuit breakers, G-12 and L-07 are closed · wait for 30 seconds then close the CFDIU circuit breakers J18 and J17. wait for 180 seconds then get access to the SYSTEM REPORT/TEST/NAV page.	

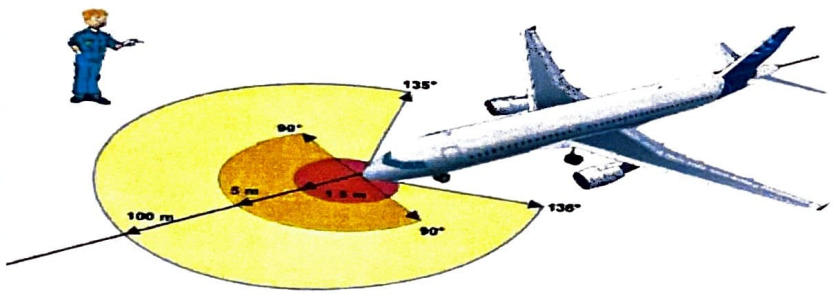
➢ WXR/PWS SYSTEM

The **airborne Weather Radar (WXR) and Predictive Wind Shear system** (PWS) detects and localizes atmospheric wet disturbances and **WINDSHEAR** events in the area scanned by the antenna..

SPECIAL PRECAUTIONS:-Some special precautions must be taken before using the Weather Radar (WXR) system on ground in MAP, WX or WINDSHEAR mode.

- the dangerous zone forward of the aircraft must be free of metallic obstacles such as hangars or aircraft, within 5 m in an arc of + or - 90º on either side of the aircraft centerline,
- make sure that nobody is within a distance of 1.5 m from the antenna, in an arc of + or - 135º on either side of the aircraft centerline,
- the **system must not be operated during the refueling** of the aircraft or during any refueling operation within 100 m..

THE SYSTEM MUST NOT be operated during the **REFUELING** of the aircraft or during any refueling operation **within 100 m**



SPECIAL PRECAUTIONS

PWS PRINCIPLE:-A wind shear event is a **sudden change of wind speed and/or direction** over a small distance caused by **downwards** and/or **upwards movement** of the air. The most critical moment for the aircraft is near the ground level during the **approach or in take-off.** The PWS function detects the wind shear event if measurable **precipitation occurs** during the event.

Note: :-To avoid radiating danger, and nuisance aural alerts the WINDSHEAR AUTO/OFF selector switch must be **selected OFF independently** of the radar selector switch.

K13	121VU COM NAV/RADAR/1 **Pwr-Up Test= 30 Sec**
K14	121VU COM NAV/RADAR/2

34-42-00 - RADIO ALTIMETER

The Radio Altimeter (RA) system calculates the height of the aircraft above the terrain during initial climb, approach and landing phases. The RA can therefore operate over non-flat ground surface. The principle of the RA is to transmit a **frequency-modulated signal,** from the aircraft to the ground, and to receive the ground reflected signal after a certain delay. The time between the **transmission and the reception** of the RA signal is proportional to the A/C height.

ARINC TEST:-The RA ARINC TEST function can be activated by pressing the line key adjacent to the corresponding indication on the **RA maintenance sub-menu** or by pressing the pushbutton switch on the face **of the transceiver.** - or until the pushbutton switch on the face of the transceiver is released.

RAMP TEST:-The RAMP TEST function from the MCDU by pressing the line key adjacent to the **SYSTEM REPORT/TEST** indication on the CFDS menu then selecting **the RA1 (RA2)** on the NAV menu and then selecting the RAMP TEST page.The RA then begins **simulating a ramp starting from 500 ft.** down to 0 ft. (with a slope of 10 ft/s from 500 ft. to 50 ft. and approximately 3 ft/s from 50 ft. to 0 ft.).

SYSTEM TEST:-The RA SYSTEM TEST function can be activated by pressing the line key adjacent to the corresponding indication on the RA 1(2) maintenance sub-menu. The following sequence occurs :

· **on the PFD** :- the bottom sector line **moves down** from the horizon line. the **radio altimeter is 40 ft.**

· **on the MCDU,** at the end of the test, the TEST OK message comes into view.

NOTE: If the system test or the ramp test cannot be initiated on ground from the MCDU (which means that a **fault affects either the LGCIU,** the EIU or the RA) a TEST page comes into view on the MCDU.

K11	**COM NAV/RAD ALTM/1**
K12	**COM NAV/RAD ALTM/2**
34-42-00-860-801-A	**Reset of the Radio Altimeter (RA)**
34-42-00-730-002-A	**Ramp Test of the Radio Altimeter (RA)**
34-42-00-750-001-A	**Ops Check & Contamination of Radio Altimeter Fan**
34-42-00-710-001-A	**Warning Test of the Radio Altimeter**

34-43-00 - TRAFFIC COLLISION AVOIDANCE SYSTEM (TCAS)

The Terrain and Traffic Collision Avoidance System (T2CAS) is a combination of two functions in a single Line Replaceable Unit (LRU). These functions are the TCAS (TCAS II Change 7) and the Terrain Awareness and Warning System (TAWS). General purpose of the T2CAS is to alert the crew of two kinds of hazards which are:-(a) Collision with terrain (Controlled Flight Into Terrain).
(B) Collision with surrounding traffic.

ATC/Mode S transponders:-Two ATC/Mode S transponders, one active and the other on standby, are used with their antennas. Each transponder is linked to the TCAS by one high-speed ARINC 429 bus for transmission and another one for reception.

Measurement of Intruder Parameters:- Determination of relative altitude Upon confirmed transponder reception, the TCAS starts to interrogate the intruder. Its altitude is transmitted directly in the reply (standard barometric altitude) and this information is used to determine the relative altitude of the two aircraft, by calculating the barometric altitude difference. This computation is, however, only possible with respect to Mode C or Mode S transponder equipped aircraft.

COMPONENTS:-The TCAS (or T2CAS) components are two antennas, one TCAS II computer (or T2CAS computer) and one TCAS/ATC control panel.

34-72-00 The Traffic and Terrain Integrated Surveillance System (T/TISS) is a combination of three functions in a single Line Replaceable Unit (LRU). These functions are Traffic alert and Collision Avoidance System (TCAS) (TCAS II Change 7.1) with Airborne Traffic Situation Awareness (ATSAW) capability , Terrain Awareness and Warning System (TAWS) and ATC/Mode S transponder.

The T/TISS:-_Provides Mode S transponder functions, including Elementary Surveillance (ELS), Enhanced Surveillance (EHS) and Automatic Dependant Surveillance-Broadcast (ADS-B OUT).

The full configuration contains a single T/TISS (using its own pair of antennas, for both TCAS and embedded transponder) and a standalone legacy transponder (using its own pair of antennas).

MAINTENANCE TASK	AMM REFERENCES
Bite Test of the T2CAS	34-43-00-740-004-A
Functional Test of the TCAS Antennas	34-43-00-720-002-A
Read CURRENT STATUS of the T2CAS (TAWS part)	34-43-00-740-005-A
Deactivation of the TCAS	34-43-00-040-001-A
Reactivation of the TCAS	34-43-00-440-001-A
Deactivation of the TCAS	34-43-00-040-002-A
Reactivation of the TCAS	34-43-00-440-002-A
BITE Test of the TCAS	34-43-00-740-001-A
Functional Test of the TCAS Antennas	34-43-00-720-001-A
Read the TCAS CONFIGURATION Data of the TCAS	34-43-00-740-007-A

➢ 34-52-00 - ATC/MODE S (SELECT)

The Air Traffic Control (ATC) system is based on the replies provided by the airborne transponders in response to interrogations from the ATC Secondary Surveillance Radar (SSR).

The ground ATC secondary radar uses technics which provide the air traffic control with information thaS be acquired by the primary radar. This system serves to distinguish between aircraft and to maintain effective ground surveillance of the air traffic.

The system provides the air traffic controllers with :

· Mode A: transmission of aircraft identification (code number)
· Mode C: transmission of aircraft barometric altitude
· Mode S: selective calling.

The ATC/Mode S transponder receives interrogations from:

. Mode S and SSR ground stations
. TCAS-equipped aircraft (the Mode S transponder transmits TCAS data from another TCAS-equipped aircraft to its own TCAS computer).

Each (ATC Mode S-equipped) aircraft has its own Mode S address. This address (24-bit) is included in all Mode S transmissions, so that every interrogation can be directed to a specific aircraft, preventing multiple replies.

The Air Traffic Control (ATC) system is based on the replies provided by the airborne transponders in response to interrogations from the ATC Secondary Surveillance Radar (SSR). The ground ATC secondary radar uses technics which provide the air traffic control with information that cannot be acquired by the primary radar. This system serves to distinguish between aircraft and to maintain effective ground surveillance of the air traffic.

G11	COM NAV/ATC/1
K10	COM NAV/TCAS Pwr-Up Test= 5 Sec
K07	COM NAV/ATC/2
L01	TCAS
P06	EIS/GPWS/28VDC Pwr-Up Test= 2 Sec
34-52-00-860-001-A	Change of ICAO Add (after a Change of A/C Reg No)
34-52-00-740-004-A	BITE Test of the ATC
34-52-00-710-003-A	Operational Test of the ATC
34-52-00-720-004-A	Functional Test of the Altitude Reporting Function
34-52-00-720-005-A02	Functional Test of the ATC/Mode S Transponder
34-52-00-720-006-A	Functional Test of the ATC Antennas
34-52-00-720-802-A	Verification of the ATC Mode S address (ICAO)
34-72-00-610-001-A	Uploading of the TAWS Database
34-72-00-610-802-A	Uploading of the OBSTACLE Database
34-72-00-040-001-A	Deactivation of the TCAS
34-48-00-610-001-A	Uploading of the Enhanced GPWC Database

34-48-00-710-001-B	Ops Test of the Enhanced GPWS Ground Self-Test
34-48-00-710-002-B	GPWS with Stall Warning Test and of GPWS/SYS
34-48-00-740-002-B	BITE Test of the Enhanced GPWS
P06	121VU EIS/GPWS/28VDC
P07	121VU EIS/GPWS/115VAC

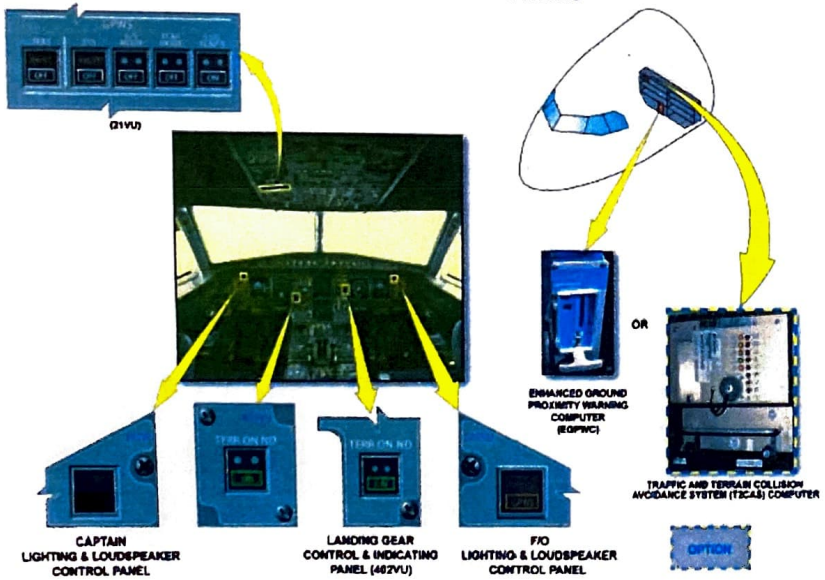
34-48-00 - GROUND PROXIMITY WARNING SYSTEM (GPWS)

EGPWS:- The Enhanced Ground Proximity Warning System (EGPWS) is built over the current Ground Proximity Warning System (GPWS).

EGPWS = GPWS + "ENHANCED" functions.

Traffic and Terrain Collision Avoidance System (T2CAS) installed instead of the EGPWS. The T2CAS includes partitioned modular functions for **both Traffic Collision Avoidance System (TCAS) and Terrain Awareness and Warning System (TAWS)** functions. The TAWS part of T2CAS carries out the same functions as the EGPWS.. NOTE: The EGPWS can also include an obstacle database in which are recorded the man-made obstacles. They are treated as terrain. The **alerting functions integrated in the T2CAS-TAWS part are:**

- basic GPWS functions (Modes 1 to 5), mainly based on Radio Altitude,
- **predictive modes: Collision Prediction and Alerting (CPA)** function and Terrain Hazard Display (THD) function, which gives forward-looking terrain avoidance and premature descent alert functions



COMPONENTS

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

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34-51-00 – DME

DME SYSTEM PRINCIPLE:-The Distance Measuring Equipment (DME) provides digital readout of the **aircraft** slant range **distance** from a selected ground station. The system generates interrogation pulses from an onboard interrogator and sends them to a selected ground station. **After a 50 microseconds delay,** the **ground station replies.** The interrogator determines the distance in nautical miles between the station and the aircraft. The interrogator detects the Morse audio signal, which identifies the ground station.

The components are **two antennas and two interrogators.**

AMM REFERENCE	MAINTENANCE TASK
34-51-00-740-002-A	BITE Test of the DME
34-51-00-710-001-A	Operational Test of the DME
34-51-00-720-001-A	Functional Test of the DME
G14	49VU NAV/DME/1
K06	121VU COM NAV/DME/2
H14	49VU NAV/ADF/1 Pwr-Up Test= 2 Sec
F09	49VU NAV/ADF/1
K02	121VU COM NAV/ADF/2
34-53-00-740-003-A	BITE Test of the ADF
34-53-00-710-002-A	Operational Test of the ADF

ADF SYSTEM PRINCIPLE:-The ADF is a radio navigation aid. It provides:

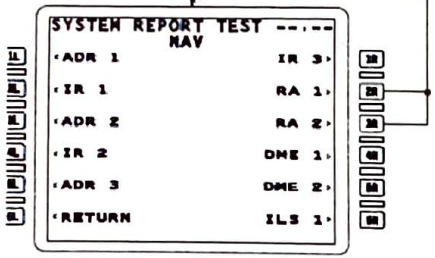
- the **relative bearing** of the aircraft to a **selected ground station** called **Non-Directional Beacon (NDB),**:-an aural identification of the ground station.

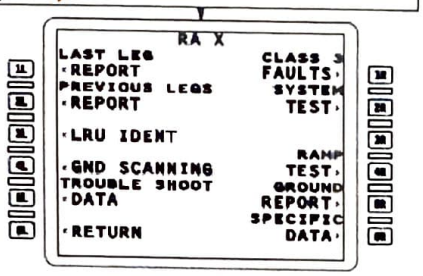
The **relative bearing is the angle** between the **aircraft heading** and the **aircraft/ground station axis.** The combination of signals, received from two loop antennas and from one omni-directional sense antenna, provides bearing information. An additional Morse signal is provided to identify the selected ground station

34-55-00 – VOR/MARKER

VOR/MKR SYSTEM PRINCIPLE:-The VOR system is a **medium-range radio navigation aid.** The VOR system receives, decodes and processes bearing information from the omni-directional ground station, working in the frequency range of 108 MHz to 117.95 MHz. The **ground VOR station** generates a reference phase signal and a variable phase signal. The phase difference between these signals, called bearing, is function of the aircraft position with respect to the ground station. The bearing is the angle between the magnetic north and the ground station/aircraft axis. Furthermore, the VOR station provides a Morse identification, which identifies the station.

AMM REFERENCE	MAINTENANCE TASK
34-55-00-740-002-A	BITE Test of the VOR/MKR
34-55-00-710-001-A	Operational Test of the VOR/MKR
34-55-00-720-001-A	Functional Test of the VOR/MKR
G13	49VU NAV/VOR/1
K08	121VU COM NAV/VOR/2



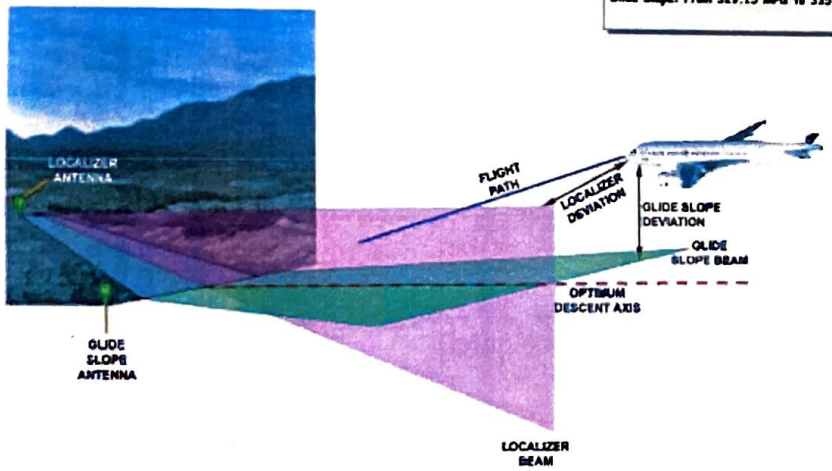


THEN SELECT THE DESIRED SUB-MENU FUNCTION

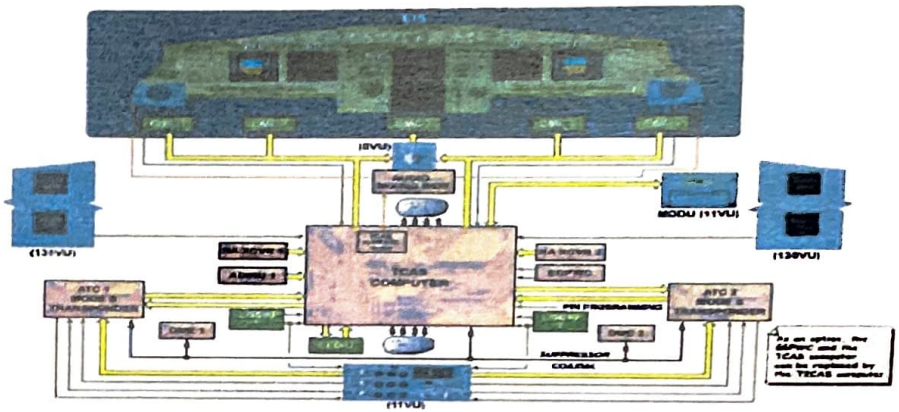
ILS operational frequency range

Localizer: From 108.1 MHz to 111.95 MHz

Glide Slope: From 329.15 MHz to 335 MHz

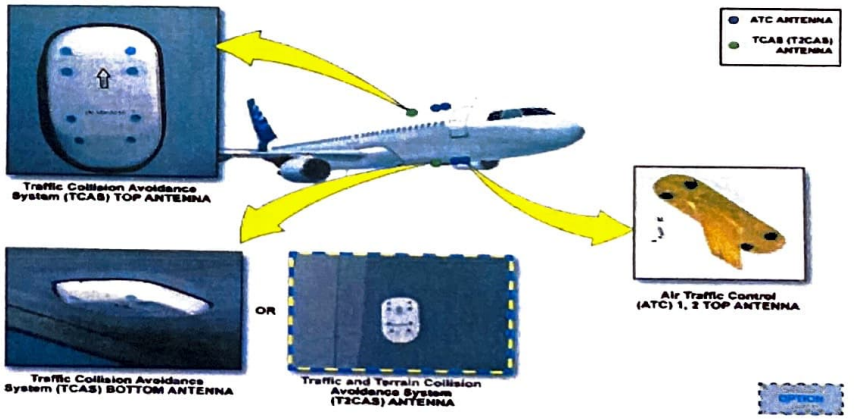


GENERAL & ILS PRINCIPLE



ATC MODE	INFORMATION ABOUT THE A/C
A	IDENTIFICATION
C	ALTITUDE
S	SELECTIVE CALL FLIGHT DATA

PRINCIPLE



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Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

ME-36 Pneumatic

FAULT MESSAGE	POTENTIAL CAUSES
AIR APU BLEED FAULT.	APU is running and the position of the APU bleed valve disagrees with the selected position of the APU BLEED pb-sw..
AIR APU BLEED LEAK.	APU bleed leak detection loop detects a temperature above 124 °C.
AIR APU BLEED LEAK APU LEAK FED BY ENG	BLEED LEAK is detected in the APU bleed ducts and the APU is OFF.
AIR APU LEAK DET FAULT.	APU BLEED leak detection loop is inop.
AIR BLEED 1(2) OFF	ENG 1(2) BLEED pb-sw is abnorm set to OFF.
AIR BLEED LEAK	LEAK is detected in a bleed duct and the X-BLEED selector is set to OPEN.
AIR ENG HP VALVE FAULT	HP valve is abnormally closed.
AIR ENG 1(2) BLEED ABNORM PR	REGULATED pressure in the engine bleed duct is abnormal.
AIR ENG 1(2) BLEED FAULT	ENGINE 1(2) is running and engine bleed air pressure is above 57 PSI (+3/-0)
AIR ENG 1(2) BLEED FAULT (BLEED NOT CLOSED)	ENGINE 1(2) is running, the engine 1(2) bleed valve fails to close,
The engine 1(2) bleed air pressure is above 57 PSI (+3/-0)	
AIR ENG 1(2) BLEED NOT CLSD	BLEED valve not automatically closed during engine start or with APU bleed selected
AIR ENG 1+2 BLEED FAULT.	BOTH ENG bleed supply are lost without wing leak or pylon leak on any side.
AIR ENG 1+2 BLEED FAULT LEFT LEAK	BOTH ENGINE bleed supply are lost with a left wing leak or a pylon leak on side 1.
AIR ENG 1+2 BLEED FAULT RIGHT LEAK	BOTH ENG bleed supply sys are lost with a (right wing or a pylon) leak on side 2.
AIR ENG 1+2 BLEED FAULT LEFT LEAK AND RIGHT LEAK	BOTH ENG bleed supply sys are lost with a wing leak or a pylon leak on both sides.
AIR ENG 1(2) BLEED LO TEMP (OPPOSITE BLEED AVAILABLE)	ASSOCIATED ENGINE bleed supplies bleed air at a temperature below 150 °C in flight and the WING A-ICE pb-sw is set to ON.
AMM 36-22-00-100-802-A (CFM) & 36-22-00-100-803-A (PW)= Cleaning and Application of Electrical Insulating Compound to the Overheat Detection System (OHDS) Connectors.	

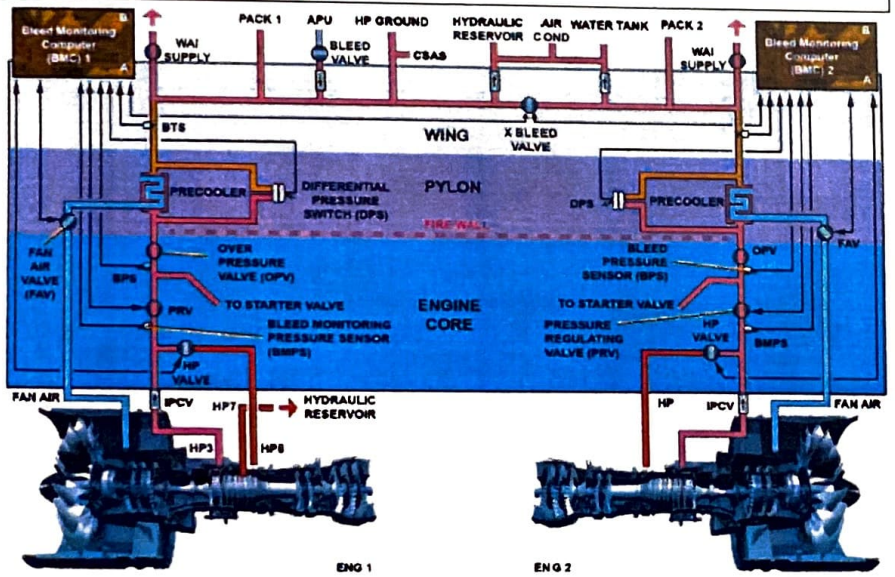
This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

TASK ON A/C 101-150	AMM REFERENCE
Deactivation of the Bleed Valve	36-11-00-040-803-A
Deactivation of the HP Bleed Valve	36-11-00-040-804-A
Reactivation of the Bleed Valve	36-11-00-440-802-A
Reactivation of the HP Bleed Valve	36-11-00-440-803-A
Deactivation of the HPV in the CLOSED Position to Isolate the IP Bleed Check-Valve	36-11-00-040-806-A
Reactivation of the HPV to MAKE serviceable the IP VLV	36-11-00-440-805-A
Operational Test of the Bleed Air System	36-11-00-710-802-A
Drift Test of the Pressure Sensor	36-11-00-740-805-A
Emergency Protection Function (EPF) Test	36-11-00-740-806-A
Ground Scanning Test	36-11-00-740-809-A
Overheat Electrical Test	36-11-00-740-810-A
BITE Test of the Eng Bleed Air System (EBAS) (Sys Test)	36-11-00-740-802-A

TASK ON A/C 009-100, 201-300	AMM REFERENCE
Deactivation of the Bleed Pressure Regulator Valve	36-11-00-040-001-A
Reactivation of the Bleed Pressure Regulator Valve	36-11-00-440-001-A
Deactivation of the HP Bleed Valve in the CLOSED Position to Isolate the IP Bleed Check-Valve	36-11-00-040-002-A
Reactivation of the HP Bleed Valve to Make serviceable the IP Bleed Check-Valve	36-11-00-440-002-A
Deactivation of the HP Bleed Valve	36-11-00-040-003-A
Reactivation of the HP Bleed Valve	36-11-00-440-003-A
Pylon Leak Detection and APU Leak Detection Operates Correctly	36-11-00-040-004-A
Pylon Leak Detection and APU Leak Detection Loop Operates Correctly in LH Side	36-11-00-040-807-A
Pylon Leak Detection Operates Correctly in RH Side	36-11-00-040-808-A
CURRENT STATUS of the Engine Bleed Air System	36-11-00-710-001-A
Operational Test to Read the CLASS III FAULTS	36-11-00-710-002-A
Operational Test of the Bleed Air System	36-11-00-710-003-A
BITE Test of the BMC 1(2)	36-11-00-740-001-A
Operational Test of Closing Signal to Temp Limitation Thermostat Solenoid from Engine Fire Pushbutton	36-11-00-710-005-A
Leak Check of Engine Bleed Air Supply System and Packs Components with APU Bleed Air	36-11-00-720-005-A
Perform Leak Check on the Combo Seals on the Pylon Duct Sleeves (Downstream Precooler)	36-11-00-790-002-A
Health Check Procedure - Temperature Control Function	36-11-00-720-802-A

BLEED MONITORING COMPUTER (BMC) Power-up Test= 22 sec.	
** ON A/C 001-007, 009-100, 201-300	
D12	49VU AIR BLEED/ENG 1/CTL
D11	49VU AIR BLEED/ENG 1/MONG
Z23	122VU AIR BLEED/ENG 2/CTL
Z22	122VU AIR BLEED/ENG 2/MONG
** ON A/C 101-150	
D11	49VU AIR BLEED/ENG 1/CTL
Z23	122VU AIR BLEED/ENG 1/MONG
Z22	122VU AIR BLEED/ENG 2/CTL



** ON A/C 101-150

Air is generally bled from an Intermediate Pressure (IP) stage of the engine High Pressure (HP) compressor to minimize engine pressure losses. This is the normal engine air-bleed configuration.

· **The IP stage** is the **3th HP compressor stage.** At **low engine speeds**, when the pressure from the IP stage is insufficient, air is automatically bled from a higher compressor stage (HP stage). This happens especially at some aircraft holding points and **during descent**, with engines at idle.

· The HP stage is the **8th HP compressor stage.** Transfer of bleed air is achieved by means of a pneumatically operated and electrically commanded butterfly valve, designated **HP bleed valve (4000HA).**

When the HP bleed valve is closed, air is directly bled from **the IP stage** through an IP bleed **check valve.**

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The PRV **pneumatically regulates the downstream pressure** to:-51 psig for normal bleed operation **It closes automatically** in the following cases:

· When the torque-motor is **not energized**
· When the torque-motor is energized but without pressure in the valve body
· **Overtemperature** downstream of the precooler exchanger 257 deg.C (60 s delay)
· **Overpressure** downstream of the PRV (57 plus or minus 3) psig (15 s delay)
· **Ambient overheat** in pylon/wing/fuselage ducts surrounding areas
· APU bleed valve **not closed**
· Corresponding starter valve **not closed.**

It is controlled in closed position **by crew action** on:- ENG FIRE pushbutton switch **or-** ENG BLEED pushbutton switch.

The PRV closes pneumatically in case of impending reverse flow to the engine. The Overpressure Valve (OPV) installed downstream of the PRV protects the system against damage if overpressure occurs. The BMC control the HPV to close position if the PRV is closed or controlled to close.

PRESSURE SENSORS

BLEED MONITORING PRESSURE SENSOR (BMPS):-The Bleed Monitoring Pressure Sensor (BMPS) is used to perform bleed port switching function. It is also used to estimate the position of the HPV butterfly and to monitor the HPV and the PRV.

BLEED PRESSURE SENSOR (BPS):-The Bleed Pressure Sensor (BPS) is installed downstream the PRV. It provides to BMC the actual bleed air pressure delivered through the PRV. This sensor is also used by the BMC for system monitoring (over pressure and low pressure alarms) and to monitor the position of the OPV butterfly.

DIFFERENTIAL PRESSURE SENSOR (DPS):-The Differential Pressure Sensor (DPS) ensures the reverse flow protection by sensing the differential pressure between Precooler hot side inlet and outlet. It also provides to the BMC an indication of the PRV and OPV position.

BLEED TEMPERATURE SENSOR (BTS):-The **dual Bleed Temperature Sensor (BTS)** installed downstream the Precooler provides to the BMC the actual EBAS temp. The **BMC uses EBAS** temperature to position the Fan Air Valve (FAV). The wiring connected to channel A of the BTS is fully segregated from the wiring connected to channel B. Both BMCs interchange temperature measurements and can carry out both sides temperature regulation. This **dual sensor is also** used by the BMCs for system monitoring **(overtemperature and low temperature alarms).**

NOTE: Channel B of one BMC is connected to Channel A of the other BMC, so that in case of loss of temperature monitoring and control in Channel A of one side, the opposite controller can **take over control of the whole EBAS.**

PNEUMATIC LEAK DETECTION:DETECTION LOGIC:- Both Bleed Monitoring Computers (BMCs) permanently receive signals from the **leak detection loops primarily tested at power-up.** They exchange data via an ARINC bus for the double loop detection. Each BMC channel A normally controls its side engine bleed air system, so monitors the **Over Heat Detection System (OHDS).**.

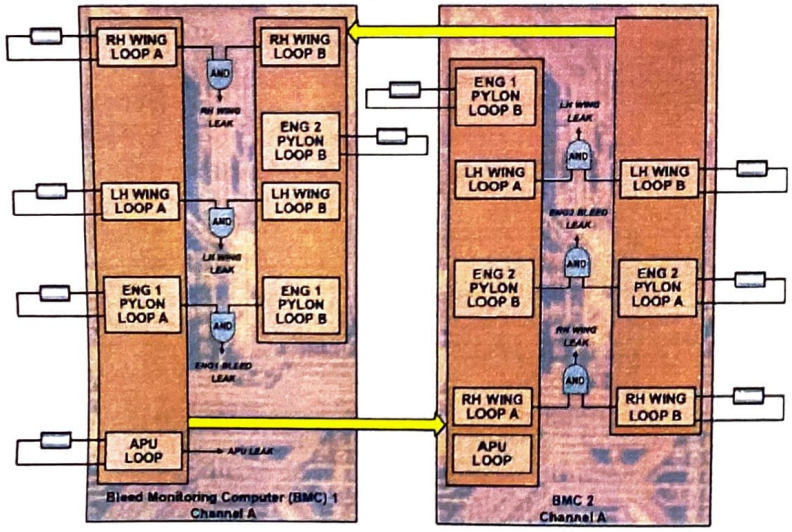
The ENG BLEED FAULT light comes on when a leak is detected by the wing loops A and B or by the pylon loops A and B. **The APU BLEED FAULT light comes on** when an APU duct leak is detected.

When an overheat condition is detected by both loops, the following alerts are generated for the affected zone:

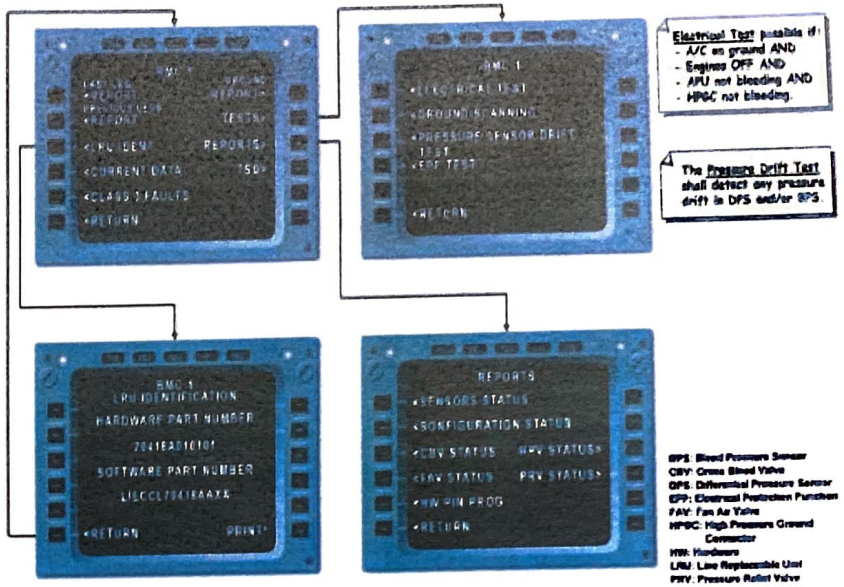
- **AIR ENG 1(2) LEAK** for a leak/overheat detected in the Pylons,
- **AIR L(R) WING LEAK** for a leak/overheat detected in the Wings,
- **AIR APU LEAK** for a leak/overheat detected in the APU line,
- **AIR APU LEAK [APU LEAK FED BY ENG]** for a leak/overheat detected in the APU line and the leak is automatically isolated.

A new warning alert has been **introduced on the A320neo**, the **AIR BLEED LEAK** to isolate a bleed leak in the opposite pylon to the operative bleed with **manually open Cross bleed Valve.** The **failure of a single loop** for Pylon or Wing is identified by a **MAINTENANCE** message displayed on the STATUS SD page. **Dual engine loop** failure is identified by the **AIR ENG 1(2) LEAK DET FAULT and is NO GO.**

If one BMC is failed, the other BMC takes over monitoring of the bleed system and triggers the ECAM warnings.

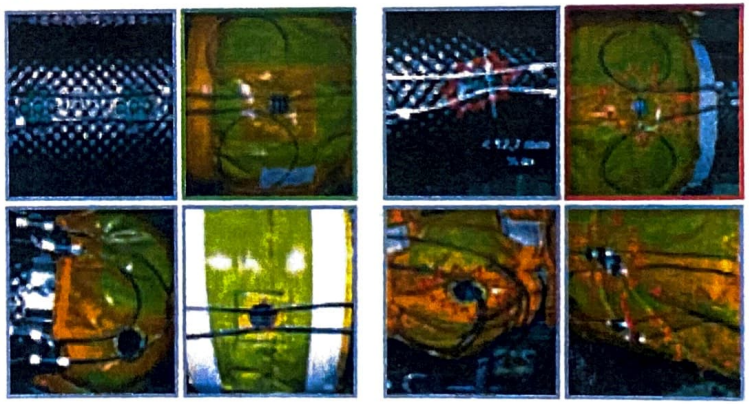


DETECTION LOGIC



Sensing element orientation.:- In dual loop system, both sensing elements will be routed in such a way as to ensure a minimum constant segregation of **12.7 mm** (0.5 inch). **Note:** The muff **detection hole** must be in front of the overheat elements.

Correct **Not Correct**

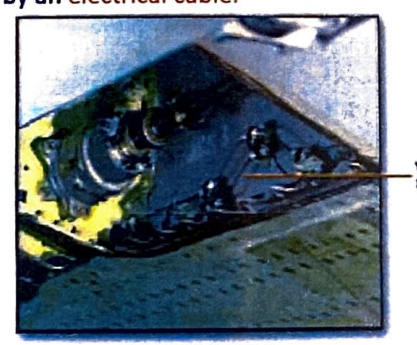


*** ON A/C 001-007, 009-100, 201-300***

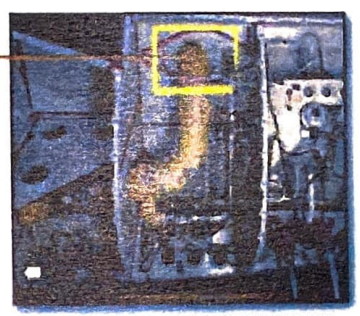
Air is generally bled from an Intermediate Pressure (IP) stage of the engine High Pressure (HP) compressor to minimize engine pressure losses. This is the normal engine air-bleed configuration.

· The IP stage is the 5th HP compressor stage. At low engine speeds, when the pressure from the IP stage is insufficient, air is automatically bled from a higher compressor stage (HP stage). This happens especially at some aircraft holding points and during descent, with engines at idle.

· The HP stage is the 9th HP compressor stage. Transfer of air bleed is achieved by means of a pneumatically operated butterfly valve, designated HP bleed valve. Two pressure transducers are installed on a bracket adjacent to the precooler exchanger. One pressure transducer (7HA) is connected with a sense line to the pneumatic duct downstream of the HP bleed valve , the other (8HA) is connected with a sense line to the pneumatic duct downstream of the PRV.. Both pressure transducers are connected to the bleed air monitoring computers (BMC) by an electrical cable.

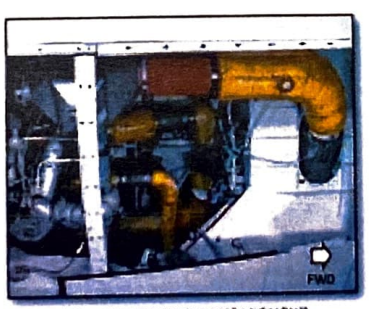


WING LEADING EDGE



FUSELAGE LEFT SIDE (AFT BELLY FAIRING)

The WING leak detection elements monitor more than the wings alone.
The protected areas are :
- Wing leading edge (wing anti-ice supply),
- Air conditioning compartment (pack supply, crossbleed manifold, APU supply, ground air supply)
- APU supply duct (from the APU check valve through the wheel well).



AIR CONDITIONING COMPARTMENT

ME-52 Doors

FAULT MESSAGE	POTENTIAL CAUSES
#DOOR FWD(AFT)(BULK) CARGO	FWD(AFT)(BULK) cargo door is not detected closed by the proximity sensors.
#DOOR L(R) AFT AVIONICS	L(R)(FWD)(AFT) avionics door is not detected closed by the proximity sensors.
#DOOR L(R) AFT CABIN.	L(R) FWD(AFT) cabin door is not detected closed by the proximity sensors..
#DOOR L(R) AFT EMER EXIT.	L(R) FWD(AFT) emergency exit door is not detected closed by the proximity sensors.
#DOOR L(R) FWD AVIONICS	L(R)(FWD)(AFT) avionics door is not detected closed by the proximity sensors.
DOOR L(R) FWD CABIN	L(R) FWD(AFT) cabin door is not detected closed by the proximity sensors.
#DOOR L(R) FWD EMER EXIT.	L(R) FWD(AFT) emergency exit door is not detected closed by the proximity sensors.
#No crew action required as long as cabin pressure is normal.	

MAINTENANCE TASKS	AMM REFERENCES
Removal of the Inflated off wing Escape Slide	25-62-42-000-002-A
Removal of the Emergency Exit Hatch	52-21-11-000-001-A
Removal of the Inflated Left-Hand Escape-Slide Raft	25-62-44-000-011-A
Removal of Inflated Right-Hand Escape-Slide Raft	25-62-44-000-805-A
Removal of the Emergency Exit Hatch	52-21-11-000-001-A
Passenger Seats - Seat Belt removal/installation	25-21-42
Repair of the Door and the Divider Net	25-50-00-300-001-A
Deactivation of the Defective Recline System of the CAPT (F/O) Seat= MMEL 25-11-03A	25-11-00-040-001-A
Clean the windshields	56-10-00-110-001
Inspection of the Windshields	56-11-11-200-001-A
Deactivation of the Front Windshield	56-10-00-040-001-A
Reactivation of the Front Windshield	56-10-00-440-001-A
Reactivation of the Lateral Fixed or Sliding Window	56-10-00-440-002-A
Deactivation of the Lateral Fixed or Sliding Window	56-10-00-040-002-A
Inspection of All Cockpit Windows from Inside	56-10-00-200-003-A

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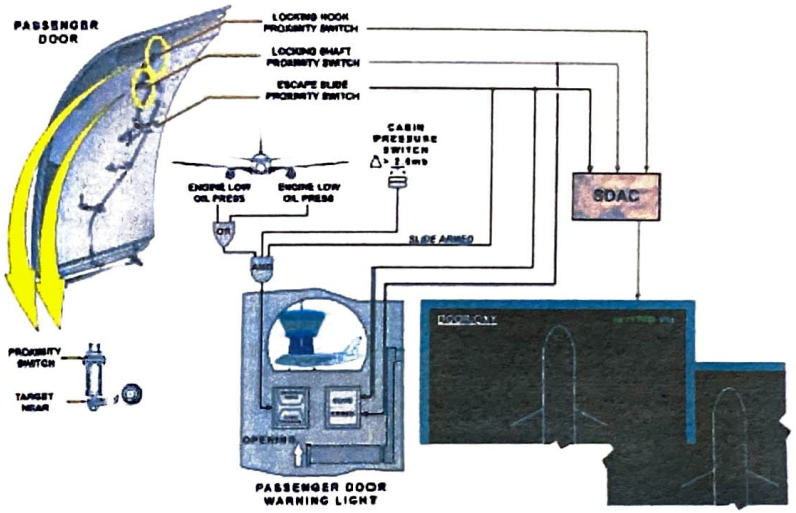
MAINTENANCE TASK	AMM REFERENCE
Reactivation of the Cargo Compartment Doors	52-70-00-440-001-A
Check of the Proximity Switches of PAX /Crew Door	52-70-00-040-002-A
Reactivation of the Avionics-Compartment Access Door	52-70-00-440-002-A
Emergency Exit is Correctly Closed &Proximity-Switch	52-70-00-040-003-A
Reactivation of the Emergency Exit Doors	52-70-00-440-003-A
Avionics-Compartment Doors are Correctly Closed	52-70-00-040-004-A
Reactivation of the Avionics-Compartment Access Doors	52-70-00-440-004-A
Check of the Proximity Switches of the Doors	52-70-00-040-007-A
Reactivation of the Over wing Emergency Exits	52-70-00-440-007-A
Visual Check to Make Sure that Slide is in ARMED	52-70-00-040-008-A
Visual Check to Make Sure that Slide is in ARMED	52-70-00-040-009-A
Visual Check of EMERGENCY EXIT Close & SLIDE Arming	52-70-00-040-010-A
Visual Check of EMERGENCY EXIT Close & SLIDE Arming	52-70-00-040-011-A
Sensor rigging	52-71-00 PB501
Door rigging	52-41-11/12/13/14
Replacement of Proximity sensors-Removal	52-71-1x-000-001
Replacement of Proximity sensors- Installation	52-71-1x-400-001
Inspection of Proximity sensors	52-71-00-200-001
Indication and Warnings,	
121VU EIS/SLIDES/ARM AND WARN/FLT	P11
121VU EIS/SLIDES/ARM AND WARN/GND	P10
121VU EIS/SDAC1 AND 2/DOOR/DET/PAX	P05

PASSENGER DOORS:-Each door is monitored by three proximity switches that are:
- the locking hook proximity switch,;- the locking shaft proximity switch,
- the escape slide proximity switch.

DOOR INDICATING AND WARNING - The locking hook and the locking shaft proximity switches provide door indication on the ECAM DOOR page via the System Data Acquisition Concentrator (SDAC).

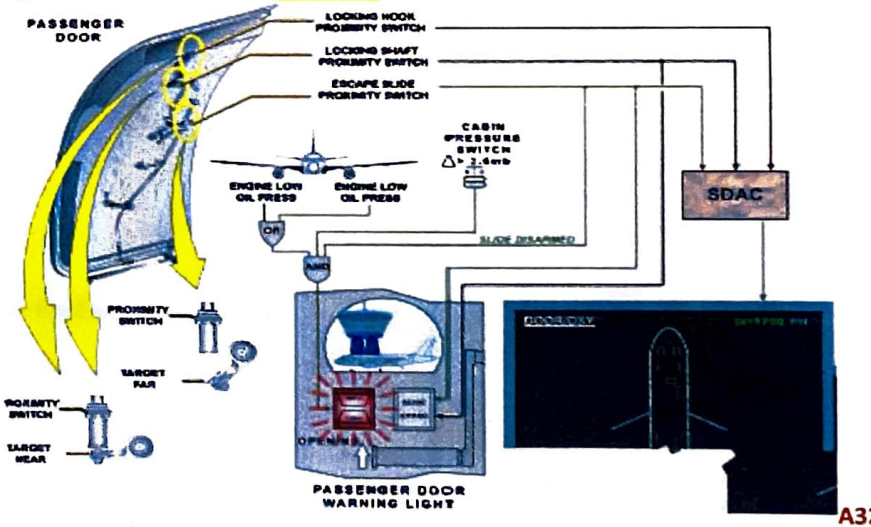
DOOR INDICATING AND WARNING – LOCKED:-When the door is locked, the locking hook and the locking shaft proximity switch targets are near, and the door symbol is green on the ECAM DOOR page.

52 - 70 DOOR IND / WARNING:-All data concerning the passenger/crew doors, the emergency exits, the avionics and cargo compartment doors and the escape slide arming and release and the cabin overpressure, are sent to the ECAM system through proximity switches. Data concerning passenger/crew doors, emergency exits & the avionics compartment doors are processed by the SDAC 1 and SDAC 2. Data concerning cargo compartment doors are processed by the LGCIU 1 and sent to the FWC 1 and FWC 2 through the ARINC 429 busbar.



DOOR INDICATING AND WARNING - NOT LOCKED:-As soon as at least one of the locking hook and the locking shaft proximity switch target is far, the door indication is amber on the ECAM DOOR page.

RESIDUAL CABIN PRESSURE:-The red flashing light indicates excessive residual cabin pressure. The red light flashes as soon as one of the two engines or the two engines is (are) off, the escape slide is disarmed and the residual cabin pressure is greater than 2.5 mbars (0.04 psi).



A320

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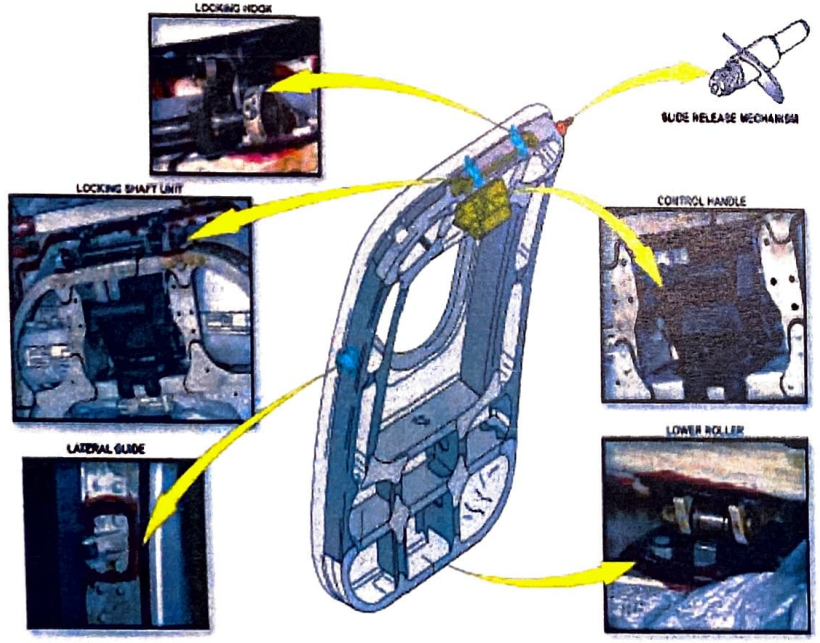
EMERGENCY EXIT DOORS:-Each door is monitored by two proximity switches:
- the cover flap proximity switch,;- the escape slide proximity switch.

DOOR INDICATING AND WARNING -The cover flap proximity switch gives door indication on the ECAM DOOR page via the SDAC.

DOOR INDICATING AND WARNING – LOCKED:-When the door is locked, the cover flap proximity switch target is near, and the door symbol is green on the ECAM DOOR page..

OPENING FOR MAINTENANCE:-To open one of the two emergency exit hatches from the outside, a red panel has to be pushed in, the door falls into the cabin and activates the escape slide release mechanism. To open one of the two emergency exit hatches from the inside, pull down the cover flap from the recess. A slide armed indicator illuminates to show that the escape slide release mechanism is in the armed configuration. To disarm the mechanism, turn the retractable pin a quarter turn anticlockwise. This is confirmed by the extinguishing of the slide armed indicator. Pull the lever of the hatch control handle to the down position. Carefully let the top of the hatch fall inwards so that it comes clear of the structure. Take the lower handle and pull the hatch from the recess. A red manual handle can be used to activate the escape slide release mechanism manually. Install a rigging pin in the provision of the hatch frame.

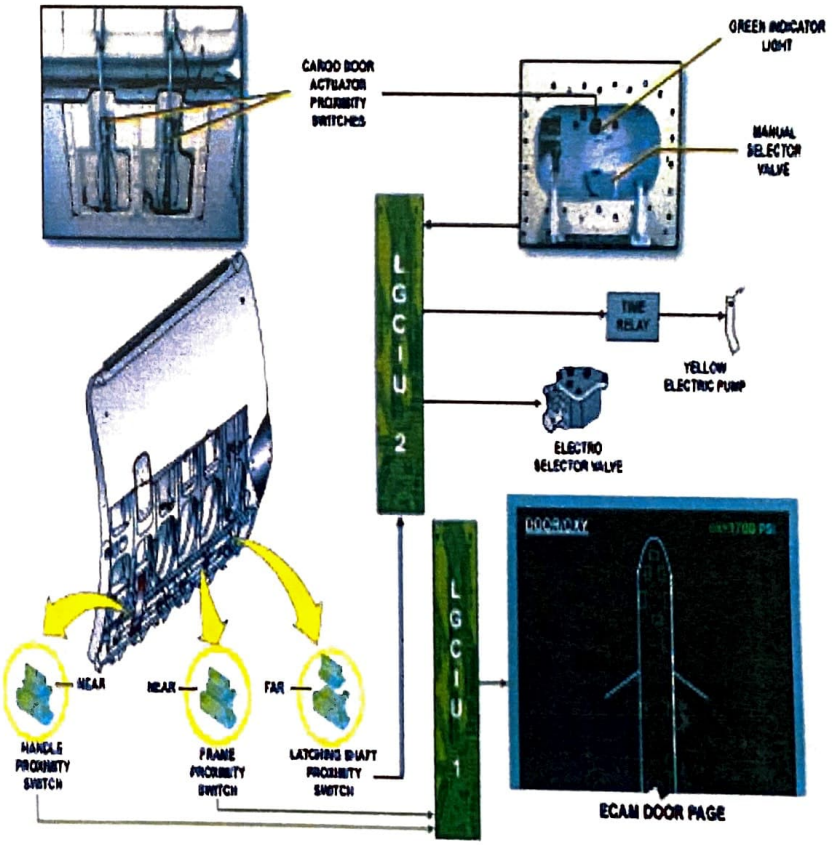


FWD & AFT CARGO DOORS:-have three similar proximity switches:
- the handle proximity switch,;-the frame proximity switch,
- the latching shaft proximity switch.

DOOR INDICATING AND WARNING -The locking handle and the frame proximity switches give the door indication on the ECAM via the Landing Gear Control and Interface Unit (LGCIU).

DOOR INDICATING AND WARNING – LOCKED When the door is latched and locked, the handle and frame proximity sensor targets are near. The door symbol is green on the ECAM DOOR page

DOOR INDICATING AND WARNING - NOT LOCKED As soon as the frame or the door handle proximity sensor detects target far the door is indicated as unlocked and the symbol is amber on the ECAM DOOR page..



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PW-ENGINE -(NEO)

ALL ENGINES FAILURE	Engines are failed in flight.
ENG THR LEVERS NOT SET (ON GROUND)	When the levers position does not correspond to TO power mode.
At least one FADEC engaged a takeoff thrust mode that is not in accordance with the position of the thrust levers.	
ENG THR LEVERS NOT SET (AT GO-AROUND) If Soft Go Around mode is affected. (**MSN 8146-8656**)	During go-around initiation with the soft go-around technique, the soft go-around function is lost
OR not available. Consequently, the thrust levers are not set at the right detent.	
ENG GA SOFT FAULT	The soft go-around function is lost.
ENG REV SET	REVERSE thrust is selected in flight.
ENG SAT ABOVE FLEX TEMP	SAT is above the FLEX TEMP.
ENG THRUST LOCKED	THRUST levers are not moved within 5s,
Un voluntary disconnection of the A/THR (**OR** disconnection through the FCU pb).	
ENG TO THRUST DISAGREE	A rating discrepancy between two engines is detected.
ENG TYPE DISAGREE	When a rating discrepancy between two engines is detected.
***ENG 1(2) A/C FADEC SUPPLY**	Aircraft 28 V supply is lost for:-
* Both EEC channels OR One EEC channel without switching to the other channel	
ENG 1(2) AIR MINOR FAULT	when the buffer air check valve is failed (in open position).
ENG 1(2) AIR SYS FAULT	When the BASOV is detected failed open OR failed closed, OR when the BACV is detected failed closed.
The buffer air system (Buffer Air Shut Off Valve (BASOV) OR Buffer Air Check Valve (BACV)) ensures engine bearing cooling, sealing, and pressurization. This alert also triggers when the active High Pressure Compressor (HPC) bleed valve is failed	
ENG 1(2) AIR VALVE	Air system to start bleed valve is failed.
ENG 1(2) BOWED ROTOR PROTECTION FAULT	when the bowed rotor protection (engine cooling) fails.
ENG 1(2) COLD FUEL	FADEC detects fuel temp less than 0°C,
if IDG 1(2) is connected, OR 1 °C, if IDG 1(2) is disconnected.	
ENG 1(2) COMPRESSOR VANE	LPC Stator Actuator OR HPC Stator Actuator OR LPC 2.5 Valve is partially OR fully lost.
ENG 1+2 COMPRESSOR VANE	There is a loss of the redundancy (i.e. One channel is detected faulty)
Of the compressor vane (i.e. VBV, VSV) control system on both engines. The control of the compressor vane is still fully operative on both engines.	

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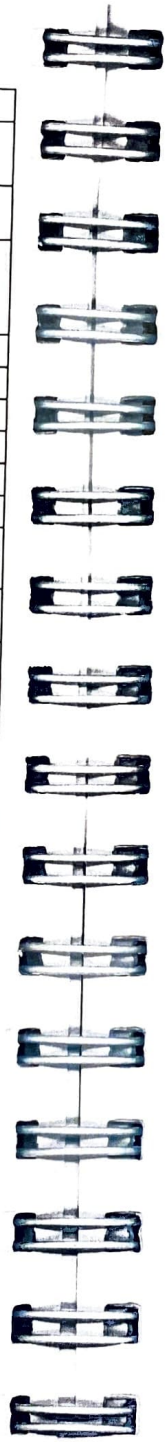

ENG 1(2) CTL SYS FAULT	Failure preventing the EEC from satisf controlling the engine is Detected.
ENG 1(2) EGT(FF)(N1)(N2) DISCREPANCY	when a discrepancy between real and displayed values is detected.
Upper ECAM upper displays a CHECK (**OR** CHK) message below affected indication. Normal indication may be recovered by switching from DMC 1 to DMC3.If unsuccessful, and if both thrust levers are at the same position, crosscheck with the opposite parameter.	
ENG 1(2) EGT EXCEEDED in AIR START	EGT limit is exceeded during engine relight in flight.
Data bus between the EIU and ECU is failed. When this alert is triggered:-Affected engine start is lost; Auto thrust control is lost; Thrust reverser on the affected engine is lost or When idle is selected, only approach idle is available;-Bleed corrections on N1 limit are lost;-Continuous ignition is on (in flight).	
ENG 1(2) FADEC ALTERNATOR	Electrical auto supply for the FADEC system is lost.
ENG 1(2) FADEC FAULT	when both FADEC channels are lost.
ENG 1(2) FADEC OVHT	FADEC is in overheat condition.
ENG 1(2) FADEC IDENT FAULT	ENGINE Data Storage Unit (DSU) is failed.
ENG 1(2) FADEC SYS FAULT	when the FADEC system is failed.
ENG 1(2) FAN COWL NOT CLOSED	ENGINE fan cowl is not closed.
ENG 1(2) FAIL	When the engine core speed is below idle, with the ENG MASTER lever set to ON, and ENG FIRE pb not pushed.
An engine flame-out may be recognized by a rapid decrease in EGT, N2, FF, followed by decrease in N1	
ENG 1(2) FUEL CTL FAULT	The Fuel Metering Valve (FMV) position is failed.
, OR The FMV command is failed, OR FMV position feedback is failed	
ENG 1(2) FUEL FILTER CLOG	When the fuel filter is clogged.
ENG 1+2 FUEL FILTER CLOG	Actual bypass is detected on both fuel filters.
ENG 1(2) FUEL FILTER DEGRAD	When an impeding bypass is detected on the fuel filter.
ENG 1(2) FUEL VALVE FAULT	when the HP fuel valve is failed in closed, OR in open position.
ENG 1(2) FUEL HEAT SYS	The Fuel Diverter Valve is failed,
OR The Fuel OR Oil temperature sensors are failed, OR The Fuel Return Valve is failed in open position.	

ENG 1(2) FUEL LEAK	Abnormal difference among the engines is detected, either in fuel flow OR in fuel used.
This caution could be indicative of a fuel leak downstream of the Fuel Metering Valve (FMV).In such a case, ECAM msg FUEL F. USED/FOB DISAGREE will not be triggered.	
ENG 1(2) FUEL SENSOR FAULT	When fuel system monitoring and the fuel filter of IDG Fuel/Oil cooler sensing are failed.
ENG 1(2) HEAT EXCHGR CLOG	when the IDG oil/fuel exchanger is detected clogged.
ENG 1+2 HEAT EXCHGR CLOG	Both IDG oil/fuel exchangers are detected clogged.
ENG 1(2) HEAT SYS DEGRADED	A minor failure of the heat management system is detected.
ENG 1(2) HEAT SYS FAULT	Heat management system is failed
(Fuel/oil cooling bypass valve is failed, FMV fuel OR oil temperature sensor is lost).	
ENG 1(2) HIGH VIBRATION	N1 vibrations are above 5 units, OR N2 vibrations are above 5 units.
ENG 1(2) HOT AIR DET FAULT	Hot air leak detection is failed (burst duct).
ENG 1(2) HOT AIR LEAK	Hot air leak (burst duct) is detected in engine compartment.
ENG 1(2) HOT FUEL	Hot fuel is detected by the FADEC.
ENG 1(2) IGN A(B) FAULT	Ignition circuit A OR B is failed.
ENG 1(2) LO START AIR PRESSURE	Engine start is failed due to low start air pressure.
ENG 1(2) IGN A+B FAULT	Both ignition circuits are failed.
ENG 1(2) MINOR FAULT	A minor engine failure is detected.
ENG 1(2) N1(N2)(EGT) OVER LIMIT	N1 is above 100 %,
OR N2 is above 100 %, OR EGT is above 1 083 °C during engine start.	
ENG 1(2) OIL CHIP DETECTED	A chip is detected by the EEC in the engine oil system.
ENG 1(2) OIL FILTER CLOG	Oil filter is clogged.
ENG 1(2) OIL FILTER DEGRAD	An impending bypass is detected on oil filter.
ENG 1(2) OIL LO TEMP	Oil temperature is low.
*ENG 1(2) OIL HI TEMP	Oil temperature is above caution threshold.

Engine main oil temperature caution threshold varies with engine power level.The caution threshold decreases from 152 °C at idle, to 146 °C at cruise thrust, to 141 °C at high thrust.

*ENG 1(2) OIL LO PR	Oil pressure is below the upper red threshold.
* The upper red threshold varies with N2, and increases from 65 PSI at idle, to 176 PSI at high thrust. when oil pressure is between the upper red threshold and the upper amber threshold. The upper amber threshold varies with N2, and increases from 75 PSI at idle, to 186 PSI at high thrust.	
ENG 1(2) OIL SENSOR FAULT	Oil system monitoring is failed.
ENG 1(2) OIL SYS FAULT	Oil system is failed.
ENG 1(2) ONE TLA FAULT	Crew awareness.
ENG 1(2) OVTHR PROT FAULT	Thrust Control Malfunction is failed.
ENG 1(2) REV INHIBITED	Reverser is inhibited by maintenance action.
ENG 1(2) REV LOCKED	Reverser system is failed in stowed position..
ENG 1(2) REV MINOR FAULT	A failure is detected and the reverser is not unlocked and not inhibited.
ENG 1(2) REV PRESSURIZED	EEC detects that the thrust reverser system is pressurized while the thrust reverser is not selected.
ENG 1(2) REVERSE UNLOCKED	One OR more reverser doors are not locked in stowed position in flight,
OR on ground with no deploy order. FADEC may automatically set engine at idle.	
ENG 1(2) REVERSE CTL FAULT	Thrust reverser system is failed.
ENG 1(2) REVERSER FAULT	Thrust reverser on one engine is failed (due to system components OR inputs).
ENG 1(2) SENSOR FAULT	N1 OR N2 OR T2 OR P2 OR burner pressure OR ambient pressure engine sensors is lost.
ENG 1(2) SHUT DOWN	ENG master is at off iOR ENG FIRE pb is pushed.
ENG 1(2) STALL	An engine stall is detected.
ENG 1(2) START FAULT *If the associated THR LEVER NOT AT IDLE subtitle is displayed *If the associated STARTER SHAFT SHEAR subtitle Is displayed *NIL	Engine start is failed due to the following conditions:No light up, OR Engine stall, OR Eng overtemperature, OR Hung start, OR No N1 rotation, OR Starter time exceeded, OR Thrust lever not at idle, OR Hot start, OR Starter shaft shear.

ENG 1(2) START VALVE FAULT	Start valve is stuck in closed OR open position.
ENG 1(2) SYSTEM FAULT	Closure of the 6th stage bleed valves OR Turbine Case Cooling is failed.
ENG 1(2) THR LEVER ABV IDLE	One thrust lever is above idle.
while the other thrust lever is in the reverse detent at landing	
ENG 1(2) THR LEVER DISAGREE	A discrepancy between both resolvers of a thrust lever is detected.
ENG 1(2) THR LEVER FAULT	Both resolvers on one thrust lever are failed.
ENG 1(2) TURB COOL FAULT	Turbine Active Clearance Control (ACC) valve is failed in the closed position.

CFM-56 Engine (CEO)

ALL ENGINES FAILURE	All engines are failed in flight.
*ENG THR LEVERS NOT SET	Levers position does not correspond to TO power mode.
* At least one FADEC engaged a take off thrust mode that is not in accordance with the position of the thrust levers.	
ENG REV SET	Reverse thrust is selected in flight.
ENG THRUST LOCKED	Thrust levers are not moved within 5 s.
* un voluntary disconnection of the A/THR (OR disconnection through the FCU pb).	
ENG TYPE DISAGREE	A rating discrepancy between two engines is detected.
ENG VIB SYS FAULT	Vibration detection system is failed.
*ENG 1(2) BLEED STATUS FAULT	Status of one of the following valves is not received by the FADEC active channel:.
* Bleed valves, OR Pack valves, OR Wing and eng anti ice vlv, OR X bleed valve	
ENG 1(2) COMPRESSOR VANE	Either Variable Bleed Valve (VBV) OR Variable Stator Vane (VSV) is Failed.
ENG 1+2 COMPRESSOR VANE	when there is a loss of the redundancy
* (i.e. one channel is detected faulty) of the compressor vane (i.e. VBV, VSV) control system on both engines.	
ENG 1(2) EGT(FF)(N1)(N2) DISCREPANCY	A discrepancy between real and displayed values is detected.
Upper ECAM upper displays a CHECK (OR CHK) msg below the affected indication. Normal indication may be recovered by switching from DMC 1 to DMC 3.If unsuccessful, and if both thrust levers are at the same position, crosscheck with the opposite parameter.	
*ENG 1(2) EIU FAULT	Data bus between the EIU and ECU is failed.

*Affected engine start is lost. Auto thrust control is lost. Thrust reverser on the affected engine is lost. When idle is selected, only approach idle is available. Bleed corrections on N1 limit are lost.	
*ENG 1(2) FADEC A(B) FAULT	Associated FADEC channel is lost.
* Some cases of spurious FADEC fault have been experienced at engine start on ground. Set the master sw to OFF, and wait until N2 speed goes below 5 % (If N2 indication is not available, wait 2 minutes before going to next step). Pull and reset the C/B's of the affected ECU electrical supply (A04 OR A05 on 49 VU OR R41 OR Q40 on 121 VU). Wait 10 s for the ECU power-up sequence, and restart the engine.	
ENG 1(2) FADEC ALTERNATOR	Electrical auto supply for the FADEC system is lost.
ENG 1(2) FADEC FAULT	Both FADEC channels are lost.
ENG 1(2) FADEC HI TEMP	ECU TEMP is above 105 °C:
ENG SAT ABOVE FLEX TEMP	SAT is above the FLEX TEMP.
ENG 1(2) CTL VALVE FAULT	HP Turbine Clearance (HPTC) sys is failed,
ENG 1(2) FAIL	Engine core speed is below idle, with the ENG MASTER lever set to ON,.
& ENG FIRE pb not pushed An engine flame-out may be recognized by a rapid decrease in EGT, N2, FF, followed by decrease in N1 for CFM engines,	
ENG 1(2) FUEL CTL FAULT	Fuel Metering Valve (FMV) position is failed,
OR FMV command is failed, OR FMV position feedback is failed.	
ENG 1(2) FUEL FILTER CLOG	Fuel filter is clogged.
ENG 1(2) FUEL RETURN VALVE	Fuel return valve is failed in closed, OR in open position.
ENG 1(2) HP FUEL VALVE	HP fuel valve is failed in closed OR open position.
ENG 1(2) IGN A(B) FAULT	Ignition circuit A OR B is failed.
ENG 1(2) IGN A+B FAULT	Both ignition circuits are failed.
ENG 1(2) LOW N1	When N1 rotation is failed during start.
ENG 1(2) MINOR FAULT	When a minor engine failure is detected.
*ENG 1(2) N1(N2)(EGT) OVER LIMIT	Max pointer indication:-
* EGT between 915 °C and 950 °C (except during takeoff, alpha flore activation, OR reverse selected), OR EGT between 950 °C and 970 °C, OR N1 between 104.0 % and 105.8 % OR N2 between 105.0 % and 105.8 %	
ENG 1(2) OIL FILTER CLOG	Oil filter is clogged.
ENG 1(2) OIL HI TEMP	Oil temperature is:-
* Between 140 °C and 155 °C for more than 15 min, OR Above 155 °C.	
ENG 1(2) OIL LO PR	Oil pressure is below 13 PSI.
ENG 1(2) OIL SENSOR FAULT	when the oil system monitoring is failed.

ENG 1(2) ONE TLA FAULT	Crew awareness.
ENG 1(2) OVSPD PROT FAULT	Overspeed protection is lost.
ENG 1(2) PROBES FAULT	T12, P0, OR PT2 data are unavailable on both channels.
ENG 1(2) REV INHIBITED	Reverser is inhibited by maintenance action.
ENG 1(2) REV ISOL FAULT	Thrust reverser shut off valve is failed in open position.
ENG 1(2) REV PRESSURIZED	Thrust reverser system is pressurized while:
* For CFM engines: The reverser doors are stowed and locked.	
ENG 1(2) REV SWITCH FAULT	Reverser permission switch is failed.
*ENG 1(2) REVERSE UNLOCKED	when one OR more reverser doors are not locked in stowed position in flight,
* OR on ground with no deploy order.One OR more reverser doors are not stowed.	
ENG 1(2) REVERSER FAULT	Thrust reverser on one engine is failed (due to system components OR inputs).
ENG 1(2) SENSOR FAULT	PS3 OR T25 OR T3 OR N1 OR N2 data is unavailable on both channels.
ENG 1(2) SHUT DOWN	ENG master is at off in phases OR ENG FIRE pb is pushed
ENG 1(2) STALL	when an engine stall is detected.
ENG 1(2) START FAULT	Start fault due to:-
No light up, OR Engine stall, OR Engine overtemperature (above 725 °C), OR Starter time exceeded, OR Low start air pressure, If the associated THR LEVER NOT AT IDLE subtitle is displayed.	
ENG 1(2) START VALVE FAULT	Start valve is stuck in closed OR open position.
ENG 1(2) THR LEVER ABV IDLE	One thrust lever is above idle while the other thrust lever is in the reverse detent at landing.
ENG 1(2) THR LEVER DISAGREE	A discrepancy between both resolvers of a thrust lever is detected.
ENG 1(2) THR LEVER FAULT	Both resolvers on one thrust lever are failed.

PW-ENGINE -(NEO) - POWER PLANT	
N1 Over Limit	71-00-00-810-839-A
EEC detected that the N1 speed probe has exceeded the specified limit.	
N2 Over Limit	71-00-00-810-840-A
EEC detected that N2 speed transducer has exceeded the specified limit	
N1 Over speed	71-00-00-810-841-A
EEC detected the N1 speed probe ckt is out of range OR rate in ch A & channel B.	
N2 Over speed	71-00-00-810-842-A
EEC has detected the N2 speed transducer circuit is out of range OR rate in channel A and channel B.	

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Fuel Filter Differential Pressure (FFDP)= sensor measures differential pressure across fuel filter. This helps to detect if the filter is partially or totally clogged. According to the received value, the EEC will generate various warnings on the EWD: ENG X FUEL FILTER DEGRAD or ENG X FUEL FILTER CLOG or ENG X FUEL SENSOR FAULT and on the SD:- CLOG

IDG Fuel-Oil Heat Exchanger (FOHE) differential pressure sensor is used to sense the *differential pressure* on the fuel side of the FOHE and send signal to EEC in case of clogging detection. According to status, the EEC will generate various warnings:- *ENG X HEAT EXCHANGR CLOG or ENG X FUEL SENSOR FAULT.* monitoring and Thermal Management System control by the EEC,

The fuel temperature is sensed by two dual channel temperature sensors. The fuel temperature sensor is used for the control of the heat exchangers *(Fuel/Oil Heat Exchanger Bypass Valve (FOHEBV))* and BDCV. The Fuel Return To Tank (FRTT) temperature sensor is used for the RTTV control. The engine fuel temperature is not directly displayed in the cockpit but, EEC will generate various warnings on the *EWD: ENG X HOT FUEL or ENG X FUEL HEAT SYS or ENG X HEAT SYS DEGRADED or ENG X HEAT SYS FAULT*

MAINTENANCE TASK	AMM REFERENCE
High Oil Temperature	71-00-00-810-844-A
*Engine after an Oil Pressure Low or Fluctuating	71-00-00-810-845-A
* Lubrication and scavenge oil pump contains a fixed lubrication trim orifice not an adjustable valve. If there has been a sudden shift of oil pressure the oil pump should be remove& examined prior to further engine operation.	
Oil Leak from Drain Mast event	71-00-00-810-848-A
Engine after a Surge - Reverse Thrust event	71-00-00-810-849-A
No Light with Correct Fuel Flow	71-00-00-810-851-A
Engine after a Flame Out - No/Low Fuel Flow	71-00-00-810-853-A
Engine after an EGT Exceeded Operating Limits	71-00-00-810-855-A
Engine after a High (N1) Vibration	71-00-00-810-856-A
Engine after a Hot Start/Impending Hot Start	71-00-00-810-861-A
N1 Locked (EEC) did not sense N1 rotation.)	71-00-00-810-863-A
EGT Over Limit	71-00-00-810-864-A
Hot Start Detected	71-00-00-810-866-A
Hung Start Detected	71-00-00-810-865-A
*During an automatic start sequence, prior to fuel ignition on, the EEC checks that the Fuel Metering Valve (FMV) in the Integrated Fuel Pump and Control (IFPC) is closed. If it is not closed the over speed solenoid is powered and the start is aborted with no fuel flow	

*Engine after a High Oil Consumption event	71-00-00-810-846-A
Imp=* NOTE: Use the instruction in the procedure fill the engine with oil Ref. AMM 79-00-00-610-801 to examine the oil level. If you do not, the oil level sight glass indication will not be accurate. NOTE: The amount of oil that is distributed in the oil system during engine operation and returned to the oil tank at shutdown is referred to as oil gulp. Oil gulp for this engine can be as much as 10.1 quarts (9.6 liters) leaving 4.8 quarts (4.5 liters) of useable oil in the tank.	
Engine Flameout Detected	71-00-00-810-867-A
N2 High Vibration Detected	71-00-00-810-868-A
Engine after a No (N1) Rotation	71-00-00-810-870-A
Engine after a Flame Out - Fuel Flow Normal	71-00-00-810-871-A
Engine after an Oil Temperature High	71-00-00-810-872-A
Engine after a High (N2) Vibration	71-00-00-810-873-A
Engine after an Oil Filter Clog Warning	71-00-00-810-874-A
Engine after a Slow Engine Response	71-00-00-810-875-A
Engine after an Idle not Correct	71-00-00-810-876-A
Engine after a Sel. Take off Power not Attained	71-00-00-810-877-A
Engine after a Thrust Power (N1) Fluctuates	71-00-00-810-878-A
Engine after a Slow Acceleration to Idle	71-00-00-810-879-A
Engine after a no Throttle Lever Response	71-00-00-810-880-A
Engine after a no Oil Pressure	71-00-00-810-881-A
Engine after a No/Limited (N2) Rotation	71-00-00-810-882-A
Engine after an Auto Deceleration	71-00-00-810-883-A
Engine after a Fuel Filter Clog Warning	71-00-00-810-884-A
Engine after a Hung Start	71-00-00-810-885-A
Start Aborted due to Bowed Rotor Overspeed	71-00-00-810-888-A
Engine after a Fuel Leak from Drain Mast	71-00-00-810-839-A
*Smoke and/or Oil Fumes in the Cabin	71-00-00-810-847-A
NOTE: In most cases fumes in the cabin are caused by contamination of the aircraft pneumatic system. The pneumatic sys (ATA 36) supplies air to the air conditioning sys (ATA 21) and can be contaminated by (APU) or the engine. Make sure that you rule out other sources of smoke or fumes before trouble shooting engine. Check the various aircraft related areas such as the APU recirculation fans, cargo compartments air conditioning ducts & cooling packs.	
*Engine after a High Fan Vibration	71-00-00-810-857-A
*N1 High Vibration	71-00-00-810-858-A
*NF High Vibration	71-00-00-810-859-A

* The vibration indication system (forward vibration sensor and aft vibration sensor) has detected that there is a high fan vibration event. In flight deck, ECAM VIB N1 corresponds to actual Nf (fan vibration).	
General Visual Inspection of the Inlet Cowl	71-61-10-210-801-A
Removal of the Fan Blades	72-11-03-000-801-A
*Motor the Engine (Dry Method)	71-00-00-860-817-A
* Dry-motoring procedure uses the engine starter only to operate the engine for a short time to remove unburned fuel from the engine or cool the engine down to the correct levels if the engine was too hot at S/D. The ignition system is OFF for this test. The fuel goes to the fuel pump (for pump lubrication) but not to the engine fuel manifolds and nozzles. The actuators fuel pressure lines are not pressurized. This procedure is for most motor checks unless the wet-motoring check is specified	
Start the Engine (Normal Manual Start)	71-00-00-860-822-A
Start the Engine (Normal Automatic Start)	71-00-00-860-823-A
*Motor the Engine (Wet Method)	71-00-00-860-825-A
To check the complete fuel system and the oil system for leaks. The wet motor leak test uses the engine starter only to operate the engine for a short time to check for leaks in the fuel or oil system. The ignition system is OFF for this test. The fuel goes to the Integrated Fuel Pump and Control (IFPC), the actuator fuel pressure lines, the engine fuel manifolds (primary fuel lines only) and nozzles. Fuel is then sprayed in the combustion chamber.	
Idle Power Test	71-00-00-720-811-A
Above Idle Test (fault confirmation)	71-00-00-720-816-A
Prime Engine Fuel and Oil Systems	71-00-00-610-802-A
*Use this procedure to check for correct engine acceleration and deceleration operation within the permitted time limits.	
*Vibration analysis (Vibration Survey)	71-00-00-700-802-A
*Use this procedure to check for satisfactory engine vibration from idle power to 90 percent N1 power. The vibration is checked for both the acceleration and deceleration operation.	
Main Oil Pressure Test and Adjustment	71-00-00-780-802-A
Oil System Leak Test (Dye Method)	71-00-00-790-803-A
*Power Assurance Test	71-00-00-710-806-A
*Use this procedure to make sure that engine will make rated take off thrust within the EGT and N2 speed limits when you set power to an N1 target.	
Function Test (Fan Trim Balance)	71-00-00-710-807-A
Inspection of the Engine (After Surge or Stall)	72-00-00-200-809-A
Visual Examination After Bird Strike(FOD)	72-00-00-210-807-A
Visual Examination (After Damage for Serviceability)	72-00-00-210-808-A

Visual Examination (after an (EGT) Overtemperature)	72-00-00-210-809-A
Insp of Engine after N1/N2 Over Speed Operation	72-00-00-210-810-A
Inspection of Engine after ENG Oil Overtemperature	72-00-00-210-811-A
General visual Insp (GVI) of the Engine Exhaust Area	72-00-00-210-812-A
Inspection of the Engine after Engine Wind milling	72-00-00-210-814-A
General Visual Insp (GVI) of the Engine Inlet Area	72-00-00-210-813-A
Insp of Fan Rotor Blades Removed from the Fan Disk	72-21-00-210-006-A
Visual Examination of Fan Blade for Bends and Curls	72-11-03-220-801-A
Visual Examination of the Fan Blade Root	72-11-03-210-801-A
Visual Examination of the Fan Blade Root	72-11-03-210-801-A
*Insp of Eng after a Bowed Rotor Protection Fault	72-00-00-200-824-A

* A bowed rotor protection fault (ENG1 ENGINE BORESCOPE OR ENG2D ENGINE BORESCOPE) occurs when the Electronic Engine Control (EEC) channel A or channel B has sensed that a specified N2 speed limit was outside the permitted limits after the engine bowed rotor start (slow motor) sequence was started.

*During engine motor-to-start: - If a steady stream of fuel is observed coming from the overboard vent in the drain mast, the engine should be shut down and restart. If a steady stream of fuel is observed during the next motor-to-start, replace the ecology tank. – If fuel leakage is less than or equal to ten drops/minute, proceed to idle. *Engine at idle: -If a steady stream of fuel is observed coming from the overboard vent in the drain mast after one minute at idle, the engine should be shut down and restart. If a steady stream of fuel is observed during the next run to idle, replace the ecology tank. - A fuel leakage rate of five drops per minute at idle is acceptable and no maintenance action is required.

*After Shutdown: - After engine shutdown, the ecology system may overfill and result in overboard leakage out the drain mast. A fuel leakage rate of five drops per minute is acceptable under these conditions and no maintenance action is required. If leakage exceeds five drops/min, draining the ecology tank.

FULL AUTHORITY DIGITAL ENGINE CONTROL (FADEC)-EEU	
*EEC Operation Test (Self Test)	73-21-00-710 806-A
* Engine Electronic Control (EEC) sys interactive test electrically verifies EEC & Prognostics and Health Management Unit (PHMU) input and output circuits.	
*Hydraulic-Pump Depressurization Test with MCDU	73-21-00-710-808-A
* check of depressurization of engine hydraulic pump when EEC controls EIU.	
Faults of the Scheduled Maintenance Report (SMR)	73-21-00-740-803-A
*FADEC System Wiring Harness Operation Test	73-21-00-710-810-A
*The harness interactive test checks for harness and connector failures. During the test the suspected harnesses must be moved to help reproduce fault messages reported by the Electronic Engine Control (EEC). Use this procedure to perform harness checks to isolate intermittent EEC monitored faults.	
*Ops Test (Dry Motor) of FADEC System Eng Actuators	73-21-00-710-809-A

*The actuator interactive test shall detect any operational faults of the control system actuators without an engine start.
This test shall also detect any operational faults of the Integrated Fuel Pump and Control (IFPC) Fuel Metering Valve (FMV).
The Full Authority Digital Engine Controls (FADEC) will perform interactive tests on the following actuators through engine crank.
(1) The Low Pressure Compressor (LPC) Variable Stator Vane Actuator (SVA).
(2) High Pressure Comp (HPC) Primary Variable Stator Vane Actuator (SVA).
(3) High Pressure Comp (HPC) Secondary Variable Stator Vane Actuator (SVA).
(4) The LPC 2.5 bleed valve actuator.
(5) The turbine Active Clearance Control (ACC) actuator.
(6) The Integrated Fuel Pump and Control (IFPC) Fuel Metering Valve (FMV).
➢ This test is performed while the engine is dry motoring.

FULL AUTHORITY DIGITAL ENGINE CONTROL (FADEC)-EEC	
A03	49VU ENGINE/1 AND 2/IGN/SYS A
ENG 1- FIN 4020KM1	
A04	49VU ENGINE/1/FADEC A/AND EIU 1
P41	121VU ENGINE/IGN/ENG1/SYS B
R41	121VU ENGINE/ENG1/FADEC B/AND EIU 1
ENG 2- FIN 4020KM2	
A05	49VU ENGINE/2/FADEC A/AND EIU 2
P42	121VU ENGINE/IGN/ENG2/SYS B
Q40	121VU ENGINE/ENG2/FADEC B/AND EIU 2

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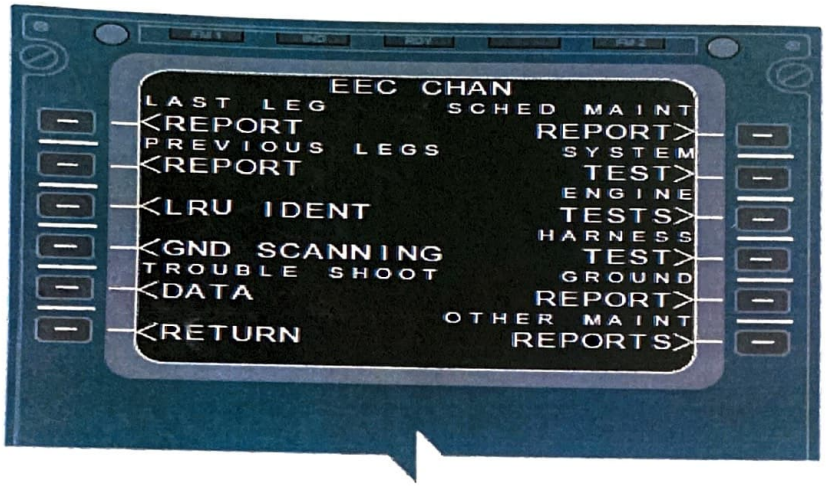

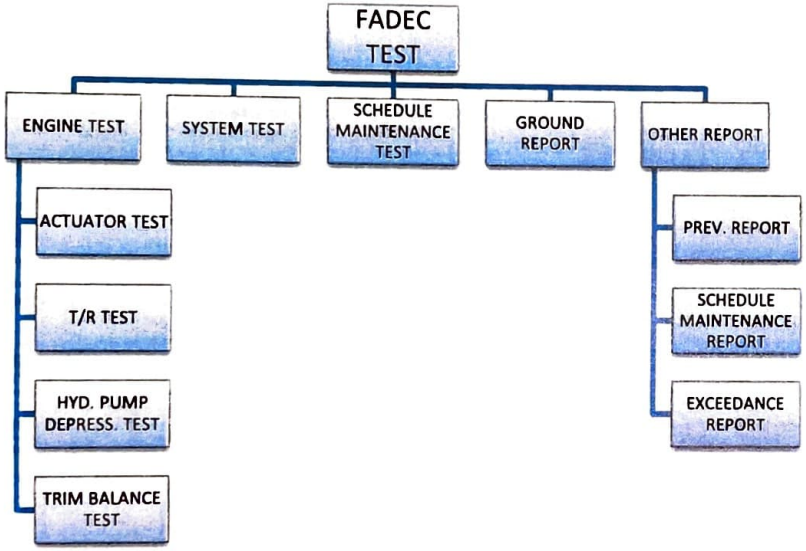

MAINTENCE TASKS	AMM REFERENCE
Motor the Engine (Wet Method)	71-00-00-860-825-A
Normal Manual Start)	71-00-00-860-822-A
Normal Automatic Start	71-00-00-860-823-A
Leak Check -Wet Method	71-00-00-720-814
Acceleration And Deceleration Test	71-00-00-710-805-A
EEC - Idle Test	73-21-00-710-807
Vibration analysis	71-00-00-700-802-A
Power Assurance Test	71-00-00-710-806-A
Post Engine Replacement Test	71-00-00-720-813

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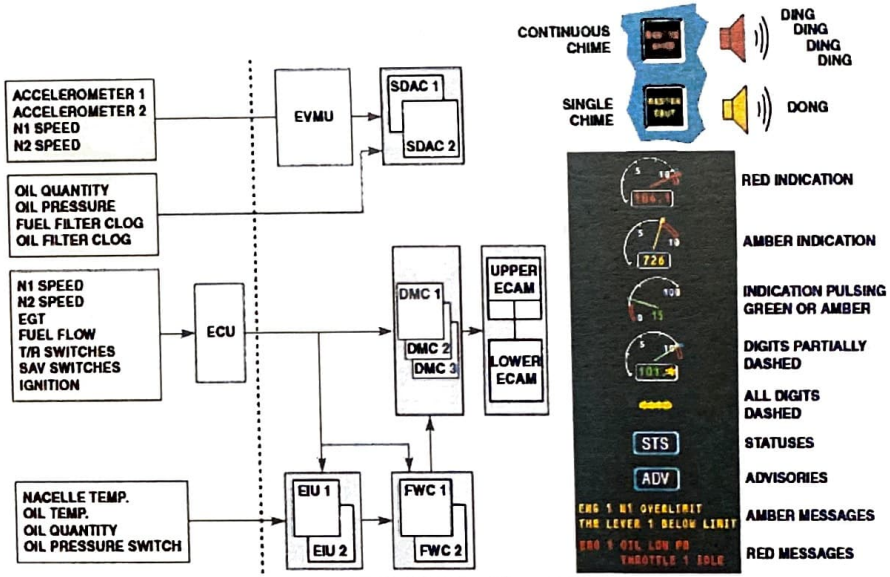
CFM-56 Engine

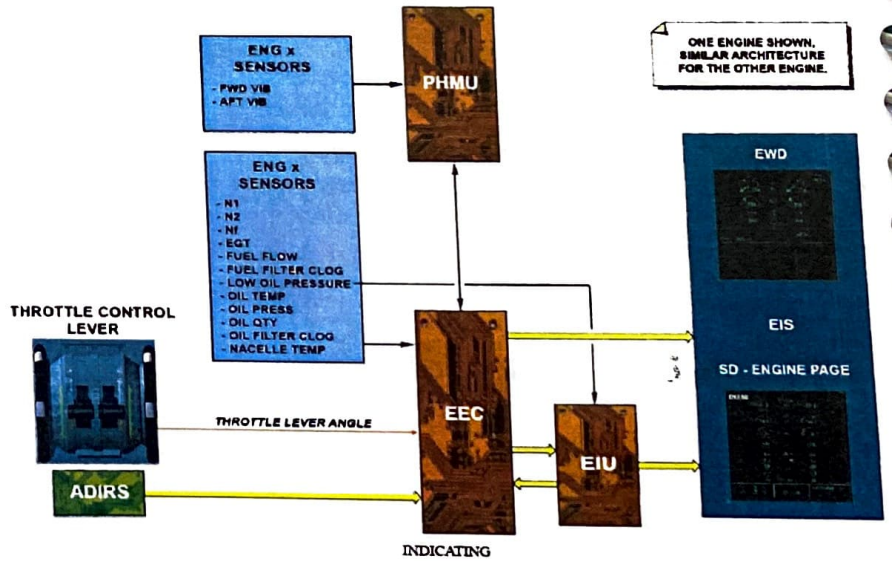
FULL AUTHORITY DIGITAL ENGINE CONTROL (FADEC)-ECU	
Some cases of spurious FADEC fault have been experienced at engine start on ground. The caution can be considered as spurious, if it disappears after application of the following procedure:-Set the master sw to OFF, and wait until N2 speed goes below 5 %. Pull and reset the C/B's of the affected ECU electrical supply (A04 or A05 on 49 VU or R41 or Q40 on 121 VU). Wait 10 s for the ECU power-up sequence, and restart the engine.	
A03	49VU ENGINE/1 AND 2/IGN/SYS A
A04	49VU ENGINE/1/FADEC A/AND EIU 1
P41	121VU ENGINE/IGN/ENG1/SYS B
R41	121VU ENGINE/ENG1/FADEC B/AND EIU 1
A08	49VU FUEL/LP VALVE/MOT1/ENG1
A01	49VU ENGINE/1/HP FUEL SOV
A03	49VU ENGINE/1 AND 2/IGN/SYS A
M25	121VU FUEL/LP VALVE/MOT2/ENG1
P39	121VU ENGINE/IGN/ENG1/SYS A BAT
A09	49VU FUEL/LP VALVE/MOT1/ENG2
A05	49VU ENGINE/2/FADEC A/AND EIU 2
A02	49VU ENGINE/2/HP FUEL SOV
M26	121VU FUEL/LP VALVE/MOT2/ENG2
P42	121VU ENGINE/IGN/ENG2/SYS B
P40	121VU ENGINE/IGN/ENG2/SYS A BAT
Q40	121VU ENGINE/ENG2/FADEC B/AND EIU 2

MAINTENANCE TASK- CFMB - POWER PLANT	AMM REFERENCE
*Dry Motoring Check	71-00-00-710-001-B
*The dry motoring check makes sure that the engine will turn freely and that instruments operate correctly, & that operation of the starter obeys the speed requirements for correct starts. Use to dry the remaining fuel that can collect in the combustion chamber or the lower section of the turbine casing.	
*Wet Motoring Check	71-00-00-710-002-B
*Engine have fuel flow without ignition:- leak check of the fuel system, OR engine is removed from storage, OR to prime engine fuel sys after maintenance	
*Minimum Idle Check	71-00-00-710-006-B
*Idle check gives instructions to make sure that the engine connections do not leak. It also permit you to make sure that noise from engine operation is normal and that all engine instruments give the correct indications.	

Engine Shutdown	71-00-00-710-028-B
Engine Automatic Start	71-00-00-710-003-B
Engine Manual Start	71-00-00-710-004-B
*Do a power assurance check	71-00-00-710-008
*engine can produce the necessary take off thrust in line with EGT and N2 limits when N1 is set. The power level used in this procedure is 72.5 percent.	
Do a vibration check	71-00-00-710-009
Abnormal Operation and Emergency Procedures	71-00-00-869-001-B
* Procedures show conditions that can be found during engine operation and emergency action that must be taken to stop the abnormal condition. Correct the cause of the abnormal condn refer to Trouble Shooting Manual.	
Hot Start; Hung Start ; Overtemperature during the Manual Start Procedure	71-00-00-869-113-A
*Unsatisfactory Starts during the Automatic Start	71-00-00-869-113-A
*Stall indication or overtemperature or Slow start or Hung start or NO FAN speed (N1) indication	
Unsatisfactory Operation above Idle	71-00-00-869-113-A or Ref.72-00-00-200-008)
(a) N1 and/or N2 transitory overspeed or (b) Engine stalls or (c) Engine flameout or (d) Oil system malfunction (e) Scavenge oil overtemperature or (f) Engine overtemperature or (g) Internal engine fire or (h) Ext engine fire	
Leak Test of the Acc -Gearbox (AGB) Carbon Seal	71-00-00-790-001-B
Fuel or Hydraulic or Oil Leakage Limits	71-00-00-790-002-B
Leakage at the Drain Mast	71-00-00-790-053-B
Drain Mast Leakage Identification Procedure	71-00-00-790-005-A
Parameter difference between engines:-MONITORING OF THE RELEVANT DISPLAY OF THE ***ENGINE PARAMETERS N1, N2,*** EGT and FF **(Fuel Flow).** Indications of both engines are monitored. The FWC's perform monitoring between the feedback signals (that **correspond to the displayed values**) and the signals that are directly received by the FWC's from the ECU's. Should a discrepancy occur, for one or more parameters, a **CHECK amber message** is displayed under the relevant indication. **The FWC's generate a caution:** ***ENG1(2) N1(N2/EGT/FF) DISCREPANCY***	



ENGINE INDICATING SYSTEM



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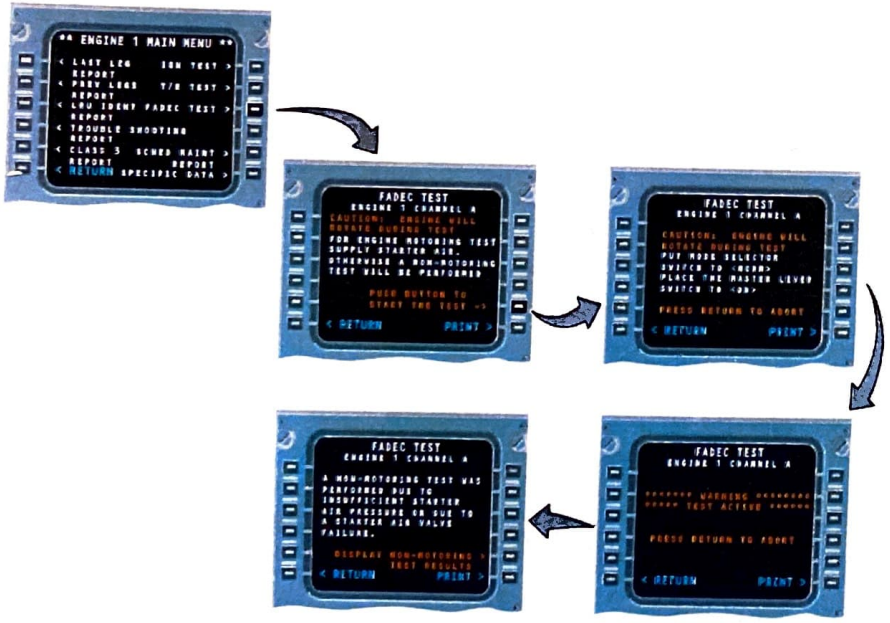
ECU Menu:-The ECU main menu provides access to various submenus:-

-Last leg report (leg 00)	- Ignition tests.
- Previous legs report (legs 01 - 63).	-Thrust reverser tests.
- LRU identification report.	- FADEC test (motoring / non-motoring)
- Troubleshooting report.	- Scheduled maintenance report
- Class 3 report.	Specific data (PWR setting max values).

In case of Report <06> generation due to EGT exceedence (REASON EGT per code 5100, 5200, 5300), it is advised: read Specific Data Report (AMM 73-21-60-740-027) A ***relevant Report <06> (not spurious)*** should be associated with an **ECAM message**, and Specific Report Data should **show EGT** values above limits.



FADEC TEST

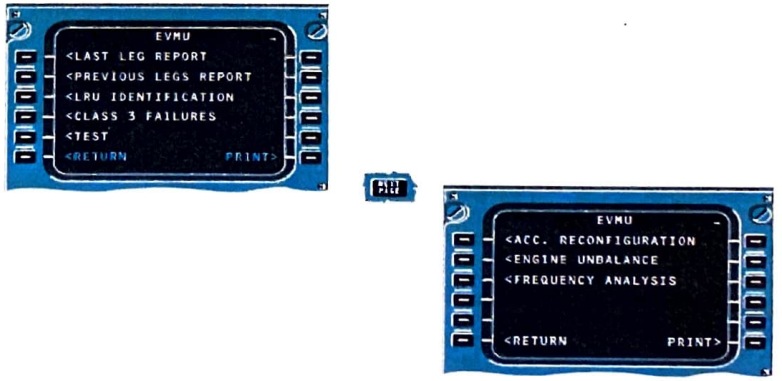
Scheduled maintenance report:-The report format is the same as the 'Last leg report', except that there is no flight leg or data information. When no SM faults are recorded during the last 64 flight legs, a **'NO FAULTS RECORDED'** message is displayed. Troubleshooting data is not available for scheduled maintenance faults.
NOTE:-Some (not all) single channel SM faults may be upgraded by the ECU to class 2, or even class 1, if they become dual channel faults.

Specific data:- report is a sub-menu that currently has only one selection available: **PWR SETTING MAX VALUES.** This displays the maximum values of N1, N2 and EGT reached the last time the engine was operated. The time, in seconds, logged at these maximum values is also displayed. Both **indicated and physical** N1 and EGT values are displayed. There is **no separate indicated value for** N2. These maximum values and the duration of any limit exceedance are reset during engine ground start, or they may be reset by an option in menu mode. When the reset option is selected by the operator, a confirmation screen is displayed.

Engine vibration measurement consists of:
- 2 transducers (piezo-electric accelerometers).
- An Engine Vibration Monitoring Unit (EVMU).
- 2 vibration indications.

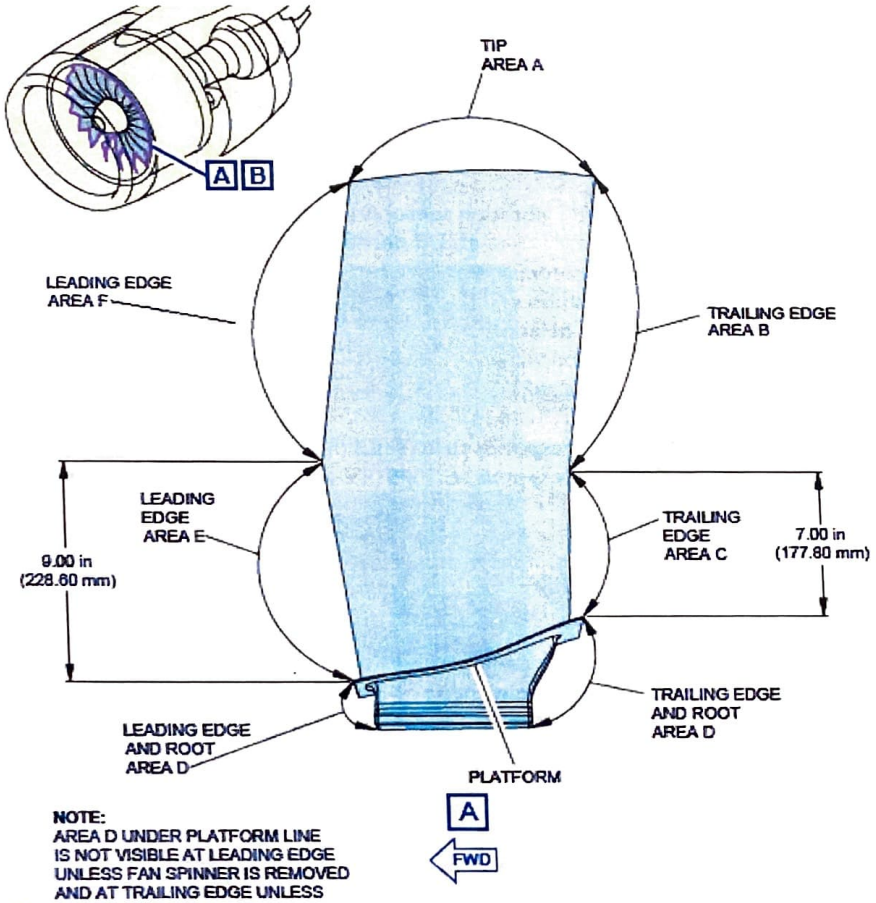
The No 1 bearing vibration sensor permanently monitors vibrations from the No 1 bearing. It also senses vibrations in the LPT and HPT shafts. This sensor is also used for trim balance operations.
The **Turbine Rear Frame (TRF)** vibration sensor is used in conjunction with the No 1 bearing vibration sensor to monitor and, if necessary, reduce engine vibration levels using the trim balance procedure.
The EVMU computes the position and the **amplitude of the unbalance** and is capable of on-board fan trim balancing.
The ECAM receives information via **SDAC1 and SDAC2.**
The vibration indications are **displayed in green** on the lower ECAM display, in the **engine and cruise pages.** The maximum value that can be displayed is 10 units.
- 10 units for **the N1 rotor corresponds to 10 MILS** (*MILS = Milli-Inch).*
- 10 units for **the N2 rotor corresponds to 4 IPS** (**IPS** = Inch per second).

.

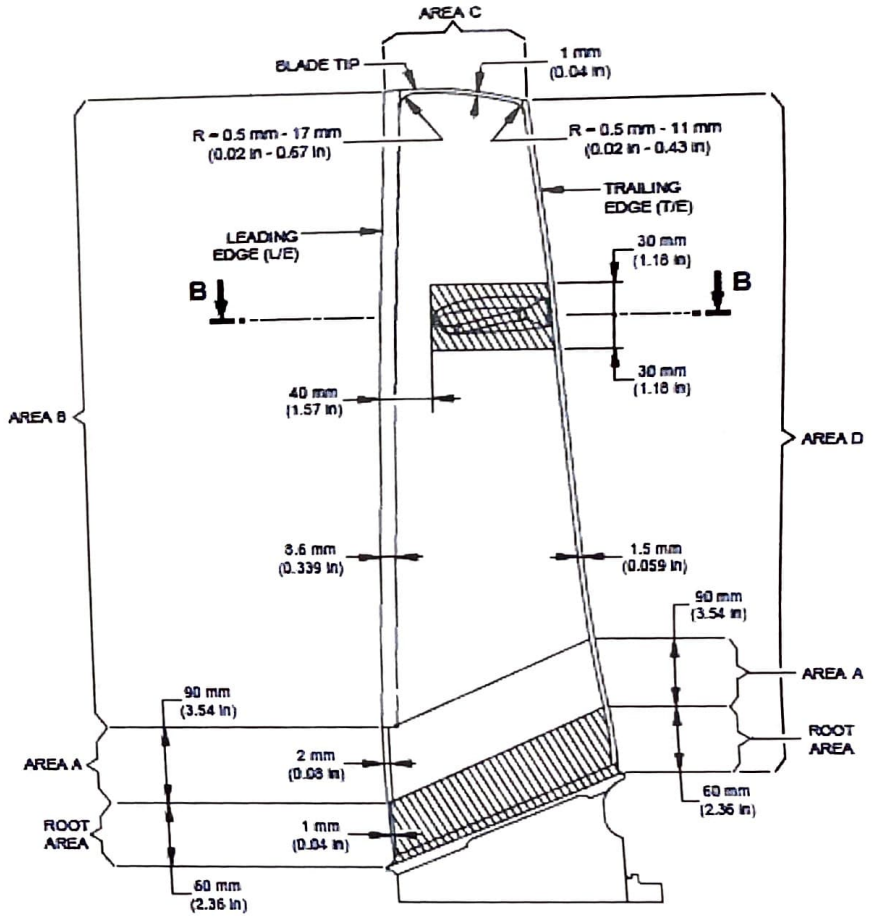


EVMU MAIN MENU

** ON A/C 001-007, 009-100, 201-300	
Visual Inspection of the Air Intake Cowl	71-11-00-210-001-A
Insp of Fan Rotor Blades Fan Disk.	72-21-00-210-006-A
** ON A/C 101-150	
General Visual Inspection of the Inlet Cowl	71-61-10-210-801-A
Removal of the Fan Blades	72-11-03-000-801-A
Visual Insp of an Blade for Bends and Curls	72-11-03-220-801-A



NOTE:
AREA D UNDER PLATFORM LINE IS NOT VISIBLE AT LEADING EDGE UNLESS FAN SPINNER IS REMOVED AND AT TRAILING EDGE UNLESS FAN BLADE IS REMOVED.



NOTE:
CRITICAL AREAS :
NO REWORK ALLOWED IN THESE AREAS EXCEPT AT THE L/E AND T/E LOCATION

L/E + T/E BLADE TIP MAXIMUM BLENDING LIMITS (DIM P)

N MM 722100 6 RHM

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Prepared by R.K.CHOPRA

MAINTENECE TOOL
AIRCRAFT INTEGRATED
DATA SYSTEM (AIDS)

Flight Data Interface and Management Unit (FDIMU)

The Flight Data Interface and Management Unit (FDIMU) combines two functions which operate independently from each other: the Flight Data Interface Unit (FDIU) and the **Data Management Unit (DMU).** An internal data-bus connects the two parts. The Data Management Unit (DMU) processes up to **23** different types of report:-

Standard reports described in this AMM 31-37 are adapted to the specific A/C recording configuration.

-**AMM 31-37-21** provides with complete description of **ECS reports**
-**AMM 31-37-49** provides with complete description of **APU reports**
-**AMM 31-37-51** provides with complete description of **Structure reports**
-**AMM 31-37-73** provides with complete description of **Engine reports**

To each individual report, a set of **trigger code** has been assigned and designed for a specific purpose:

- **code 1000** corresponds to a manual report generation where report is manually triggered by an operator from the cockpit through the MCDU AIDS menu,
- **code 2000** corresponds to a manual report generation where the report is triggered by means of the remote print button (RPB) from the cockpit (flight phase dependent),
- **code 3xxx** corresponds to programmable trigger codes where the user can program its own trigger logic conditions (through the DMU/FDIMU ground programming tool),
- **codes 4xxx to 7xxxx** correspond to automatic report generations according to the predefined trigger conditions. The trigger code number is particularly used to clearly identify the source and reason of the trigger like:- Referring example as:-

EGT = 3877 should actually be read EGT = 387.7 deg C (positive values using the first position digit)

N1 = 0802 should be read N1 = 80.2 % rpm

Please find enclosed herewith detailed EGT and N1, N2 parameter descriptions:

EGT readout (X999 format): - for positive EGT values : EGT = 9999 in the report means 999.9 deg C (first position is used for the value) - for negative EGT values: EGT = N999 in the report means -99.9 deg C (the negative value is indicated by N in the first position) [EGT op. range -80 to 999.9 °C]

N1,N2 readout (9999 format):-N1,N2 = 9999 in the report must be read 999.9 % rpm [N1,N2 op. range 0 to 120.0 % rpm]

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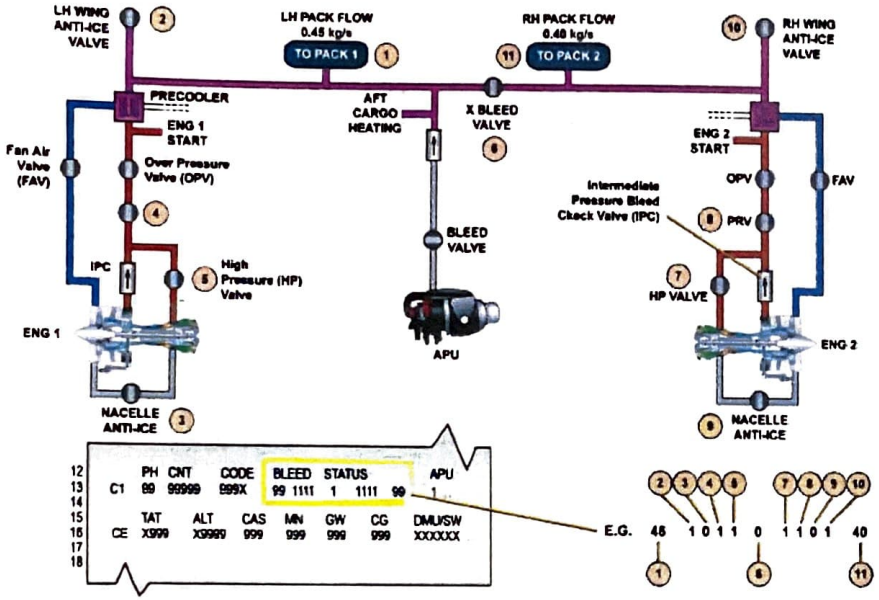
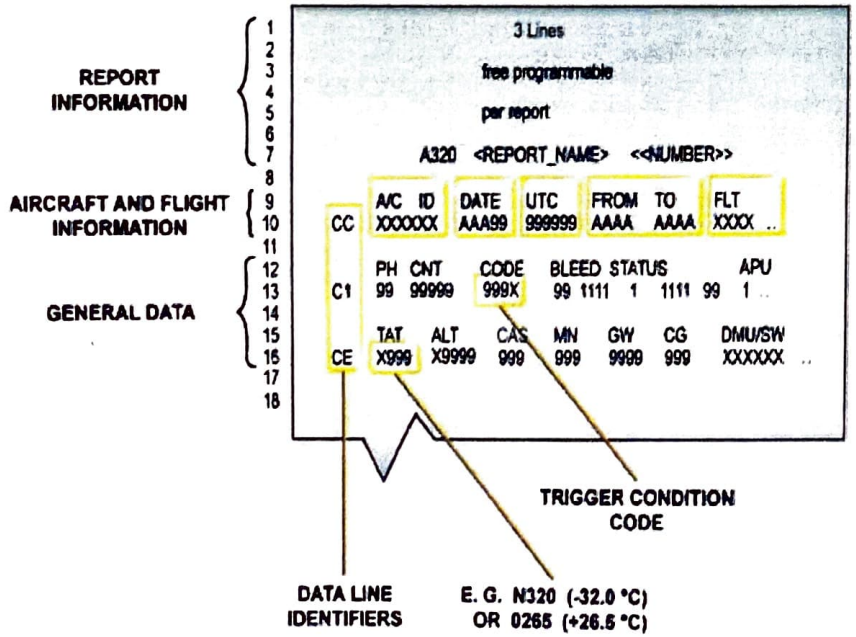


GENERAL DATA - BLEED STATUS



BLEED STATUS:-Bleed status is indicated with discrete coded information and numerical values. In the discrete coded information, 0 indicates that the valve is closed and 1 indicates that the valve is open.

A320 family aircraft:-Equipment providing the function: DMU or FDIMU AIDS / ACMS Engine Cruise report <01> code 4000 As described in AMM 31-37-73, AIDS Engine Cruise report <01> has two logic for the observing of engines performance during Cruise:-

- one based on Flight Hours.&- one based on Flight Legs.

At entry into AIDS Cruise phase, when observation is launched, the DMU starts to look for the "Stable Frame Condition" to be met in order to compute code 5000 reports. report with the best quality factor QE for the whole flight will then be kept into memory.

However, if after a certain time ('Y01.2' minutes = 10 min by default), the stability criteria is **not** met, a report code 4000 will be generated with the following message "**NO STABLE FRAME CONDITION**".

- For **CFM / PW engines,** the "Stable Frame Condition" is met when the **HPT** parameter ('Selected High Pressure Turbine Clearance Position' from ECU / EEC on label 306) is between 'HPTL1'= 70% and 'HPTL2'=105% (example given for CFM56-5-B4 Engines, if not customized) and if the variation of the following parameters stays inside a set of tolerances during 'P01'=100s

(if not customized): IALT, GS, ROLL ANGLE, TAT, N2, EGT, VACC, MN, N1, PT2, HPT, LPT.

ACMS Real Time monitoring:-Parameter Call-up Functions:-Alpha Call-up

- Parameter value is displayed in engineering unit (Deg, Ft, Kt, Lbs, etc.)
- Sets of alpha call ups can be stored for later recall or sent in real time to the printer - Ability to display in real time via the MCDU, any digital data on the aircraft that is available to the FDIMU/DMU.

(All ARINC 429 parameters from computers connected to ACMS can be read) - Outputs: MCDU display, printer

Label Call-up:- Parameter value is displayed in binary form **ACMS = ARINC429 Reader** - Sets of label call ups can be stored for later recall or to be sent in real time to the printer

- EQ.SYS.LAB.SDI data entry concept
- SSM readout
- Outputs: MCDU display, printer
- The **Alpha Call-up list** is accessible under **AMM 31-36 or 31-37**
- The **EQ codes list** is accessible under **AMM 31-36 or 31-37**

It is recommended to use the ACMS parameter callup functions intensively as being an efficient means for system T/S. The following AMM tasks can be consulted for this purpose:

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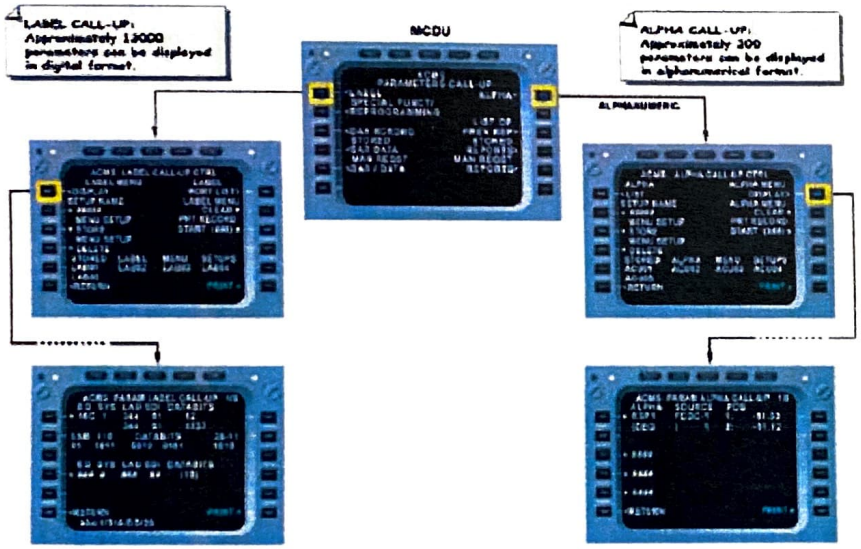
Prepared by R.K.CHOPRA

A320 family:-AMM TASK 31-36-00-740-008 – Access to the Parameter Call-Up menus.

Used by Line Maintenance Staff as an help to :

⇒ Checks Signals correctly transmitted and received

⇒ Position/status of systems/components



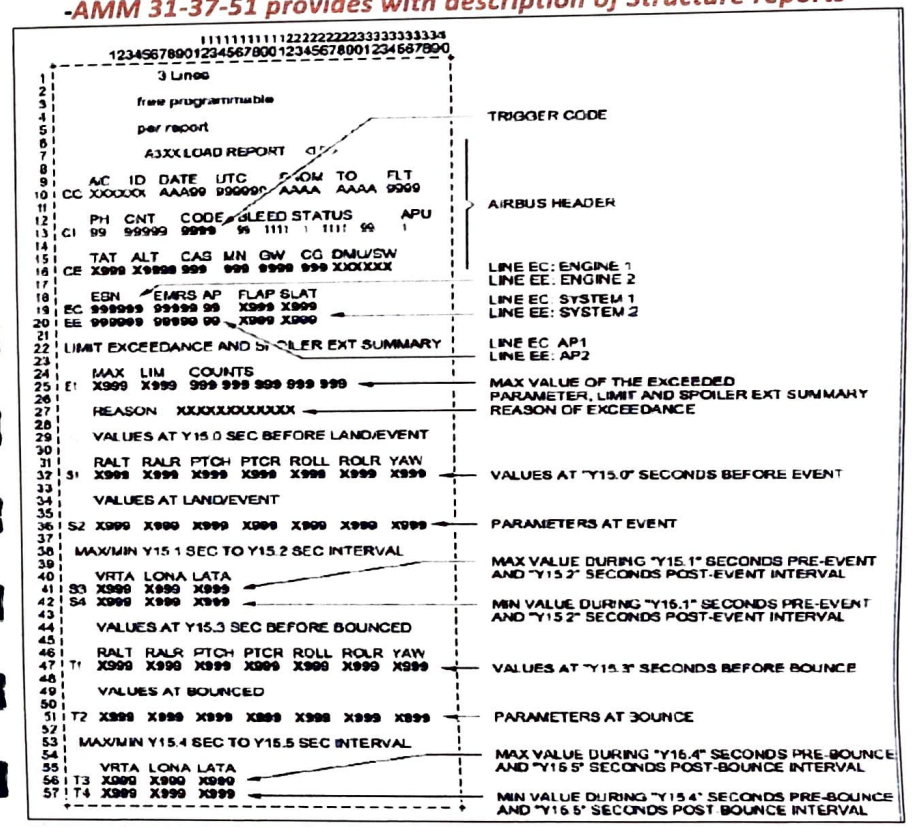
Engine Cycle:- Each time when flight phase 5 (climb) is reached, the counter is incremented by one. The ECYC is set to zero if a new ESN is recognized by the DMU.

Engine Flight Hours:- Time between "Main (LH and RH) Landing Gear Decompressed" and "Main (LH and RH) Landing Gear Compressed".

(DMU) processes up to 23 different types of report:

A standard header is printed on each report. It is composed of information about the report at the top, information about the aircraft and the flight in the middle and general data at the bottom. The header data is taken at the time when the respective report is generated.

-AMM 31-37-51 provides with description of Structure reports



TASK 05-51-11-200-004-B: - ***Report 15***

Inspections After a Hard or Hard Overweight Landing for Aircraft Load

Hard landing: *Aircraft wt =/< Maximum Landing Weight (MLW) & VRTA =/> 2.6 g and < 2.86 g*

Severe hard landing: *Aircraft wt =/< MLW & VRTA =/>2.86 g.*

Hard overweight landing: *Aircraft wt > MLW & VRTA =/> 1.7 g & < 2.6 g.*

Severe hard overweight landing: *Aircraft wt > MLW & VRTA=/> 2.6 g.*

High pitch-rate landing: *A high pitch-rate landing is a landing during which the pitch rate is more than 10 Deg/sec.*

NOTE: ***When Reading from the load report :Aircraft weight in kg = GW x 10 & VRTA*** *(vertical acceleration) in g = VRTA / 100.*

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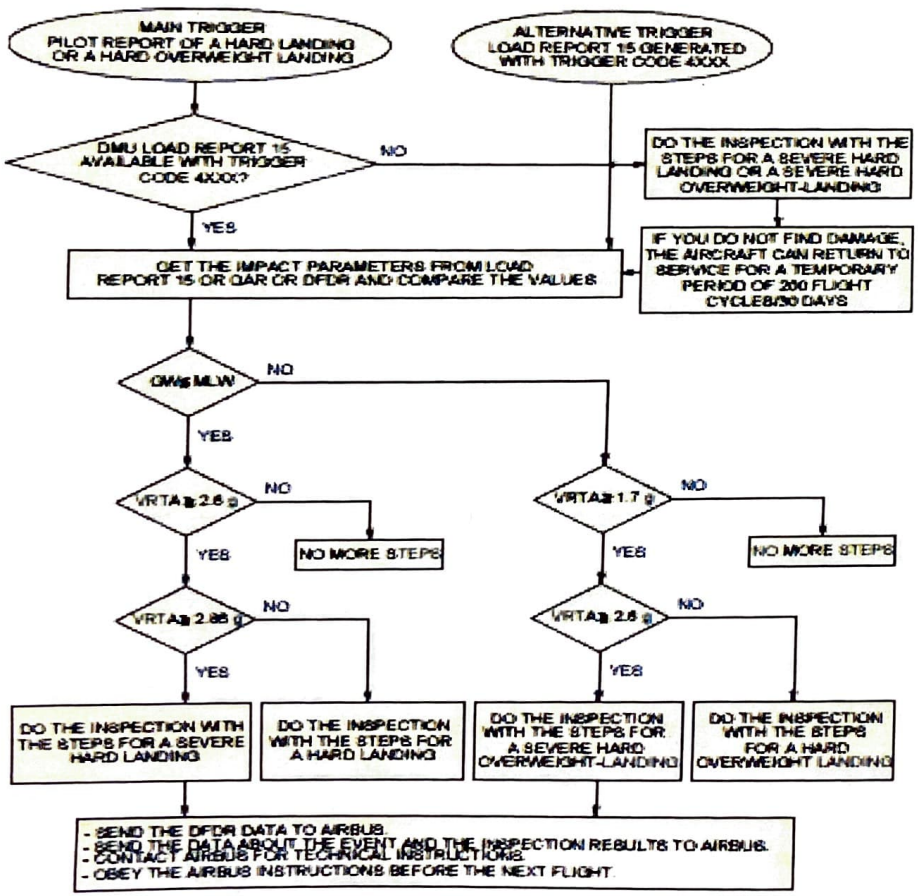
Prepared by R.K.CHOPRA

LOAD REPORT <15>

The Load report is a collection of aircraft data before, at, and after an abnormal Load condition either in the air or at touchdown.
Basically, this report is generated when excessive loads are applied to the airframe during landing. The report mainly contains aircraft aerodynamic data recorded before, at and after a hard landing. An aircraft bounce can also be detected. In that case, additional data lines T1 to T4 are also generated. Report lines **T1, T2, T3 and T4 are generated if the A/C bounced** and the appropriate logic conditions are true.



31-37-51 AIDS - STRUCTURE REPORTS - DESCRIPTION AND OPERATION

MAX: Maximum value of the exceedance parameter from time interval 0.5 sec. before 'landing until 0.5 sec. after 'landing detection'.
COUNTS: Counter for spoiler 4 extensions.
Source: DMU
Remark: If the report was not triggered by a limit exceedance, this field contains blanks.

RALT	***Radio Altitude.***	*(-20 to 2500 ft)*
RALR	***Radio Altitude Rate.***	*(-99.9 to 99.9 ft/sec)*
PTCH	***Pitch Angle.***	*(-99.0 to 90.0 deg)*
PTCR	***Body Pitch Rate.***	*(-45.0 to 45.0 deg/sec)*
ROLL	***Roll Angle.***	*(-90.0 to 90.0 deg)*
ROLR	***Body Roll Rate.***	*(-45.0 to 45.0 deg/sec)*
YAW	***YAW Rate.***	*(-45.0 to 45.0 deg/sec)*
VRTA	***Vertical Acceleration.***	*(-3.00 to 6.00 g)*
LONA	***Longitudinal Acceleration.***	*(-1.00 to 1.00 g)*
LATA	***Lateral Acceleration.***	*(-1.00 to 1.00 g)*

CODE:
1000: Manual report request.
4100: RALR < RALRL (Standard RALRL limit -9ft/sec)
4400: VRTA > VRTA L1.1 (VRTAL1.1 : 2.6g)
4800: GW > GWL (at landing) (GWL64500kg) and RALR > RALRLG (RALRLG limit -6ft/sec) (at dataset time at landing)
4900: GW > GWL (at landing)(GWL64500kg) and VRTA > VRTALG (VRTALG limit 1.7g) (during +/- 0.5 sec before and after landing).
4500: Report is generated if one of the following logic items is present during the bouncing: VRTA > VRTAL1.2(2.6g) during +/- 0.5 sec at landing (1st touchdown) or VRTA > VRTAL1.3(2.6g) during +/- 0.5 sec at landing (2nd touchdown).
5100: VRTA > VRTA L2.1 if FLAPL < 0.5 deg. (VRTAL2.1 limit 2.5g)
5200: VRTA < VRTA L2.2 if FLAPL < 0.5 deg. (VRTAL2.2 limit -1g)
5300: VRTA > VRTA L2.3 if FLAPL >/= 0.5 deg (VRTAL2.3 limit2g) or VRTA < VRTAL2.4 if FLAPL >/= 0.5 deg. (VRTAL2.4 limit 0g)
5400: If one of the 5 spoiler excursion counters has an overflow (999 is reached).
8100: ACARS MU uplink request with IMI 'REQ15'.The report <15> is immediately generated to the ACARS MU.

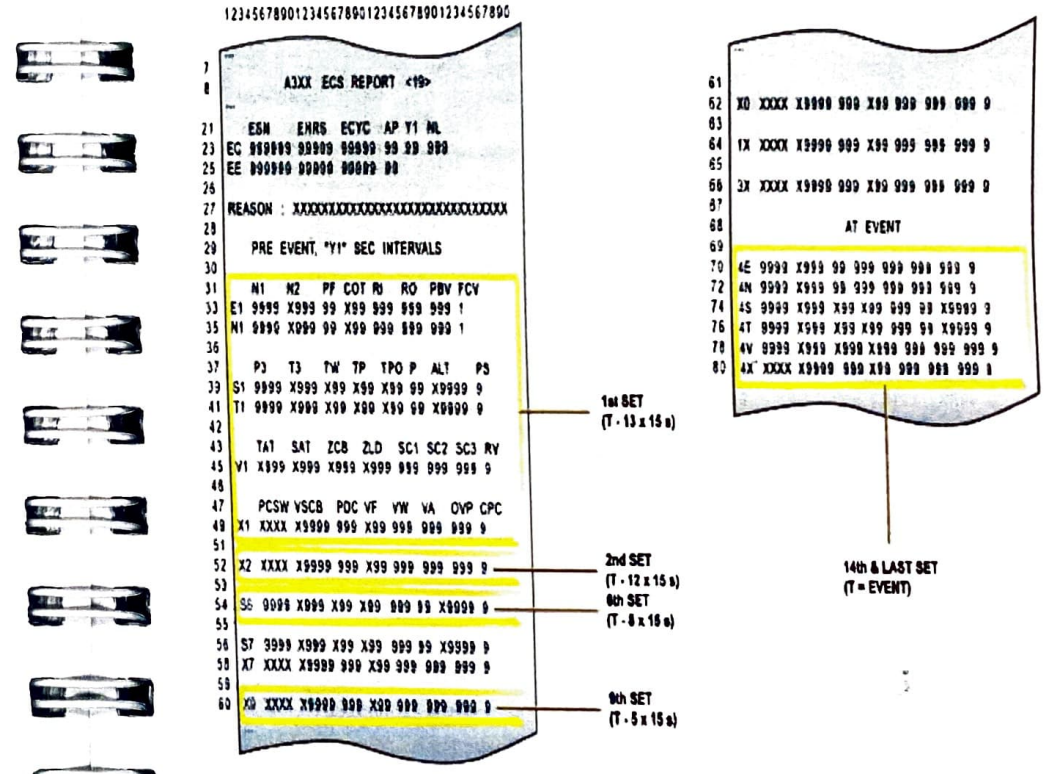
31-37-21 AIDS ECS REPORTSENVIRONMENTAL CONTROL SYSTEM REPORT <19>

The environmental control system report is generated when there is a malfunction in the air conditioning or pressurization system. The reason for report generation is displayed (e.g. EXCESSIVE CABIN ALTITUDE). The report contains engine, aircraft and environmental data. Basically, up to 19 sets of parameters can be recorded at 15 seconds intervals before the event and 1 set at the event. E.g.: Cabin altitude (ZCB) is observed for changes in each Vx line and causes the print out of one line when the change limit is exceeded (i.e. +/- 100 feet).

CODES	REASON FOR EXCEEDANCE
4110	DUCT OVHT F/D
4120	DUCT OVHT FWD
4130	DUCT OVHT AFT
4130	4 TIMES DUCT OVHT F/D
4140:	4 TIMES DUCT OVHT FWD
4150:	4 TIMES DUCT OVHT AFT
4160	4 TIMES COMPR OUTLET OVHT LH
4210	4 TIMES COMPR OUTLET OVHT LH
4220:	4 TIMES COMPR OUTLET OVHT RH
4230	PACK OUTLET OVHT LH
4240	PACK OUTLET OVHT RH
4310	EXCESSIVE CABIN ALTITUDE
5100	CABIN ALTITUDE
5200	CABIN DIFFERENT PRESSURE
NOTE:- If report is not triggered by limit exceedance, field contains blanks	

PF = Pack Flow ; COT = Pack Compressor Outlet Temperature
RI = Pack Ram Air Inlet Position RO = Ram Air Outlet Door Position
PBV = Pack Bypass Valve Position
FCV = Flow Control Valve Status, 1 = closed 0 = not closed
P3 = Selected PS3 (Burner Pressure)
For NEO P&W report given to "P3" instead of "PB".
T3 = Selected T3
TW = Pack Water Extr. Temperature
TP = Pack Outlet Temperature
TPO = Pre cooler Engine Outlet Temperature
PD = Pre cooler Engine Inlet Pressure
ALT = Altitude
TAT = Total Air Temperature
SAT = Static Air Temperature
ZCB = Cabin Altitude
ZLD = Landing Elevation

SC1 = Selected Cockpit Compt Temperature
SC2 = Selected FWD Cabin Compt Temperature
SC3 = Selected AFT Cabin Compt Temperature
RV = Trim Air Pass Reg. Valve Status [1 = Closed]
PCSW = Pressure Controller Status Word
VSCB = Cabin V/s; PDC = Cabin Differential Pressure
VF = Cabin Temperature Reg. Valve Position Group 1
VW = Cabin Temperature Reg. Valve Position Group 2
VA = Cabin Temperature Reg. Valve Position Group 3
OVP = Outflow Valve Position
CPC = System in Control 0 = no System in Control ;1 = System 1 in Control
2 = System 2 in Control



ENVIRONMENTAL CONTROL SYSTEM REPORT <19>

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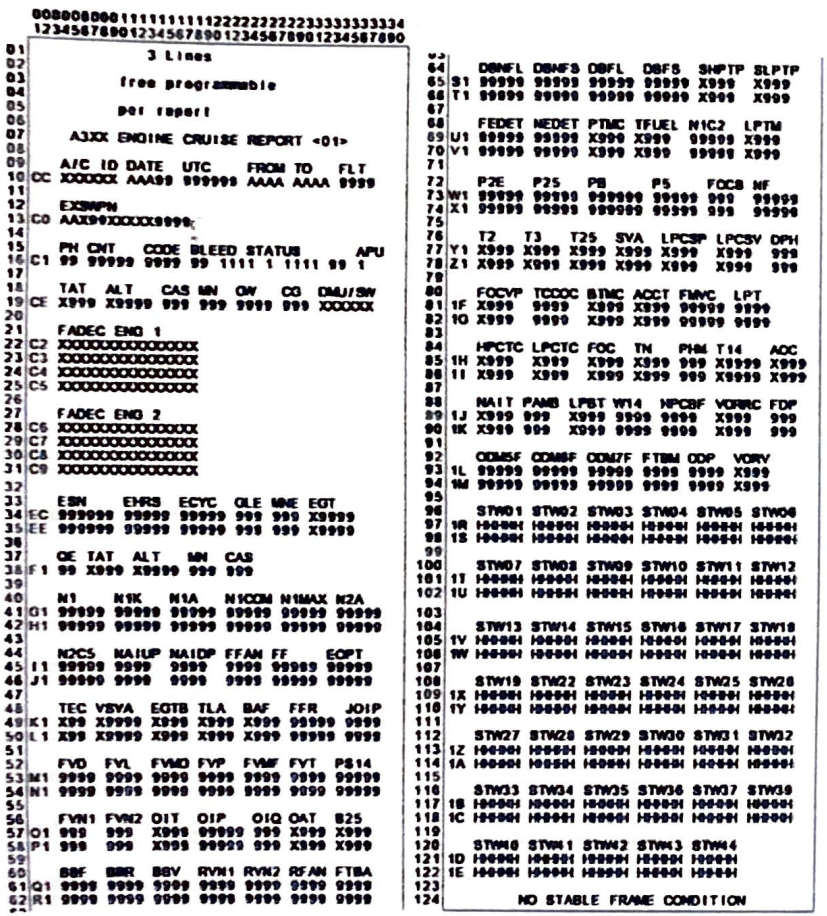
Prepared by R.K.CHOPRA

Engine Cruise Report <01> PW 1100G (Neo)



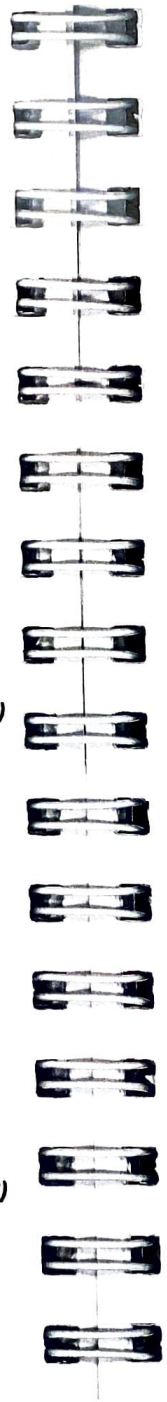
```
                    3 Lines
                free programmable
                    per report
          A3XX ENGINE CRUISE REPORT <01>

   A/C ID DATE   UTC      FROM TO   FLT
CC XXXXXX AAA99 999999 AAAA AAAA 9999

   EXSMPN
C0 AAX99XXXXX9999

   PH CNT    CODE BLEED STATUS          APU
C1 99 99999 9999 99 1111 1 1111 99 1

   TAT  ALT   CAS MN  GW   CG  DMU/SW
CE X999 X9999 999 999 9999 999 XXXXXX

   FADEC ENG 1
C2 XXXXXXXXXXXXXX
C3 XXXXXXXXXXXXXX
C4 XXXXXXXXXXXXXX
C5 XXXXXXXXXXXXXX

   FADEC ENG 2
C6 XXXXXXXXXXXXXX
C7 XXXXXXXXXXXXXX
C8 XXXXXXXXXXXXXX
C9 XXXXXXXXXXXXXX

   ESN    EHRS  ECYC  CLE MNE EGT
EC 999999 99999 99999 999 999 X9999
EE 999999 99999 99999 999 999 X9999

   CE TAT  ALT   MN  CAS
F1 99 X999 X9999 999 999

   N1    N1K   N1A   N1CCM N1MAX N2A
G1 99999 99999 99999 99999 99999 99999
H1 99999 99999 99999 99999 99999 99999

   N2C5  NAIUP NAIDP FFAN FF    EOPT
I1 99999 9999  9999  9999 99999 99999
J1 99999 9999  9999  9999 99999 99999

   TEC VSVA  EGTB TLA  BAF  FFR   JOIP
K1 X99 X9999 X999 X999 X999 99999 9999
L1 X99 X9999 X999 X999 X999 99999 9999

   FVD  FVL  FVMD FVP  FVMF FVT  PS14
M1 9999 9999 9999 9999 9999 9999 99999
N1 9999 9999 9999 9999 9999 9999 99999

   FVN1 FVN2 OIT OIP  OIQ OAT  B25
O1 999  999  X999 99999 999 X999 X999
P1 999  999  X999 99999 999 X999 X999

   BBF  BBR  BBV  RVN1 RVN2 RFAN FTBA
Q1 9999 9999 9999 9999 9999 9999 9999
R1 9999 9999 9999 9999 9999 9999 9999

   DBNFL DBNFS DBFL  DBFS  SHPTP SLPTP
S1 99999 99999 99999 99999 X999  X999
T1 99999 99999 99999 99999 X999  X999

   FEDET NEDET PTMC TFUEL N1C2  LPTM
U1 99999 99999 X999 X999  99999 X999
V1 99999 99999 X999 X999  99999 X999

   P2E   P25   P8    P5    FOCB NF
W1 99999 99999 999999 99999 999  99999
X1 99999 99999 999999 99999 999  99999

   T2   T3   T25  SVA  LPCSP LPCSV DPH
Y1 X999 X999 X999 X999 X999  X999  999
Z1 X999 X999 X999 X999 X999  X999  999

   FOCVP TCCOC BTMC ACCT FMVC LPT
1F X999  9999  X999 X999 99999 9999
1G X999  9999  X999 X999 99999 9999

   HPCTC LPCTC FOC  TN   PHM T14   AOC
1H X999  X999  X999 X999 999 X9999 X999
1I X999  X999  X999 X999 999 X9999 X999

   NAIT PAMB LPBT W14  HPCBF VCRRC FDP
1J X999 999  X999 9999 9999  X999  999
1K X999 999  X999 9999 9999  X999  999

   ODM5F ODM6F ODM7F FTBM ODP  VCRV
1L 99999 99999 99999 9999 9999 X999
1M 99999 99999 99999 9999 9999 X999

   STW01 STW02 STW03 STW04 STW05 STW06
1R HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1S HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW07 STW08 STW09 STW10 STW11 STW12
1T HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1U HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW13 STW14 STW15 STW16 STW17 STW18
1V HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1W HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW19 STW22 STW23 STW24 STW25 STW26
1X HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1Y HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW27 STW28 STW29 STW30 STW31 STW32
1Z HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1A HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW33 STW34 STW35 STW36 STW37 STW38
1B HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1C HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

   STW40 STW41 STW42 STW43 STW44
1D HHHHH HHHHH HHHHH HHHHH HHHHH
1E HHHHH HHHHH HHHHH HHHHH HHHHH

        NO STABLE FRAME CONDITION
```

ACCT	ACC Valve Torque Motor Current	(-55.0 to 55.0 mA)
BBF	Broadband Vibration Front	(0.00 to 10.00 IPS)
BBR	Broadband Vibration Rear	(0.00 to 10.00 IPS)
BBV	Broadband Vibration	(0.00 to 8.00 IPS)
BTMC	2.5 BldAct Torque Motor Current	(-55.0 to 55.0 mA)
DBFL	Debris Rate Ferrous-Long-Term	
DBFS	Debris Rate Ferrous-Short-Term	
DBNFL	Debris Rate Non-Ferrous-Long-Term	
DBNFS	Debris Rate Non-Ferrous-Short-Term	
DPH	Displacement Unbalance from PHMU	(0.00 to 9.99 ips)
ECYC	Engine Cycle	(00000 to 99999)
EHRS	Engine Flight Hours	(00000 to 99999 hours)
ESN	Engine Serial Number	(000000 to 999999)
EOPT	Engine Operating Time	(0 to 65536 hours)
FEDET	Cumulative No. of Fe. Particles Detected	(0 to 65535 Ferrous particles.)
FFAN	Front Vibe Sensor FAN SO1	(0.00 to 10.00 IPS)
FTBM	Fan Trim Balance Solution Magnitude	(0.00 to 30.00 amper)
FTBA	Fan Trim Balance Solution Angle	(0.00 to 30.00 amper)
FVD	Front Vibe Sensor Deoiler Schaft SO1	(0.00 to 10.00 IPS)
FVL	Front Vibe Sensor Lay schaft SO1	(0.00 to 10.00 IPS)
FVMF	Front Vibe Sensor Main Fuel Pump SO1	(0.00 to 10.00 IPS)
FVMO	Front Vibe Sensor Main Oil Pump SO1	(0.00 to 10.00 IPS)
FVN1	Front Vibe Sensor N1 SO1	(0.00 to 10.00 IPS)
FVN2	Front Vibe Sensor N2 SO1	(0.00 to 10.00 IPS)
FVP	Front Vibe Sensor PMA Schaft SO1	(0.00 to 10.00 IPS)
FVT	Front Vibe Sensor Tower Schaft SO1	(0.00 to 10.00 IPS)
HPCTC	HPC SVA Torque Motor Current	(-55.0 to 55.0 mA)
LPCSV	LPC SVA position % open feedback	(-5.0 to 105.0 %)
LPCTC	LPC SVA Torque Motor Current	(-55.0 to 55.0 mA)
LPT	LPT Trim Balance Solution Angle	(1.00 to 30.00 %)
LPTM	LPT Trim Balance Solution Magnitude	(0.0 to 999.9 oz-inches)
N1MAX	Low Press. Module Speed, N1 Max.	(0.00 to 105.00 %rpm)
NAIT	NAI Temperature	(-62 to 810 deg C)
NEDET	No. of Non-Fe. Particles Detected	(0 to 65535 Fe particles.)
OIT	Engine Oil Temperature	(-60.0 to 250.0 deg C)
ODM5F	ODM Bin5 Ferrous Counts	(0 to 65536 particles)

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

ODM6F	ODM Bin6 Ferrous Counts	(0 to 65536 particles)
ODM7F	ODM Bin7 Ferrous Counts	(0 to 65536 particles)
PHM	Phase Unbalance from PHMU	(0 to 360)
PTMC	Protection Torque Motor Current	(-55.0 to 110.0 mA)
QE	Eng Quality Number, Report Stability	(00 to 99)
RFAN	Rear Vibe Sensor FAN SO1	(0.00 to 10.00 IPS)
RVN1	Rear Vibe Sensor N1 SO1	(0.00 to 10.00 IPS)
RVN2	Rear Vibe Sensor N2 SO1	(0.00 to 10.00 IPS)
STWXX	Engine Status Word	()*
VORRC	Variable Oil Redu V/V Pos Command	(0.0 to 128.0 %)
VORV	Variable Oil Reduction V/V Pos F/b	(0 to 128 %)
ALT	Standard Altitude (1013 mbar)	(-2000 to 50000 ft)
AOC	The Eng Air Oil Cooler Valve Feedback	(-5.0 to 105.0 %)
B25	Stage 2.5 Bleed Valve Actuator	(-5.0% to 105.0%)
BAF	Eng 2.5 Pos Bleed Actuator F/b	(-5% to 105%)
CAS	Computed Air Speed	(30 to 450 kts)
EGT	EGT. from Engine (Station 5)	(-80.0 to 1250.0 deg C)
EGTB	Unbiased Exhaust Gas Temp	(-81.0 to 886.0 deg C)
FDP	Engine Fuel Filter Delta Pressure	(0.0 to 99.9 psig)
FF	Engine Fuel Flow	(0 to 8000 kg/h)
FFR	Fuel Metering Valve Position Feedback	(0 to 14500 pph)
FMVC	Fuel Metering Valve (FMV) Command	(0 to 14500 pph)
FOC	FOC Position Feedback	(-50.0 to 50.0 %)
FOCB	FOC bypass indication	(5.0 to 32.0 psia)
FOCVP	Fuel Oil Cooler Bypass Valve Position	(0.0 to 100.0 %)
GLE	Engine Generator Load	(0 to 100%)
HPCBF	HPC Bleed Valve Feedback Pressure	(0.0 to 512.0 psia)
JOIP	Journal Oil Pressure	(1.5 to 350.0 psia)
LPBT	Buffer Air Temperature	(-78.0 to 557.0 deg C)
LPCSP	LPC SVA position % open command	(-5.0 to 105.0 %)



MN	Mach Number	(0.100 to 0.999)
MNE	Mach Number from Engine	(0.100 to 0.999)
N1	Low Press.Speed, N1 Unbiased	(0.00 to 128.00 %rpm)
N1A	Low Press. (Indicated) N1 Actual	(0.00 to 120.00 %rpm)
N1C2	N1 Corrected	(0.00 to 120.00 %rpm)
N1COM	Low Press. Speed, N1 Command	(0.00 to 105.00 %rpm)
N1K	Low Press. Speed, Corrected N1	(0.00 to 120.00 %rpm)
N2A	High Pres. Speed, (Indicated) N2 Actual	(0 to 120 %rpm)
N2C5	Speed, N2 Corrected for station 2.5	(0.00 to 120.00 %rpm)
NAIDP	NAI Down Str Valve Pressure	(1.0 to 512.0 psi)
NAIUP	NAI Up Str Valve Pressure	(1.0 to 512.0 psi)
NF	Fan Speed	(0.00 to 120.00 %)
OAT	Outside Air Temperature	(-78.0 to 99.9 deg C)
ODP	Engine Oil Filter Delta Pressure	(0.0 to 96.0 psig (rounded))
OIP	Engine Oil Pressure	(0.00 to 335.00 psid)
OIQ	Engine Oil Quantity	(0.0 to 24.0 Qts)
P25	Total air pressure from eng gas path	(1.000 to 64.000 psia)
P2E	Selected Inlet Total Pressure	(1.000 to 25.250 psia)
P5	Eng. sensed turbine exhaust tot Press.	(0.000 to 32.000 psia)
PAMB	Amb Air Pres from the Eng(under nacelle fan cowl)	(1.5 to 15.9 psia)
PB	Sel Burner Press. from eng. gas path	(1.000 to 700.000 psia)
PS14	FEGV(Fan Exit Guide Vane)Static Press.	(1.025 to 30.000 psia)
SLPTP	Synthesized LPT Pressure	(0.0 to 500.0 psia per sec.)
SVA	Starter Vane Actuator Feedback	(0.0 to 100.0 %)
T14	Synthesized Air Flow at Station 14	(-106.5 to 226.9 deg C)
T2	T2 Temperature	(-78.0 to 94.0 deg C)
T25	TAT from eng.gas path (Station2.5)	(-80.0 to 330.0 deg C)
T3	Engine Selected T3 temperature	(-81.0 to 789.0 deg C)
TAT	TAT from the aircraft	(-60.0 to 99.9 deg C)
TCCOC	Turbine Clearance Control Valve	(0.0 to 100.0 %)

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

TEC	Elec. Eng Cont Box(EEC) Internal Temp.	(-68 to 263 deg C)
TFUEL	Fuel Temperature from the Engine	(-62.5 to 187.5 deg C)
TLA	Thrust Lever Ang Pos fb from Eng. EEC	(-23.5 to 49.0 deg)
TN	Nacelle Temp.(Eng Core Compartment)	(-62.5 to 200.0 deg C)
VSVA	Var. Stator Vane Act % Open Command	(-5.0 to 100.0 %)
W14	Synthesized Air Flow at Station 14	(50 to 1800 pps)
EGT	Selected Exhaust Temp.from(Station5)	(0.100 to 0.999)
QE	Eng Quality Number, Report Stability	(00 to 99)

Cruise Performance Report <02> PW 1100G (Neo)

ESN	Engine Serial Number	(000000 to 999999)
EHRS	Engine Flight Hours	(00000 to 99999 hours)
ECYC	Engine cycles (DMU computed)	(00000 to 99999)
GLE	Generator load engine	(0 to 100%)
MNE	Mach Number from Engine	(0.100 to 0.999)
EGT	Selected Exhaust Temp. from(Station 5)	(-80.0 to 1250.0 deg C)
QE	Engine Quality Number, Report Stability	(00 to 99)
QA	A/c Quality Number, Report Stability	(00 to 99)
TAT	Total Air Temp. from the aircraft	(-60.0 to 99.9 deg C)
ALT	Standard Altitude (1013 mbar)	(-2000 to 50000 ft)
MN	Mach Number	(0.100 to 0.999)
CAS	Computed Air Speed	(30 to 450 kts)
N1	Low Pres. Module Speed, N1 Unbiased	(0.00 to 128.00 %rpm)
N1K	Low Pres. Module Speed, Corrected N1	(0.00 to 120.00 %rpm)
N1A	Low Pres. Module Speed, (Indicated) N1	(0.00 to 120.00 %rpm)
N1COM	Low Pres. Module Speed, N1 Command	(0.00 to 105.00 %rpm)
N1MAX	Low Pres. Module Speed, N1 Maximum	(0.00 to 105.00 %rpm)
N2A	High Pres. Module Speed, (Indicated) N2	(0 to 120 %rpm)
N2C5	High Pres. Speed, N2 Corr. for sta. 2.5	(0.00 to 120.00 %rpm)
NAIUP	NAI Up Str Valve Press.	(1.0 to 512.0 psi)
NAIDP	NAI Down Str Valve Press.	(1.0 to 512.0 psi)

Cruise Performance Report <02> PW 1100G (Neo)

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      1234567890123456789012345678901234567890

                  3 Lines

             free programmable

             per report

       A3XX CRUISE PERFORMANCE REPORT <02>

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       EXSNPN
    C0 AAX99XXXXX9999

       PH CNT   CODE BLEED STATUS          APU
    C1 99 99999 9999 99 1111 1 1111 99 1

       TAT  ALT   CAS MN  GW   CG  DMU/SW
    CE X999 X9999 999 999 9999 999 XXXXXX
    CN X999 X9999 999 999 9999 999

       FADEC ENG 1
    C2 XXXXXXXXXXXXXXXX
    C3 XXXXXXXXXXXXXXXX
    C4 XXXXXXXXXXXXXXXX
    C5 XXXXXXXXXXXXXXXX

       FADEC ENG 1
    C6 XXXXXXXXXXXXXXXX
    C7 XXXXXXXXXXXXXXXX
    C8 XXXXXXXXXXXXXXXX
    C9 XXXXXXXXXXXXXXXX

       ESN    EHRS  ECYC  GLE MNE EGT
    EC 999999 99999 99999 999 999 X9999
    EE 999999 99999 99999 999 999 X9999

       QE QA TAT  ALT   MN  CAS
    F1 99 99 X999 X9999 999 999

       N1    N1K   N1A   N1COM N1MAX N2A
    G1 99999 99999 99999 99999 99999 99999
    H1 99999 99999 99999 99999 99999 99999

       N2C5  NAIUP NAIDP FFAN FF    EOPT
    I1 99999 9999  9999  9999 99999 99999
    J1 99999 9999  9999  9999 99999 99999

       TEC VSVA  EGTB TLA  BAF  FFR   JOIP
    K1 X99 X9999 X999 X999 X999 99999 9999
    L1 X99 X9999 X999 X999 X999 99999 9999

       FVD  FVL  FVMO FVP  FVMF FVT  PS14
    M1 9999 9999 9999 9999 9999 9999 99999
    N1 9999 9999 9999 9999 9999 9999 99999

       FVN1 FVN2 OIT  OIP   OIQ OAT  B25
    O1 999  999  X999 99999 999 X999 9999
    P1 999  999  X999 99999 999 X999 9999

       BBF  BBR  BBV  RVN1 RVN2 RFAN FTBA
    Q1 9999 9999 9999 9999 9999 9999 9999
    R1 9999 9999 9999 9999 9999 9999 9999

       DBNFL DBNFS DBFL  DBFS  SHPTP SLPTP
    S1 99999 99999 99999 99999 X999  X999
    T1 99999 99999 99999 99999 X999  X999

       FEDET NEDET PTMC TFUEL N1C2  LPTM
    U1 99999 99999 X999 X999  99999 X999
    V1 99999 99999 X999 X999  99999 X999

       P2E   P25   PB     P5    FOCB NF
    W1 99999 99999 999999 99999 999  99999
    X1 99999 99999 999999 99999 999  99999

       T2   T3   T25  SVA  LPCSP LPCSV DPH
    Y1 X999 X999 X999 X999 X999  X999  999
    Z1 X999 X999 X999 X999 X999  X999  999

       FOCVP TCCOC BTMC ACCT FMVC  LPT
    1F X999  9999  X999 X999 99999 9999
    1G X999  9999  X999 X999 99999 9999

       HPCTC LPCTC FOC  TN   PHM T14   AOC
    1H X999  X999  X999 X999 999 X9999 X999
    1I X999  X999  X999 X999 999 X9999 X999

       NAIT PAMB LPBT W14  HPCBF VORRC FDP
    1J X999 999  X999 9999 9999  X999  999
    1K X999 999  X999 9999 9999  X999  999

       ODMSF ODMSF ODM7F FTBM ODP  P2
    1L 99999 99999 99999 9999 9999 99999
    1M 99999 99999 99999 9999 9999 99999

       STW01  STW02  STW03  STW04  STW05  STW06
    1R H9999H H9999H H9999H H9999H H9999H H9999H
    1S H9999H H9999H H9999H H9999H H9999H H9999H

       STW07  STW08  STW09  STW10  STW11  STW12
    1T H9999H H9999H H9999H H9999H H9999H H9999H
    1U H9999H H9999H H9999H H9999H H9999H H9999H

       STW13  STW14  STW15  STW16  STW17  STW18
    1V H9999H H9999H H9999H H9999H H9999H H9999H
    1W H9999H H9999H H9999H H9999H H9999H H9999H

       STW19  STW22  STW23  STW24  STW25  STW26
    1X H9999H H9999H H9999H H9999H H9999H H9999H
    1Y H9999H H9999H H9999H H9999H H9999H H9999H

       STW27  STW28  STW29  STW30  STW31  STW32
    1Z H9999H H9999H H9999H H9999H H9999H H9999H
    2A H9999H H9999H H9999H H9999H H9999H H9999H

       STW33  STW34  STW35  STW36  STW37  STW39
    2B H9999H H9999H H9999H H9999H H9999H H9999H
    2C H9999H H9999H H9999H H9999H H9999H H9999H

       STW40  STW41  STW42  STW43  STW44  FD
    2D H9999H H9999H H9999H H9999H H9999H 0999
    2E H9999H H9999H H9999H H9999H H9999H 0999

       THDG LATP  WS  WD   CFPG  CIVV FT
    2F 9999 X9999 999 X999 X9999 X999 X999
    2G 9999 X9999 999 X999 X9999 X999 X999
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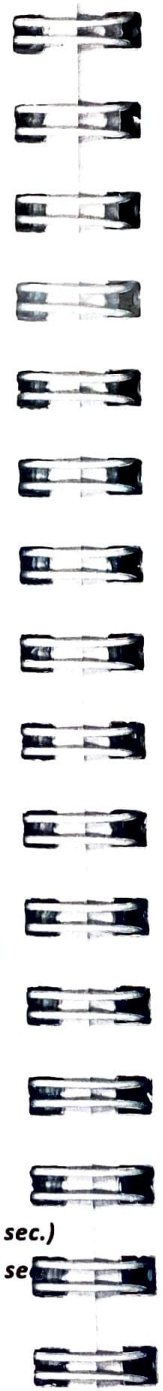
FFAN	Front Vibe Sensor FAN SO1	(0.00 to 10.00 IPS)
FF	Engine Fuel Flow	(0 to 8000 kg/h)
EOPT	Engine Operating Time	(0 to 65536 hours)
TEC	EEC Internal Temp.	(-68 to 263 deg C)
VSVA	VSV Actuator % Open Command	(-5.0 to 100.0 %)
EGTB	Unbiased Exhaust Gas Temp. from Eng	(-81.0 to 886.0 deg C)

TLA	Thrust Lever Angle Position feedback	(-23.5 to 49.0 deg)
BAF	Eng 2.5 Pos Bleed Actuator Feedback	(-5% to 105%)
FFR	Fuel Metering Valve Position Feedback	(0 to 14500 pph)
JOIP	Journal Oil Press.	(1.5 to 350.0 psia)
FVD	Front Vibe Sensor Deoiler Schaft SO1	(0.00 to 10.00 IPS)
FVL	Front Vibe Sensor Lay schaft SO1	(0.00 to 10.00 IPS)
FVMO	Front Vibe Sensor Main Oil Pump SO1	(0.00 to 10.00 IPS)
FVP	Front Vibe Sensor PMA Schaft SO1	(0.00 to 10.00 IPS)
FVMF	Front Vibe Sensor Main Fuel Pump SO1	(0.00 to 10.00 IPS)
FVT	Front Vibe Sensor Tower Schaft SO1	(0.00 to 10.00 IPS)
PS14	FEGV St. Press. Syn. HPT Press.)	(1.025 to 30.000 psia)
FVN1	Front Vibe Sensor N1 SO1	(0.00 to 10.00 IPS)
FVN2	Front Vibe Sensor N2 SO1	(0.00 to 10.00 IPS)
OIT	Engine Oil Temp.	(-60.0 to 250.0 deg C)
OIP	Engine Oil Press.	(0.00 to 335.00 psid)
OIQ	Engine Oil Quantity	(0.0 to 24.0 Qts)
OAT	Outside Air Temp.	(-78.0 to 99.9 deg C)
B25	Stage 2.5 Bleed Valve Actuator	(-5.0% to 105.0%)
BBF	Broad Band Vibration Front	(0.00 to 10.00 IPS)
BBR	Broad Band Vibration Rear	(0.00 to 10.00 IPS)
BBV	Broadband Vibration	(0.00 to 8.00 IPS)
RVN1	Rear Vibe Sensor N1 SO1	(0.00 to 10.00 IPS)
RVN2	Rear Vibe Sensor N2 SO1	(0.00 to 10.00 IPS)
RFAN	Rear Vibe Sensor FAN SO1	(0.00 to 10.00 IPS)
FTBA	Fan Trim Balance Solution Angle	(0.00 to 30.00 amper)
DBNFL	Debris Rate Non-Ferrous-Long-Term	(0 to 65535 Ferrous Particles)
DBNFS	Debris Rate Non-Ferrous-Short-Term	(0 to 65535 Ferrous Particles)
DBFL	Debris Rate Ferrous-Long-Term	(0 to 65535 Ferrous Particles)
DBFS	Debris Rate Ferrous-Short-Term	(0 to 65535 Ferrous Particles)
SHPTP	Synthesized HPT Press.	(0.0 to 500.0 psia per sec.)
SLPTP	Synthesized LPT Press.	(0.0 to 500.0 psia per se



FEDET	Cumulative No. of Fe. Particles Detected	(0 to 65535 Ferrous particles.)
NEDET	Cumulative No. of Non-Fe. Particles Detected	(0 to 65535 Ferrous particles.)
PTMC	Protection Torque Motor Current	(-55.0 to 110.0 mA)
TFUEL	Fuel Temp. from the Engine	(-62.5 to 187.5 deg C)
N1C2	N1 Corrected	(0.00 to 120.00 %rpm)
LPTM	LPT Trim Balance Solution Magnitude	(0.0 to 999.9 oz-inches)
P2E	Selected Inlet Total Press.	(1.000 to 25.250 psia)
P25	Total air Press. from engine gas path	(1.000 to 64.000 psia)
PB	Sel Burner Press. from eng. gas path	(1.000 to 700.000 psia)
P5	Sel Eng. sensed turbine exhaust total Press.	(0.000 to 32.000 psia)
FOCB	FOC bypass indication	(5.0 to 32.0 psia)
NF	Fan Speed	(0.00 to 120.00 %)
T2	T2 Temp.	(-78.0 to 94.0 deg C)
T3	Engine Selected T3 Temp.	(-81.0 to 789.0 deg C)
T25	TAT from eng. gas path (Sta.2.5)	(-80.0 to 330.0 deg C)
SVA	Engine Starter Vane Actuator Feedback	(0.0 to 100.0 %)
LPCSP	LPC SVA position percent open command	(-5.0 to 105.0 %)
LPCSV	LPC SVA position percent open feedback	(-5.0 to 105.0 %)
DPH	Displacement Unbalance from PHMU	(0.00 to 9.99 ips)
FOCVP	Fuel Oil Cooler Bypass Valve Position	(0.0 to 100.0 %)
TCCOC	Turbine Clearance Control Valve	(0.0 to 100.0 %)
BTMC	2.5 Bld Act Torque motor current	(-55.0 to 55.0 mA)
ACCT	ACC Valve Torque motor current mA	(-55.0 to 55.0 mA)
FMVC	Fuel Metering Valve (FMV) Command	(0 to 14500 pph)
LPT	Fuel Metering Valve (FMV) Command	(1.00 to 30.00 %)
HPCTC	HPC SVA Torque Motor Current	(-55.0 to 55.0 mA)
LPCTC	LPC SVA Torque Motor Current	(-55.0 to 55.0 mA)
FOC	FOC Position Feedback	(-50.0 to 50.0 %)
TN	Nacelle Temp. (Eng Core Compartment)	(-62.5 to 200.0 deg C)
PHM	Phase Unbalance from PHMU	(0 to 360)
T14	Synthesized Air Flow at Station 14	(-106.5 to 226.9 deg C)
AOC	The engine Air Oil Collar valve feedback	(-5.0 to 105.0 %)

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Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

Engine Climb Report <03> PW 1100G (Neo)

NAIT	NAI Temp.	(-62 to 810 deg C)
PAMB	Amb Air Pres frm Eng.(nacelle fan cowl)	(1.5 to 15.9 psia)
LPBT	Buffer Air Temp.	(-78.0 to 557.0 deg C)
W14	Synthesized Air Flow at Station 14	(50 to 1800 pps)
HPCBF	HPC Bleed Valve Feedback Press.	(0.0 to 512.0 psia)
VORRC	Var. Oil Reduction V/V Position Req Com	(0.0 to 128.0 %)
FDP	Engine Fuel Filter Delta Press.	(0.0 to 99.9 psig)
ODM5F	ODM Bin5 Ferrous Counts	(0 to 65536 particles)
ODM6F	ODM Bin6 Ferrous Counts	(0 to 65536 particles)
ODM7F	ODM Bin7 Ferrous Counts	(0 to 65536 particles)
FTBM	Fan Trim Balance Solution Magnitude	(0.00 to 30.00 amper)
ODP	Engine Oil Filter Delta Press.	(0.0 to 96.0 psig (rounde
P2	Sel Total Air Pres. (Station 2)	(1.000 to 25.250 psi)
FD	Fuel Density from the aircraft	(0 to 0.999 kg/l)
THDG	True Heading (BCD)	(0.0 to 359.9 deg)
LATP	Latitude Position	(N 89.9 deg to S 89.9 deg)
WS	Wind Speed	(0 to 100 kts)
WD	Wind Direction-True	(-180 to 180 deg)
CFPG	Calculated Flight Path Acceleration	(-0.9999 to 4.0000 g)
CIVV	Calculated Inertial Vertical Speed	(-999 to 999 ft/min)
FT	Wing Fuel Temp.	(-60 to 170 deg C)

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                    3 Lines
                free programmable
                per report
          A3XX ENGINE CLIMB REPORT <03>

  A/C ID DATE  UTC     FROM TO   FLT
CC XXXXXX AAA99 999999 AAAA AAAA XXXX

  EXSMPN
C0 AAX99XXXXX9999

  PH CNT   CODE BLEED STATUS        APU
C1 99 99999 9999 99 1111 1 1111 99 1

  TAT  ALT   CAS MN  GW   CG  DMU/SW
CE X999 X9999 999 999 9999 999 XXXXXX

  FADEC ENG 1
C2 XXXXXXXXXXXXXX
C3 XXXXXXXXXXXXXX
C4 XXXXXXXXXXXXXX
C5 XXXXXXXXXXXXXX

  FADEC ENG 2
C6 XXXXXXXXXXXXXX
C7 XXXXXXXXXXXXXX
C8 XXXXXXXXXXXXXX
C9 XXXXXXXXXXXXXX

  ESN    EHRS  ECYC  ALT   CAS MN  TIC
EE 999999 99999 99999 X9999 999 999 999
EC 999999 99999 99999

  AOC  B26  BAF  TAT
F1 X999 X999 X999 X999
G1 X999 X999 X999

  N1    N1A   N1C2  N1COM N2A   N2C5
H1 99999 99999 99999 99999 99999 99999
I1 99999 99999 99999 99999 99999 99999

  N1MAX EGT   EGTB FFR   FMVC  FTBA
J1 99999 X9999 X999 99999 99999 9999
K1 99999 X9999 X999 99999 99999 9999

  NAIDP NAIUP BBF  B8R  B8V  FFAN DPH
L1 9999  9999  9999 9999 9999 9999 999
M1 9999  9999  9999 9999 9999 9999 999

  NAIT NF    OAT  ODP  FDP FOC  FOCB
N1 X999 99999 X999 9999 999 X999 999
O1 X999 99999 X999 9999 999 X999 999

  T3   PB     OIQ OIP   OIT  FF    GLE
P1 X999 999999 999 99999 X999 99999 999
Q1 X999 999999 999 99999 X999 99999 999

  FOCVP FVD  FVL  FVMF FVMD FVP  FVT
R1 X999  9999 9999 9999 9999 9999 9999
S1 X999  9999 9999 9999 9999 9999 9999

  HPCBF SVA  JOIP LPBT LPCSP FTBM LPT
T1 9999  X999 9999 X999 X999  9999 9999
U1 9999  X999 9999 X999 X999  9999 9999

  P25   P2E   P5    PAMB PS14  T25
V1 99999 99999 99999 999  99999 X999
W1 99999 99999 99999 999  99999 X999

  SHPTP SLPTP LPTM T2   T14   LPCTC
X1 X999  X999  X999 X999 X9999 X999
Y1 X999  X999  X999 X999 X9999 X999

  TCC  TCCOC TEC TFUEL FEDET NEDET
Z1 X999 9999 X99 X999  99999 99999
1F X999 9999 X99 X999  99999 99999

  TLA  TN   W14  PHM VB1 VB2 HPCTC
1G X999 X999 9999 999 999 999 X999
1H X999 X999 9999 999 999 999 X999

  VORV VSVA ACCT BTMC PTMC FVN1 FVN2
1J X999 X9999 X999 X999 X999 999  999
1K X999 X9999 X999 X999 X999 999  999

  DFLM  DFSM  DNFLM DNFSM LPCSV RFAN
1L 99999 99999 99999 99999 X999  9999
1M 99999 99999 99999 99999 X999  9999

  RVN1 RVN2 ODM5F ODM6F ODM7F EOPT
1N 9999 9999 99999 99999 99999 99999
1O 9999 9999 99999 99999 99999 99999

  VORRC MNE
1P X999  999
1Q X999  999

  STW01 STW02 STW03 STW04 STW05 STW06
1R HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1S HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW07 STW08 STW09 STW10 STW11 STW12
1T HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1U HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW13 STW14 STW15 STW16 STW17 STW18
1V HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1W HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW19 STW22 STW23 STW24 STW25 STW26
1X HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
1Y HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW27 STW28 STW29 STW30 STW31 STW32
1Z HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
AA HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW33 STW34 STW35 STW36 STW37 STW39
AB HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH
AC HHHHH HHHHH HHHHH HHHHH HHHHH HHHHH

  STW40 STW41 STW42 STW43 STW44
AD HHHHH HHHHH HHHHH HHHHH HHHHH
AE HHHHH HHHHH HHHHH HHHHH HHHHH
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ESN	Engine Serial Number	(000000 to 999999)
EHRS	Engine Flight Hours	(00000 to 99999 hours)
ECYC	Engine cycles (DMU computed)	(00000 to 99999)
ALT	Standard Altitude (1013 mbar)	(-2000 to 50000 ft)
CAS	Computed Air Speed	(30 to 450 kts)
MN	Mach Number	(0.100 to 0.999)

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

TIC	Time in Climb	(0 to 999 seconds)
AOC	Engine Air Oil Collar valve feedback	(-5.0 to 105.0 %)
B25	Stage 2.5 Bleed Valve Actuator	(-5.0% to 105.0%)
BAF	Eng. 2.5 Pos Bleed Actuator Feedback	(-5% to 105%)
TAT	Total Air Temperature from the aircraft	(-60.0 to 99.9 deg C)
N1	Eng. LP Module Speed, N1 Unbiased	(0.00 to 128.00 %rpm)
N1A	Eng. LP Module Spd, N1 Actual	(0.00 to 120.00 %rpm)
N1C2	N1 Corrected	(0.00 to 120.00 %rpm)
N1COM	Engine LP Module Speed, N1 Command	(0.00 to 105.00 %rpm)
N2A	Eng. HP Module Speed, N2 Actual	
N2C5	HP Mod Speed, N2 Corrected for sta. 2.5	(0.00 to 120.00 %rpm)
N1MAX	Eng. LP Module Speed, N1 Max	(0.00 to 105.00 %rpm)
EGT	Selected Exhaust Temp. from(Station 5)	(-80.0 to 1250.0 deg C)
EGTB	Unbiased Exhaust Gas Temp. from Eng	(-81.0 to 886.0 deg C)
FFR	Fuel Metering Valve Position Feedback	(0 to 14500 pph)
FMVC	Fuel Metering Valve (FMV) Command	(0 to 14500 pph)
FTBA	Fan Trim Balance Solution Angle	(0.00 to 30.00 amper)
NAIDP	NAI Down Str Valve Pressure	(1.0 to 512.0 psi)
NAIUP	NAI Up Str Valve Pressure	(1.0 to 512.0 psi)
BBF	Broad Band Vibration Front	(0.00 to 10.00 IPS)
BBR	Broad Band Vibration Rear	(0.00 to 10.00 IPS)
BBV	Broadband Vibration	(0.00 to 8.00 IPS)
FFAN	Front Vibe Sensor FAN SO1	(0.00 to 10.00 IPS)
DPH	Displacement Unbalance from PHMU	(0.00 to 9.99 ips)
NAIT	NAI Temperature	(-62 to 810 deg C)
NF	Fan Speed	(0.00 to 120.00 %)
ODP	Engine Oil Filter Delta Pressure	(0.0 to 96.0 psig (rounde
FDP	Engine Fuel Filter Delta Pressure	(0.0 to 99.9 psig)
FOC	FOC Position Feedback	(-50.0 to 50.0 %)
FOCB	FOC bypass indication	(5.0 to 32.0 psia)
T3	Engine Selected T3 temperature	(-81.0 to 789.0 deg C)
PB	Burner Press. from engine gas path	(1.000 to 700.000 psia)

OIQ	Engine Oil Quantity	(0.0 to 24.0 Qts)
OIP	Engine Oil Pressure	(0.00 to 335.00 psid)
OIT	Engine Oil Temperature	(-60.0 to 250.0 deg C)
FF	Engine Fuel Flow	(0 to 8000 kg/h)
GLE	Generator load engine	(0 to 100%)
FOCVP	Fuel Oil Cooler Bypass Valve Position	(0.0 to 100.0 %)
FVD	Front Vibe Sensor Deoiler Schaft SO1	(0.00 to 10.00 IPS)
FVL	Front Vibe Sensor Lay schaft SO1	(0.00 to 10.00 IPS)
FVMF	Front Vibe Sensor Main Fuel Pump SO1	(0.00 to 10.00 IPS)
FVMO	Front Vibe Sensor Main Oil Pump SO1	(0.00 to 10.00 IPS)
FVP	Front Vibe Sensor PMA Schaft SO1	(0.00 to 10.00 IPS)
FVT	Front Vibe Sensor Tower Schaft SO1	(0.00 to 10.00 IPS)
HPCBF	HPC Bleed Valve Feedback Pressure	(0.0 to 512.0 psia)
SVA	Engine Starter Vane Actuator Feedback	(0.0 to 100.0 %)
JOIP	Journal Oil Pressure	(1.5 to 350.0 psia)
LPBT	Buffer Air Temperature	(-78.0 to 557.0 deg C)
LPCSP	LPC SVA position percent open command	(-5.0 to 105.0 %)
FTBM	Fan Trim Balance Solution Magnitude	(0.00 to 30.00 amper)
LPT	Fuel Metering Valve (FMV) Command	(1.00 to 30.00 %)
P25	Total air pressure from engine gas path	(1.000 to 64.000 psia)
P2E	Selected Inlet Total Pressure	(1.000 to 25.250 psia)
P5	Eng sensed turbine exhaust total Press.	(0.000 to 32.000 psia)
PAMB	Amb. Air Press. from the Engine	(1.5 to 15.9 psia)
PS14	FEGV (Fan Exit Guide Vane) Static Press	(1.025 to 30.000 psia)
T25	TAT from eng. gas path (Station2.5)	(-80.0 to 330.0 deg C)
SHPTP	Synthesized HPT Pressure	(0.0 to 500.0 psia per sec.
SLPTP	Synthesized LPT Presure	(0.0 to 500.0 psia per sec.)
LPTM	LPT Trim Balance Solution Magnitude	(0.0 to 999.9 oz-inches)
T2	T2 Temperature	(-78.0 to 94.0 deg C)
T14	Synthesized Air Flow at Station 14	(-106.5 to 226.9 deg C)
LPCTC	LPC SVA Torque Motor Current	(-55.0 to 55.0 mA)
TCC	Eng Tur Case Cooling Valve Feedback	(-5.0 % to 105.0 %)

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RFAN	Rear Vibe Sensor FAN SO1
TLA	Thrust Lever Angle Position f/b from Engine EEC
HPCTC	HPC SVA Torque Motor Current
FFR	Fuel Metering Valve Position Feedback
LPCTC	LPC SVA Torque Motor Current
LPCSV	LPC SVA position % open feedback
N1MAX	Engine Low Press. Speed, N1 Maximum
VSVA	Variable Stator Vane Actuator % Open Command
TCCOC	Turbine Clearance Control Valve
EOPT	Engine Operating Time
DFLM	Debris Rate Ferrous-Long-Term
DFSM	Debris Rate Ferrous-Short-Term
DNFLM	Debris Rate Non-Ferrous-Long-Term
DNFSM	Debris Rate Non-Ferrous-Short-Term
FVD	Front Vibe Sensor Deoiler Schaft SO1
FVL	Front Vibe Sensor Lay schaft SO1
FVP	Front Vibe Sensor PMA Schaft SO1
FVMF	Front Vibe Sensor Main Fuel Pump SO1
FVT	Front Vibe Sensor Tower Schaft SO1
FVMO	Front Vibe Sensor Main Oil Pump SO1
OIQ	Engine Oil Quantity
NF	Fan Speed
TCC	Turbine Case Cooling Valve Feedback
PS14	FEGV (Fan Exit G Vane) Static Press. Synth HPT Press.
JOIP	Journal Oil Press.
VB1	Engine NF Vibration displayed
VB2	Engine N Core Vibration displayed
SHPTP	Synthesized HPT Press.
SLPTP	Synthesized LPT Press.
HPCBF	HPC Bleed Valve Feedback Press.
FOC	FOC Position Feedback
PHM	Phase Unbalance from PHMU
DPH	Displacement Unbalance from PHMU
FOCVP	Fuel Oil Cooler Bypass Valve Position

OAT	Outside Air Temp.
FMVC	Fuel Metering Valve (FMV) Command
BBV	Broadband Vibration
BBF	Broad Band Vibration Front
BBR	Broad Band Vibration Rear
LPCSP	LPC SVA position percent open command
LPTM	LPT Trim Balance Solution Magnitude
SVA	Engine Starter Vane Actuator Feedback
FOCB	FOC bypass indication
FDP	Engine Fuel Filter Delta Press.
TEC	Electronic Engine Control Box (EEC) Internal Temp.
ODM5F	ODM Bin5 Ferrous Counts
ODM6F	ODM Bin6 Ferrous Counts
ODM7F	ODM Bin7 Ferrous Counts

Engine On Request Report <05> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE REPORT ON REQUEST <05> which are not included are given in the Reports 1,& 2.	
DFLM	Debris rate Fe- Long- Term Maximum (0 to 65535 Ferrous Particles)
DFSM	Debris rate Ferrous- Short-Term Max(0 to 65535)
DNFLM	Debris rate None-Ferrous- Long-Term Max(0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-Term Max(0 to 65535)
TR	Selected Thrust Reverser Percent Deployed(-22 to 105%)
VB1	Engine NF Vibration displayed(0.0 to 10.0 CU)
VB2	Engine NCore Vibration displayed(0.0 to 10.0 CU)
NSA	Starter Turbine Airspeed(0.0 to 130.0 %)
TCC	Engine Turbine Case Cooling Valve Feedback(-5.0 to 105.0 %)

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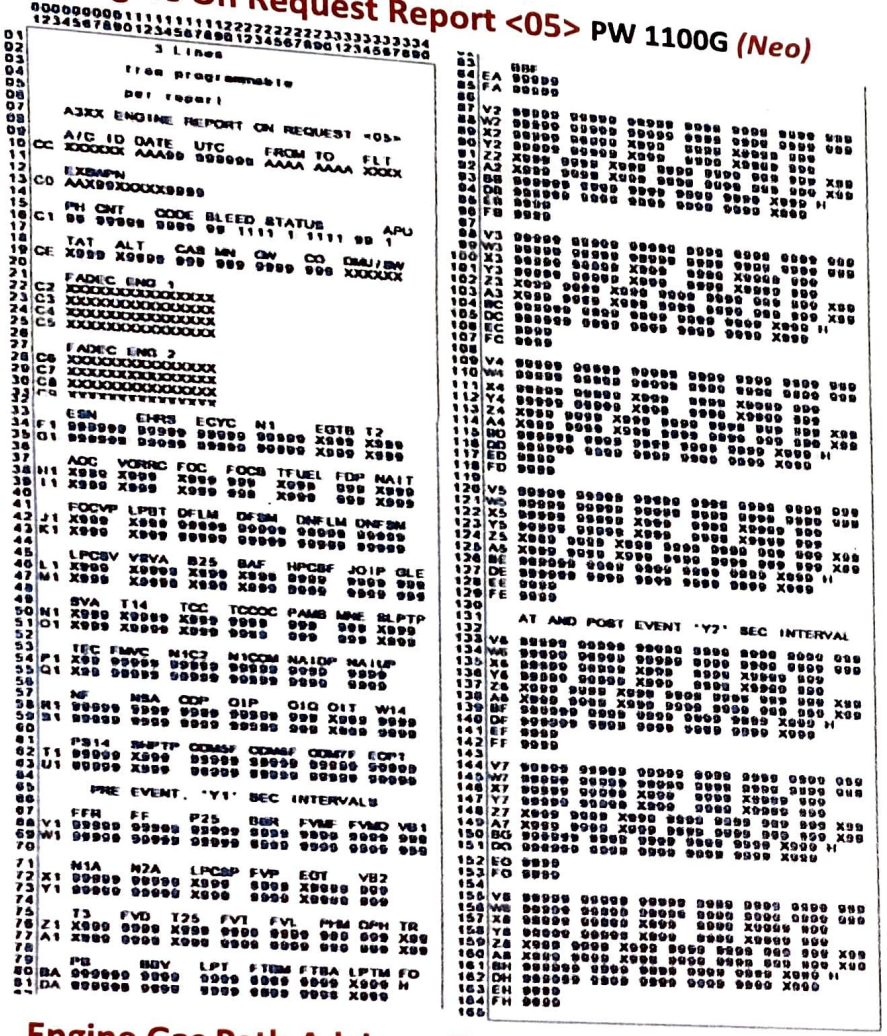
Prepared by R.K.CHOPRA

On Request Report <05> PW 1100G *(Neo)*



Engine Gas Path Advisory Report <06> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE GAS-PATH ADVISORY REPORT <06> which are not included are given in the Reports 1, 2, 3 & 4.	
AOA	Corrected Angle of Attack(-30.0 to 85.0 deg)
DFLM	Debris rate Ferrous- Long-term Max(0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max(0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max(0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max(0 to 65535)

E	Exceeding Engine Position
FO(H)	Fuel pump active (RH & LH)
MAX	Maximal Value of the exceeded engine related parameter
REVL	Left T/R cowl percent deployed position(-22 to 105%)
REVR	Right T/R cowl percent deployed position(-22 to 105%)
TCC	Turbine Case Cooling valve feedback(-5.0% to 105%)
TOL	Time Over Limit(minimum 60 secs monitoring time)
TR	Thrust reverser percent deployed(-22 to 105%)
TTP	Time to Peak(0 to 120 secs)
VACC	Aircraft Vertical Acceleration(-4.00 to 4.00 g)
VB1	Engine NF vibration displayed(0.0 to 10.0 CU)
VB2	Engine NCore vibration displayed(0.0 to 10.0 CU)
VOTM	VORV TM Current(0.0 to 128.0%)
EGTRD	EGT Redline exceeded
FLOT	Master Lever Selected On Flame out indicated
HPSOV	Reverser is inadvertently Pressurized
N1RED	N1 Redline exceeded
N2RED	N2 Redline exceeded
STALL	Engine Surge (Stall) detected
FMVT	FMV Torque Motor Current Feedback(-55.0 to 55.0 mA)

CODES	REASON FOR EXCEEDANCE Report <06>
E	Exceeding Engine Position
4100	STALL INDICATION
4200	FLAME OUT INDICATION
4300	N1 REDLINE
4400	N2 REDLINE
4500	EGT REDLINE
4600	FUEL FLOW ANOMALY
Remark: If the report was not triggered by a limit exceedance, this field contains blanks.	

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

Engine Gas Path Advisory Report <06> PW 1100G *(Neo)*

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                    3 Lines

                free programmable

                per report

  A3XX ENG GAS PATH ADVISORY REPORT <06>

    A/C ID DATE   UTC      FROM TO   FLT
CC  XXXXXX AAA99 999999   AAAA AAAA XXXX

    EXSWPN
CO  AAX99XXXXX9999

    PH CNT    CODE BLEED STATUS          APU
C1  99 99999 9999 99 1111 1 1111 99 1

    TAT  ALT   CAS MN  GW   CG  OMU/SW
CE  X999 X9999 999 999 9999 999 XXXXXX

    FADEC ENG 'E'
C2  XXXXXXXXXXXXXXX
C3  XXXXXXXXXXXXXXX
C4  XXXXXXXXXXXXXXX
C5  XXXXXXXXXXXXXXX

    REASON XXXXXXXXXXXXXXXXXXXX

    E MAX   TOL TTP W14  EOPT  OLE
F1  1 99999 999 999 9999 99999 999

    EBN     EHRS  ECYC  ALT   CAS TAT
G1  999999 99999 99999 X9999 999 X999

    BBF  BBR  BBV  ACCT AOC  TFUEL VORRC
H1  9999 9999 9999 X999 X999 X999  X999

    BTMC DFLM  DFBM  DNFLM DNFBM T14
I1  X999 99999 99999 99999 99999 X9999

    FMVT FOC  FOCB FOCVP TCCOC FMVC  VB2
J1  X999 X999 999  X999  9999  99999 999

    LPCBV LPBT TN   N1MAX NAIDP NAIUP
K1  X999  X999 X999 99999 9999  9999

    VOTM VBVA EGTB HPCBF JOIP N1    VB1
L1  X999 X9999 X999 9999  9999 99999 999

    TLA  N1C2 NAIT OIP   OIQ OIT  PAMB
M1  X999 99999 X999 99999 999 X999 999

    NF    SHPTP SLPTP ODM5F ODM6F ODM7F
N1  99999 X999  X999  99999 99999 99999

      PRE EVENT 'Y1' SEC INTERVALS

    B25  ELER T25  T3   REVL FLAP THDG
R1  X999 X999 X999 X999 X99  X999 9999

    P6    AILL AILR AOA  YAW  ROLL RUDD
S1  99999 X999 X999 X999 X999 X999 X999

    FFR  SVA  TCC  T2   YACC BAF  ELEL
T1  99999 X999 X999 X999 X999 X998 X999

    N2C5 YACC WD   XACC PTCH REVR LPCBP
U1  99999 X999 X999 X999 X999 X99  X999

    N1COM N1A  FF   P25  WB  MNE TR
Y1  99999 99999 9999 9999 999 999 X99
```

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    P2E   N2A   PB     FO EGT
W1  99999 99999 999999 H  X9999

R2  X999 X999 X999 X999 X99  X999 9999
S2  99999 X999 X999 X999 X999 X999 X999
T2  99999 X999 X999 X999 X999 X999 X999
U2  99999 X999 X999 X999 X999 X99  X999
V2  99999 99999 99999 99999 999 999 X99
W2  99999 99999 999999 H  X9999

R3  X999 X999 X999 X999 X99  X999 9999
S3  99999 X999 X999 X999 X999 X999 X999
T3  99999 X999 X999 X999 X999 X999 X999
U3  99999 X999 X999 X999 X999 X99  X999
V3  99999 99999 99999 99999 999 999 X99
W3  99999 99999 999999 H  X9999

R4  X999 X999 X999 X999 X99  X999 9999
S4  99999 X999 X999 X999 X999 X999 X999
T4  99999 X999 X999 X999 X999 X999 X999
U4  99999 X999 X999 X999 X999 X99  X999
V4  99999 99999 99999 99999 999 999 X99
W4  99999 99999 999999 H  X9999

R5  X999 X999 X999 X999 X99  X999 9999
S5  99999 X999 X999 X999 X999 X999 X999
T5  99999 X999 X999 X999 X999 X999 X999
U5  99999 X999 X999 X999 X999 X99  X999
V5  99999 99999 99999 99999 999 999 X99
W5  99999 99999 999999 H  X9999

      AT AND POST EVENT 'Y2' SEC INTERVAL

R6  X999 X999 X999 X999 X99  X999 9999
S6  99999 X999 X999 X999 X999 X999 X999
T6  99999 X999 X999 X999 X999 X999 X999
U6  99999 X999 X999 X999 X999 X99  X999
V6  99999 99999 99999 99999 999 999 X99
W6  99999 99999 999999 H  X9999

R7  X999 X999 X999 X999 X99  X999 9999
S7  99999 X999 X999 X999 X999 X999 X999
T7  99999 X999 X999 X999 X999 X999 X999
U7  99999 X999 X999 X999 X999 X99  X999
V7  99999 99999 99999 99999 999 999 X99
W7  99999 99999 999999 H  X9999

R8  X999 X999 X999 X999 X99  X999 9999
S8  99999 X999 X999 X999 X999 X999 X999
T8  99999 X999 X999 X999 X999 X999 X999
U8  99999 X999 X999 X999 X999 X99  X999
V8  99999 99999 99999 99999 999 999 X99
W8  99999 99999 999999 H  X9999

R9  X999 X999 X999 X999 X99  X999 9999
S9  99999 X999 X999 X999 X999 X999 X999
T9  99999 X999 X999 X999 X999 X999 X999
U9  99999 X999 X999 X999 X999 X99  X999
V9  99999 99999 99999 99999 999 999 X99
W9  99999 99999 999999 H  X9999

R0  X999 X999 X999 X999 X99  X999 9999
S0  99999 X999 X999 X999 X999 X999 X999
T0  99999 X999 X999 X999 X999 X999 X999
U0  99999 X999 X999 X999 X999 X99  X999
V0  99999 99999 99999 99999 999 999 X99
W0  99999 99999 999999 H  X9999

1R  X999 X999 X999 X999 X99  X999 9999
1S  99999 X999 X999 X999 X999 X999 X999
1T  99999 X999 X999 X999 X999 X999 X999
1U  99999 X999 X999 X999 X999 X99  X999
1V  99999 99999 99999 99999 999 999 X99
1W  99999 99999 999999 H  X9999
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Engine Mechanical Advisory Report <07> PW 1100G *(Neo)*

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                    3 Lines

                free programmable

                per report

    A3XX ENGINE MECHANICAL ADV REP <07>

    A/C ID DATE   UTC      FROM TO   FLT
CC  XXXXXX AAA99 999999   AAAA AAAA XXXX

    EXSWPN
CO  AAX99XXXXX9999

    PH CNT    CODE BLEED STATUS          APU
C1  99 99999 9999 99 1111 1 1111 99 1

    TAT  ALT   CAS MN  GW   CG  OMU/SW
CE  X999 X9999 999 999 9999 999 XXXXXX

    FADEC ENG 'E'
C2  XXXXXXXXXXXXXXX
C3  XXXXXXXXXXXXXXX
C4  XXXXXXXXXXXXXXX
C5  XXXXXXXXXXXXXXX

    REASON XXXXXXXXXXXXXXXXXXXX

    E MAX   TOL TTP TAT  EOPT
F1  9 99999 999 999 X999 99999

    EBN     ECYC  EHRS  ALT   CAS MN
G1  999999  99999 99999 X9999 999 999

    TFUEL EGTB FDP MNE LPBT SVA  GLE
H1  X999  X999 999 999 X999 X999 999

    NA1UP NA1DP NA1T T2   T25  T3   TLA
I1  9999  9999  X999 X999 X999 X999 X999

    P25   P2E   P5    PS14  PTMC SHPTP
J1  99999 99999 99999 99999 X999 X999

    LPCBP LPCBV HPCTC LPCTC ACCT T14
K1  X999  X999  X999  X999  X999 X9999

    SLPTP BTMC PB     FOC  VOTM B25
L1  X999  X999 999999 X999 X999 X999

    TCC  NF    VBVA  AOC  BAF  TN   FMVT
M1  X999 99999 X9999 X999 X999 X999 X999

    FOCB TCCOC FOCVP  N1    N1C2
N1  999  9999  X999   99999 99999

    ODM5F ODM6F ODM7F
O1  99999 99999 99999

      PRE EVENT, 'Y1' SEC INTERVALS

    YACC XACC YACC YAW  PTCH ROLL MEDET
P1  X999 X999 X999 X999 X999 X999 99999

    N1A   FVI   FVP   FVME  FVMD FVT  EGT
Q1  99999 9999 9999 9999 9999 9999 X9999

    N2A   FVD   OIT   N1COM FMVC  PHM DPH
R1  99999 9999 X999 99999 99999 999 999

    FEDET FF    VB1 VB2 FFR   OIP   OIQ
S1  99999 99999 999 999 99999 99999 999

    JOIP FVN1 FVN2 FFAN RFAN RVN1 RVN2
T1  9999 999  999  9999 9999 9999 9999

    BBF  BBV  BBR  ODP  FTDM FTBA LPT
U1  9999 9999 9999 9999 9999 9999 9999

    LPTM
V1  X999
```

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    P2   X999 X999 X999 X999 X999 X999 99999
Q2  00000 0000 0000 0000 0000 0000 X0000
R2  99999 9999 X999 99999 99999 999 999
S2  99999 99999 999 999 99999 99999 999
T2  9999 999  999  9999 9999 9999 9999
U2  9999 9999 9999 9999 9999 9999 9999
V2  X999

P3  X999 X999 X999 X999 X999 X999 99999
Q3  99999 9999 9999 9999 9999 9999 X9999
R3  99999 9999 X999 99999 99999 999 999
S3  99999 99999 999 999 99999 99999 999
T3  9999 999  999  9999 9999 9999 9999
U3  9999 9999 9999 9999 9999 9999 9999
V3  X999

P4  X999 X999 X999 X999 X999 X999 99999
Q4  99999 9999 9999 9999 9999 9999 X9999
R4  99999 9999 X999 99999 99999 999 999
S4  99999 99999 999 999 99999 99999 999
T4  9999 999  999  9999 9999 9999 9999
U4  9999 9999 9999 9999 9999 9999 9999
V4  X999

P5  X999 X999 X999 X999 X999 X999 99999
Q5  99999 9999 9999 9999 9999 9999 X9999
R5  99999 9999 X999 99999 99999 999 999
S5  99999 99999 999 999 99999 99999 999
T5  9999 999  999  9999 9999 9999 9999
U5  9999 9999 9999 9999 9999 9999 9999
V5  X999

      AT AND POST EVENT, 'Y2' SEC INTERVALS

P6  X999 X999 X999 X999 X999 X999 99999
Q6  99999 9999 9999 9999 9999 9999 X9999
R6  99999 9999 X999 99999 99999 999 999
S6  99999 99999 999 999 99999 99999 999
T6  9999 999  999  9999 9999 9999 9999
U6  9999 9999 9999 9999 9999 9999 9999
V6  X999

P7  X999 X999 X999 X999 X999 X999 99999
Q7  99999 9999 9999 9999 9999 9999 X9999
R7  99999 9999 X999 99999 99999 999 999
S7  99999 99999 999 999 99999 99999 999
T7  9999 999  999  9999 9999 9999 9999
U7  9999 9999 9999 9999 9999 9999 9999
V7  X999

P8  X999 X999 X999 X999 X999 X999 99999
Q8  00000 0000 0000 0000 0000 0000 X0000
R8  99999 9999 X999 99999 99999 999 999
S8  99999 99999 999 999 99999 99999 999
T8  9999 999  999  9999 9999 9999 9999
U8  9999 9999 9999 9999 9999 9999 9999
V8  X999

P9  X999 X999 X999 X999 X999 X999 99999
Q9  99999 9999 9999 9999 9999 9999 X9999
R9  99999 9999 X999 99999 99999 999 999
S9  99999 99999 999 999 99999 99999 999
T9  9999 999  999  9999 9999 9999 9999
U9  9999 9999 9999 9999 9999 9999 9999
V9  X999

P0  X999 X999 X999 X999 X999 X999 99999
Q0  99999 9999 9999 9999 9999 9999 X9999
R0  99999 9999 X999 99999 99999 999 999
S0  99999 99999 999 999 99999 99999 999
T0  9999 999  999  9999 9999 9999 9999
U0  9999 9999 9999 9999 9999 9999 9999
V0  X999

1P  X999 X999 X999 X999 X999 X999 99999
1Q  99999 9999 9999 9999 9999 9999 X9999
1R  99999 9999 X999 99999 99999 999 999
1S  99999 99999 999 999 99999 99999 999
1T  9999 999  999  9999 9999 9999 9999
1U  9999 9999 9999 9999 9999 9999 9999
1V  X999
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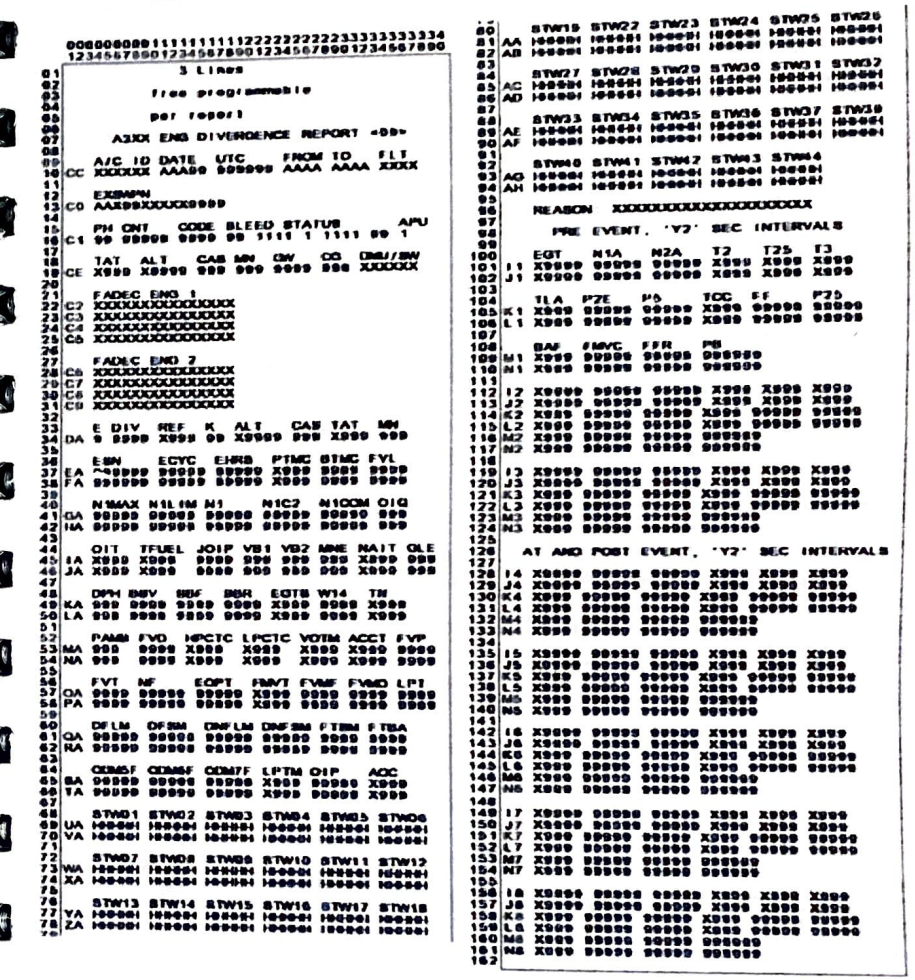
Prepared by R.K.CHOPRA

Engine Divergence Report <09> PW 1100G *(Neo)*

NOTE: Only the parts of the MECHANICAL ADVISORY REPORT <07> which are not included are given in the Reports 1, 2, 3 & 4.	
FMVT	FMV Torque Motor Current Feedback(-55.0 to 55.0 mA)
MAX	Max Value of the exceeded engine related parameter
TCC	Turbine Case Cooling valve feedback(-5.0% to 105%)
TOL	Time Over Limit(minimum 60 secs monitoring time)
TTP	Time to Peak(0 to 120 secs)
VB1	Engine NF vibration displayed(0.0 to 10.0 CU)
VB2	Engine NCore vibration displayed(0.0 to 10.0 CU)
VOTM	VORV TM Current(0.0 to 128.0%)
N1VIB	N1 Vibration Warning
N2VIB	N2 Vibration Warning
OTRED	Oil Temperature Red Limit Exceeded
OPLOW	Oil Pressure below Low Limit
ODL	Oil Debris above Limit
OILLO	Oil Level below Limit
OPRED	Oil Pressure above Red Limit
E	Exceeding Engine Position

Code	REASON OF EXCEEDENCE Report <07>
4000	OIT ABOVE REDLINE
4100	OIP BELOW REDLINE
4200	OIP ABOVE REDLINE
4300	OIL BELOW LIMIT
4400	OIL Debris LIMIT
4510	N1 VIBRATION
4520	N2 VIBRATION



This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

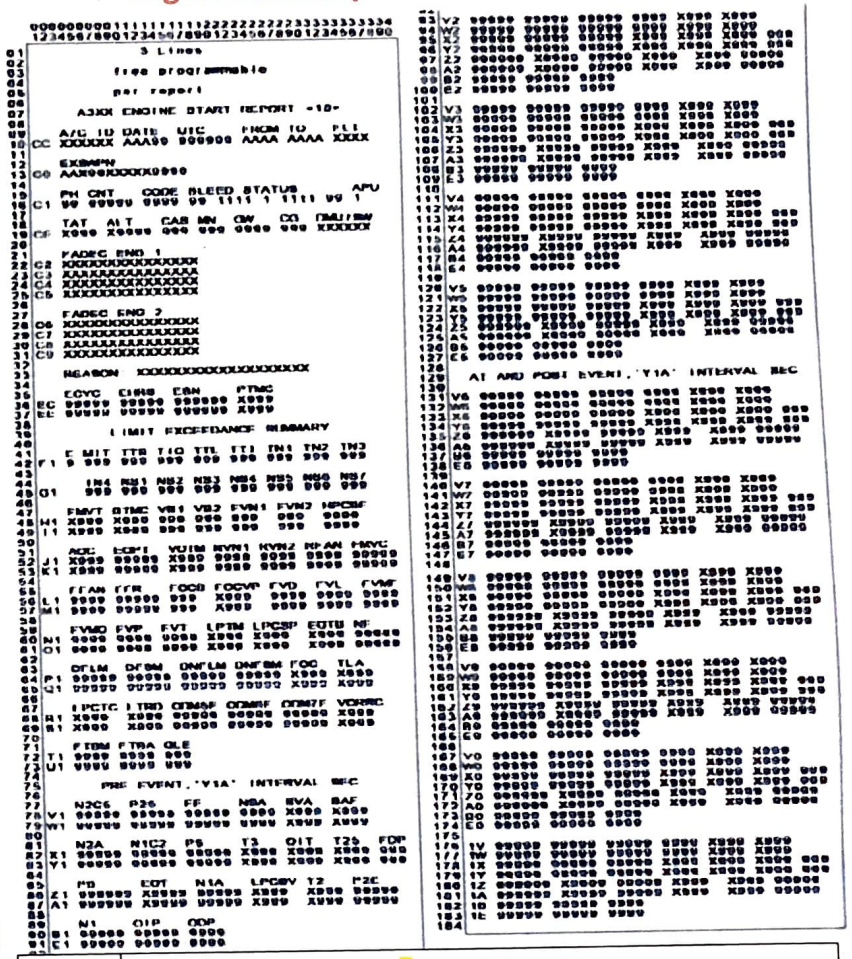
NOTE: Only the parts of the ENGINE DIVERGENCE REPORT <09> which are not included are given in the Reports 1, 2, 3 & 4.	
DFLM	Debris rate Ferrous- Long-term Max(0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max(0 to 65535)
DIV	Parameter Divergence Short-term Max
DNFLM	Debris rate None Ferrous- Long-term Max(0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max(0 to 65535)
E	Exceeding Engine Position
FMVT	FMV Torque motor current feedback(-30.0 to 15.0 deg)
K	Actual Value of K(0 to 99)
N1LIM	Low PressSpeed,N1 Trust setting Limit for FMGC(0.00 to 105.0 %rpm)
REF	DeltaEGTref or DeltaTNref value of PH5.1 or PH6(-999 to 999 deg C)
VB1	Engine NF Vibration displayed(0.0 to 10.0 CU)
VB2	Engine Core Vibration displayed(0.0 to 10.0 CU)
VOTM	VORV TM Current(0.0 to 128.0%)
DIV	Parameter Divergence
TCC	Turbine Case Cooling Valve Feedback(-5.0 to 105.0 %)

Engine Start Report <10> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE START REPORT <10> which are not included are given in the Reports 1, 2, 3 & 4	
Code	REASON OF EXCEEDENCE(Report <09>)
E=Exceeding Engine Position	
4000	ABNORMAL START
5100	ABORTED START
5200	HOT START
5300	HUNG LIGHT
5400	NO LIGHT

DFLM	Debris rate Ferrous- Long-term Max(0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max(0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max(0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max(0 to 65535)
FMVT	FMV Torque motor current feedback(-55.0 to 55.0 mA)
LTRD	Left Thrust Reverser Door local RVDT(0 to 100%)
MIT	Time to Max ITT (0 to 120 secs)
NS1	Time to Threshold Speed 1 (0 to 120 secs)

Engine Start Report <10> PW 1100G *(Neo)*



NS2	Time to Threshold Speed 2 (0 to 120 secs)
NS3	Time to Threshold Speed 3 (0 to 120 secs)
NS4	Time to Threshold Speed 4 (0 to 120 secs)
NS5	Time to Threshold Speed 5 (0 to 120 secs)
NS6	Time to Threshold Speed 6 (0 to 120 secs)
NS7	Time to Threshold Speed 7 (0 to 120 secs)
NSA	Starter Turbine Airspeed(0.0 to 130.0%)

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

TIG	Time to Ignition Commanded(0 to 120 secs)
TN1	Time to Starter Speed 1(0 to 60 secs)
TN2	Time to Starter Speed 2(0 to 60 secs)
TN3	Time to Starter Speed 3(0 to 60 secs)
TN4	Time to Starter Speed 4(0 to 60 secs)
TTI	Time to Idle (0 to 120 secs)
TTL	Time to Light-off Detected(0 to 120 secs)
TTP	Time to Idle (0 to 120 secs)
TTS	Time to Starter Air Valve Closed (0 to 120 secs)
VB1	Engine NF Vibration displayed(0.0 to 10.0 CU)
VB2	Engine Core Vibration displayed(0.0 to 10.0 CU)
VOTM	VORV TM Current(0.0 to 128.0%)
ABDS	Aborted Start detected
ENGFL	Engine Fail detected
ENGRG	Engine Running detected
ERUS	Engine Master lever Selected On
HOTS	Hot start detected
HUNG	Hung start detected
IGC1	Ignition 1 Commanded
IGC2	Ignition 2 Commanded
LUD	Light up detected
SAVRQ	Starter Air valve Solenoid Command On
SAVO	Starter Air valve Solenoid Command Open
SIP	Starter in Progress

Engine Run Up Report <11> PW 1100G *(Neo)*

```
   0000000001111111111222222222233333333334
   1234567890123456789012345678901234567890

            3 Lines

          free programmable

          per report

       A3XX ENGINE RUN UP REPORT <11>

     A/C ID DATE  UTC    FROM TO   FLT
CC  XXXXXX AAA99 999999 AAAA AAAA XXXX

     EXSWPN
C0  AAX99XXXXX9999

     PH CNT   CODE BLEED STATUS       APU
C1  99 99999 9999 99 1111 1 1111 99 1

     TAT  ALT   CAS MN  GW   CG  DMU/SW
CE  X999 X9999 999 999 9999 999 XXXXXX

     FADEC ENG 1
C2  XXXXXXXXXXXXXXXX
C3  XXXXXXXXXXXXXXXX
C4  XXXXXXXXXXXXXXXX
C5  XXXXXXXXXXXXXXXX

     FADEC ENG 2
C6  XXXXXXXXXXXXXXXX
C7  XXXXXXXXXXXXXXXX
C8  XXXXXXXXXXXXXXXX
C9  XXXXXXXXXXXXXXXX

     ESN    ECYC  EHRS  OIQ P2E   TCC
F1  999999 99999 99999 999 99999 X999
F2  999999 99999 99999 999 99999 X999

     ACCT B25  BTMC DFLM  DFSM  DNFLM GLE
G1  X999 X999 X999 99999 99999 99999 999
G2  X999 X999 X999 99999 99999 99999 999

     DNFSM EGTB FFAN FMVT FVN1 FVN2 RFAN
H1  99999 X999 9999 X999 999  999  9999
H2  99999 X999 9999 X999 999  999  9999

     HPCBF HPCTC LPCSV LPCTC NAIT PTMC
I1  9999  X999  X999  X999  X999 X999
I2  9999  X999  X999  X999  X999 X999

     OIP   OIT  P25   PB     RVN1 RVN2
J1  99999 X999 99999 999999 9999 9999
J2  99999 X999 99999 999999 9999 9999

     T25  T3   TN   SHPTP SLPTP SVA  ODP
K1  X999 X999 X999 X999  X999  X999 9999
K2  X999 X999 X999 X999  X999  X999 9999

     T14   VOTM ALT   BAF  BBF  BBR  TAT
L1  X9999 X999 X9999 X999 9999 9999 X999
L2  X9999 X999 X9999 X999 9999 9999 X999

     DPH EGT   FF    FFR   W14  FVD  FVL
M1  999 X9999 99999 99999 9999 9999 9999
M2  999 X9999 99999 99999 9999 9999 9999

     FVMF FVMD FVP  FVT  JOIP LPBT LPCSP
N1  9999 9999 9999 9999 9999 X999 X999
N2  9999 9999 9999 9999 9999 X999 X999

     OAT  LTRD TLA  NAIDP NAIUP NF    VB2
O1  X999 X999 X999 9999  9999  99999 999
O2  X999 X999 X999 9999  9999  99999 999

     N1    N1A   N1C2  N1COM N2A   N2C5
P1  99999 99999 99999 99999 99999 99999
P2  99999 99999 99999 99999 99999 99999

     P5    PAMB PHM PS14  EOPT  REVL REVR
Q1  99999 999  999 99999 99999 X99  X99
Q2  99999 999  999 99999 99999 X99  X99

     T2   TCOOC TEC TFUEL TR  VB1 AOC
R1  X999 9999  X99 X999  X99 999 X999
R2  X999 9999  X99 X999  X99 999 X999

     VSVA  FMVC  ODM5F ODM6F ODM7F BBV
S1  X9999 99999 99999 99999 99999 9999
S2  X9999 99999 99999 99999 99999 9999

     STW01  STW02  STW03  STW04  STW05  STW06
T1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
T2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW07  STW08  STW09  STW10  STW11  STW12
U1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
U2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW13  STW14  STW15  STW16  STW17  STW18
V1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
V2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW19  STW22  STW23  STW24  STW25  STW26
W1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
W2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW27  STW28  STW29  STW30  STW31  STW32
X1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
X2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW33  STW34  STW35  STW36  STW37  STW39
Y1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Y2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     STW40  STW41  STW42  STW43  STW44
Z1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Z2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

     EGTK N1K   N2K   FFK
A1  X999 99999 99999 999999
A2  X999 99999 99999 999999
```

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

NOTE: Only the parts of the ENGINE RUN-UP REPORT <11> which are **not included** are given in the **Reports 1, 2, 3 & 4.**	
DFLM	Debris rate Ferrous- Long-term Max (0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max (0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max (0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max (0 to 65535)
EGTK	Corrected Exhaust Gas Temperature from the engine
FFK	Corrected Engine Fuel Flow (0 to 8000 kg/h)
FMVT	FMV Torque motor current feedback (-55.0 to 55.0 mA)
LTRD	Left TR Door local RVDT Position (0 to 100.0%)
N2K	Corrected N2A, ENG HP module speed (0.00 to 120.00 %rpm)
REVL	Left T/R cowl percent deployed pos (-22 to 105%)
TCC	Engine Turbine Case Cooling valve Feedback
TR	Selected TR percent deployed (-22 to 105%)
VB1	Engine **NF Vibration** displayed (0.0 to 10.0 CU)
VB2	Engine NF Vibration displayed (0.0 to 10.0 CU)
VOTM	VORV TM Current (0.0 to 128.0%)
REVR	Right T/R cowl percent deployed pos (-22 to 105%)

Engine FADEC Maintenance Report <20> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE FADEC MAINTENANCE REPORT <20> which are **not included** are given in the **Reports 1, 2, 3 & 4.**	
E	Exceeding Engine Position
TCC	Engine Turbine Case Cooling valve Feedback
TR	Selected TR percent deployed (-22 to 105%)
VOTM	VORV TM Current (0.0 to 128.0%)
FVO	Fuel valve open (open equal to '0')
NSA	Starter Turbine Airspeed (0.0 to 130.0 %)

Engine FADEC Maintenance Report <20> PW 1100G *(Neo)*

```
   0000000001111111111222222222233333333334
   1234567890123456789012345678901234567890
              3 Lines

           free programmable

           per report

    A3XX FADEC MAINTENANCE REPORT <20>

    A/C ID DATE  UTC     FROM TO   FLT
CC  XXXXXX AAA99 999999 AAAA AAAA XXXX

    EXSMPN
C0  AAX99XXXXX9999

    PH CNT   CODE BLEED STATUS        APU
C1  99 99999 9999 99 1111 1 1111 99 1

    TAT  ALT   CAS MN  GW   CG  DMU/SW
CE  X999 X9999 999 999 9999 999 XXXXXX

    FADEC ENG 1
C2  XXXXXXXXXXXXXXX
C3  XXXXXXXXXXXXXXX
C4  XXXXXXXXXXXXXXX
C5  XXXXXXXXXXXXXXX

    FADEC ENG 2
C6  XXXXXXXXXXXXXXX
C7  XXXXXXXXXXXXXXX
C8  XXXXXXXXXXXXXXX
C9  XXXXXXXXXXXXXXX

    REASON: XXXXXXXXXXXXXXXXXX

    E ESN    EHRS  ECYC
EC  9 999999 99999 99999
EE    999999 99999 99999

    HPCTC LPBT LPCSP LPCSV LPCTC MNE
F1  X999  X999 X999  X999  X999  999
G1  X999  X999 X999  X999  X999  999

    N1    N1A   N1C2  N2A   N2CS  NF
H1  99999 99999 99999 99999 99999 99999
I1  99999 99999 99999 99999 99999 99999

    NAIUP NAIDP NSA  OAT  OIP   OIT
J1  9999  9999  9999 X999 99999 X999
K1  9999  9999  9999 X999 99999 X999

    P25   P2E   PS    PAMB PB     PS14
L1  99999 99999 99999 999  999999 99999
M1  99999 99999 99999 999  999999 99999

    PTMC SHPTP SLPTP SVA  TCCDC TEC ODP
N1  X999 X999  X999  X999 9999  X99 9999
O1  X999 X999  X999  X999 9999  X99 9999

    T14   T2   T25  T3   TCC  EOPT  OLE
P1  X9999 X999 X999 X999 X999 99999 999
Q1  X9999 X999 X999 X999 X999 99999 999

    TFUEL TLA  TR  VOTM VSVA  CDMSF AOC
R1  X999  X999 X99 X999 X9999 99999 X999
S1  X999  X999 X99 X999 X9999 99999 X999

    CDM6F CDM7F
T1  99999 99999
U1  99999 99999

      PRE EVENT, 'Y1' SEC INTERVALS

    STW01  STW02  STW03  STW04  STW05  STW06
V1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
W1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW07  STW08  STW09  STW10  STW11  STW12
X1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Y1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW13  STW14  STW15  STW16  STW17  STW18
Z1  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
1F  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW19  STW22  STW23  STW24  STW25  STW26
1G  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
1H  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW27  STW28  STW29  STW30  STW31  STW32
1I  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
1J  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW33  STW34  STW35  STW36  STW37  STW39
1K  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
1L  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

    STW40  STW41  STW42  STW43  STW44
1M  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
1N  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

   AT AND POST EVENT, 'Y2' SEC INTERVALS

V2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
W2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
X2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Y2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Z2  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2F  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2G  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2H  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2I  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2J  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2K  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2L  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2M  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
2N  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH

V3  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
W3  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
X3  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Y3  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
Z3  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3F  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3G  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3H  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3I  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3J  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3K  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3L  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3M  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
3N  HHHHHH HHHHHH HHHHHH HHHHHH HHHHHH
```

Engine Thrust Reverser Report <22> PW 1100G *(Neo)*

```
   0000000001111111111222222222233333333334
   1234567890123456789012345678901234567890
01          3 Lines
02
03       free programmable
04
05       per report
06
07     A3XX THRUST REVERSER REPORT <22>
08
09     A/C ID DATE  UTC    FROM TO   FLT
10 CC XXXXXX AAA99 999999 AAAA AAAA 9999
11
12    EXSWPN
13 C0 AAX99XXXXX9999
14
15    PH CNT   CODE BLEED STATUS        APU
16 C1 99 99999 9999 99 1111 1 1111 99 1
17
18    TAT  ALT   CAS MN  GW   CG  DMU/SW
19 CE X999 X9999 999 999 9999 999 XXXXXX
20
21    FADEC ENG 1
22 C2 XXXXXXXXXXXXXXXXX
23 C3 XXXXXXXXXXXXXXXXX
24 C4 XXXXXXXXXXXXXXXXX
25 C5 XXXXXXXXXXXXXXXXX
26
27    FADEC ENG 2
28 C6 XXXXXXXXXXXXXXXXX
29 C7 XXXXXXXXXXXXXXXXX
30 C8 XXXXXXXXXXXXXXXXX
31 C9 XXXXXXXXXXXXXXXXX
32
33    PARAMETER SET 1: DEPLOYMENT COM
34
35    PH UTC     MN  ALT   CAS GW   XACC
36 F1 99 999999 999 X9999 999 9999 X999
37
38    ESN    ECYC  EHRS  FLAP N1    MNE
39 G1 999999 99999 99999 X999 99999 999
40 H1 999999 99999 99999 X999 99999 999
41
42    PAMB REVL REVR TLA  TR  LTRD EOPT
43 I1 999  999  999  X999 X99 X999 99999
44 J1 999  999  999  X999 X99 X999 99999
45
46    NF    N1C2  DNFLM DNFSM DFLM  DFSM
47 K1 99999 99999 99999 99999 99999 99999
48 L1 99999 99999 99999 99999 99999 99999
49
50    RTRD RTRC ODM5F ODM6F ODM7F GLE AOC
51 M1 X999 X99  99999 99999 99999 999 X999
52 N1 X999 X99  99999 99999 99999 999 X999
53
54    PARAMETER SET 2: DEPLOYMENT
55
56    PH UTC    CAS GW
57 O1 99 999999 999 9999
58
59    TTD ECYC  EHRS  N1    NF    N1C2
60 P1 999 99999 99999 99999 99999 99999
61 Q1 999 99999 99999 99999 99999 99999
62
63    REVL REVR TLA  TR  LTRD RTRD RTRC
64 R1 999  999  X999 X99 X999 X999 X99
65 S1 999  999  X999 X99 X999 X999 X99
66
67    DNFLM DNFSM DFLM  DFSM  GLE AOC
68 T1 99999 99999 99999 99999 999 X999
69 U1 99999 99999 99999 99999 999 X999
70
71    PARAMETER SET 3: STOWAGE
72
73    PH UTC    CAS GW
74 V1 99 999999 999 9999
75
76    ECYC  EHRS  TIR TTW AOC  N1C2  N1
77 W1 99999 99999 999 999 X999 99999 99999
78 X1 99999 99999 999 999 X999 99999 99999
79
80    RTRD REVL REVR TLA  TR  RTRC NF
81 Y1 X999 999  999  X999 X99 X99  99999
82 Z1 X999 999  999  X999 X99 X99  99999
83
84    DNFLM DNFSM DFLM  DFSM  GLE
85 1F 99999 99999 99999 99999 999
86 1G 99999 99999 99999 99999 999
87
```

NOTE: Only the parts of the ENGINE THRUST REVERSER REPORT <22> which are not included are given in the Reports 1, 2, 3 & 4.	
DFLM	Debris rate Ferrous- Long-term Max (0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max (0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max (0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max (0 to 65535)
LTRD	Left TR Door local RVDT Position (0 to 100.0%)
REVL	Left T/R cowl percent deployed pos (-22 to 105%)
REVR	Right T/R cowl percent deployed pos (-22 to 105%)
RTRC	Right TR Door local RVDT Pos (0 to 100%)
RTRD	Right TR Door opp. channel RVDT Pos (-22 to 100.0%)
TIR	Time in Reverse (0 to 120 secs)
TR	Selected TR percent deployed (-22 to 105%)
TTD	Time of Deploy (0 to 120 secs)
TTS	Time to Starter Air Valve Closed (0 to 120 secs)
TTW	Time to Stow (0 to 120 secs)

UTC	Universal Time Coordinated (hours/minutes/second)
SIP	Start in Progress
TLAR	TLA in Reverse
TRS	T/R stowed
TRF	Thrust Reverser Fully Deployed
TRFA	T/R Failed

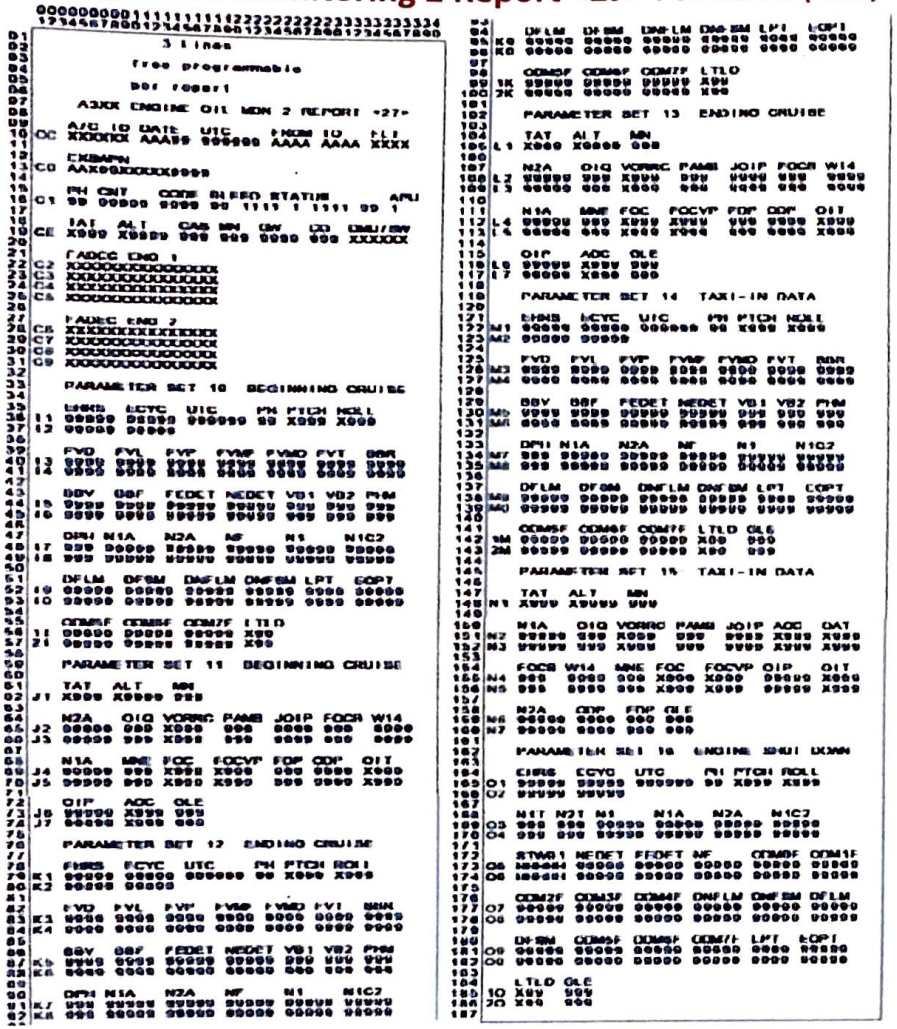
Engine Oil Monitoring 1 Report <26> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE OIL MONITORING 1 REPORT <26> which are not included are given in the Reports 1, 2, 3 & 4.	
AOCOC	Air Oil Cooler actuator open command (0.0 to 100.0%)
CG	Center of Gravity (0.0 to 35.0 %MAC)
DFLM	Debris rate Ferrous- Long-term Max (0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max (0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max (0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max (0 to 65535)
VB1	Engine NF Vibration displayed (0.0 to 10.0 CU)
VB2	Engine NCore Vibration displayed (0.0 to 10.0 CU)
VOTM	VORV TM Current (0.0 to 128.0 %)
SIP	Start in Progress
TRL	T/R Lockout Switch Activated
FMVT	FMV Torque Motor Current Feedback (-55.0 to 55.0 mA)
LTLD	Left TR Door opposite LVDT position (-22 to 105%)

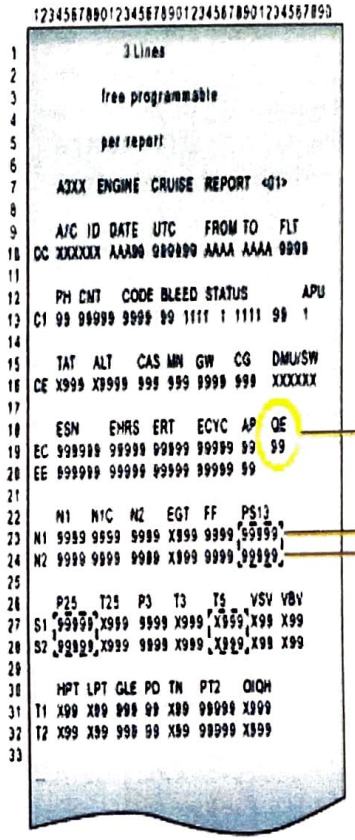
This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

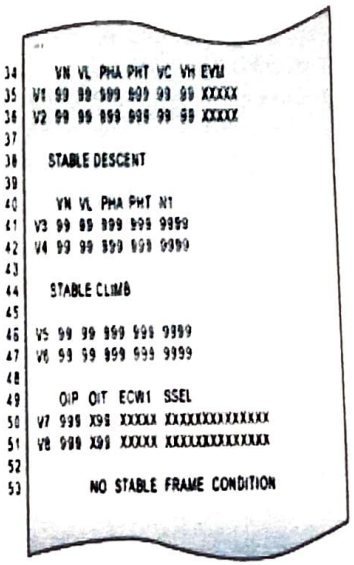
Prepared by R.K.CHOPRA

Engine Oil Monitoring 2 Report <27> PW 1100G *(Neo)*



CFM
ENGINE CFM-56B REPORTS





PARAMETER DISPLAYED IF ASSOCIATED SENSOR INSTALLED

ENGINE CRUISE REPORT <01>CFM

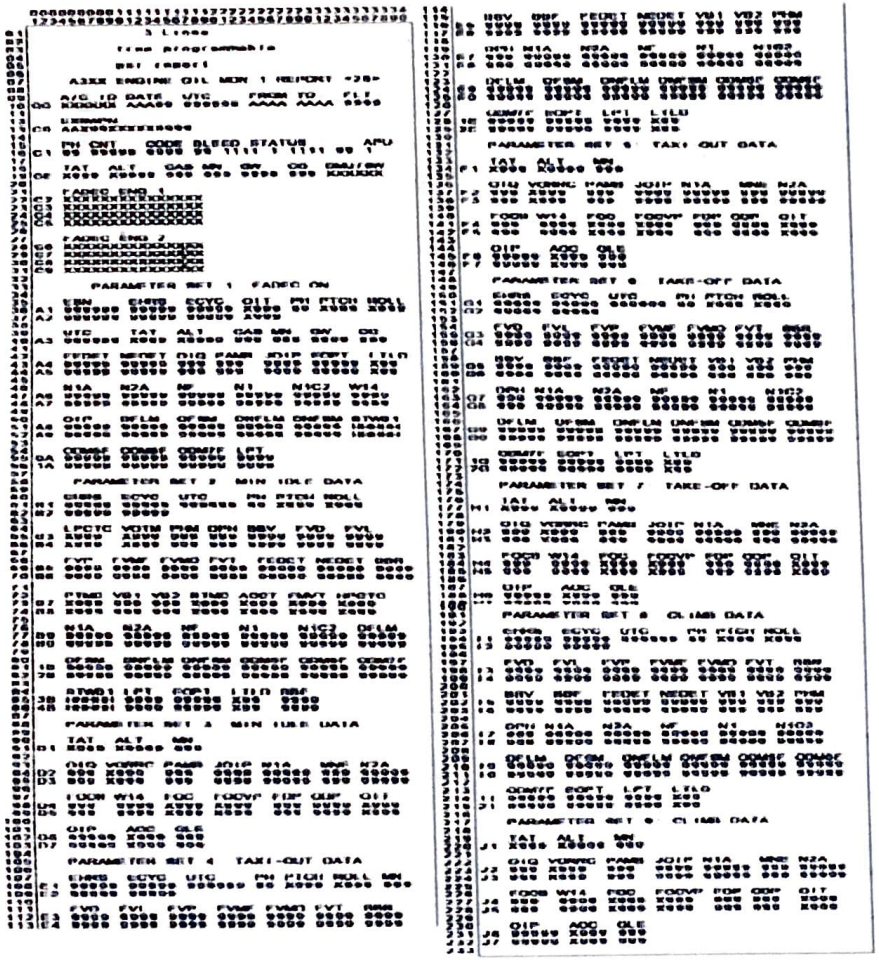
This report is a collection of data over a period of time in which the aircraft met the appropriate stability criteria. The required stability period is 100 seconds (programmable value). Basically, whatever the number of times the stability is detected, only one report is generated per flight leg. This report contains the data with the **best engine quality number (QE)** over the whole flight leg. If **no stability is detected**, then a report is generated with the following message in its last line:

- **"NO STABLE FRAME CONDITION".**

This Q.R. Guide is for Reference only.
Refer current Air-N@v AMM/TSM

Prepared by R.K.CHOPRA

Engine Oil Monitoring 1 Report <26> PW 1100G *(Neo)*



Engine Oil Monitoring 2 Report <27> PW 1100G *(Neo)*

NOTE: Only the parts of the ENGINE OIL MONITORING 2 REPORT <27> which are not included are given in the Reports 1, 2, 3 & 4	
DFLM	Debris rate Ferrous- Long-term Max (0 to 65535)
DFSM	Debris rate Ferrous- Short-term Max (0 to 65535)
DNFLM	Debris rate None Ferrous- Long-term Max (0 to 65535)
DNFSM	Debris rate None-Ferrous- Short-term Max (0 to 65535)
FMVT	FMV Torque Motor Current Feedback (-55.0 to 55.0 mA)
N1T	**N1** Spool down time (0 to 900 secs)
N2T	**N2** Spool down time (0 to 120 secs)
ODM0F	ODM Bin0 Ferrous Count (0 to 65535)
ODM1F	ODM Bin1 Ferrous Count (0 to 65535)
ODM2F	ODM Bin2 Ferrous Count (0 to 65535)
ODM3F	ODM Bin3 Ferrous Count (0 to 65535)
ODM4F	ODM Bin4 Ferrous Count (0 to 65535)
VB1	Engine **NF Vibration** displayed (0.0 to 10.0 CU)
VB2	Engine NCore Vibration displayed (0.0 to 10.0 CU)
LTLD	Left TR Door opposite LVDT Position (-22 to 105%)

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NOTE: In case of **ENGINE DIVERGENCE REPORT <09>** generated, an engine cruise report is also generated when the first stability is detected, regardless of quality. The report mainly contains operating data of both engines, including **vibration data**. The report data are averages over the required stability period, **except:-** ESN, EHRS, ERT, ECYC: Engine general data (serial number, flight hours, running time, cycle),

- **AP**: Autopilot status,
- **QE**: Engine quality number used as stability indicator for this report:- (00: best stability, 99: worst stability),
- **OIQH**: Oil consumption from the previous flight,
- **EVM, ECW1, SSEL**: Engine vibration status word, engine control word, and status of Full Authority Digital Engine Control (FADEC) sensors,
- **data lines V3, V4**: Averaged values taken from the **last stable descent** (i.e. descent of the last leg),
- **data lines V5, V6**: Averaged values taken from the **last stable climb** (i.e. climb of the current leg).

For engine health monitoring purposes, **3 additional sensors can be** connected to the FADEC to permit recording of the following parameters:

PS13 (fan tip discharge pressure), **P25** (High Pressure (HP) compressor inlet pressure), **T5** (Low Pressure (LP) turbine discharge temperature).

ESN = Engine Serial Number ;**EHRS** = Engine Flight Hours

ERT = Engine Running Time ;**ECYC** = Engine Cycle ;**AP** = Auto Pilot Status

QE = Engine Quality Number, Report Stability (00 to 99)

N1 = Selected N1 Actual (0 to 120.0 %rpm)

N1C = N1 Command (0 to 120.0 %rpm) ;**N2** = Selected N2 Actual(0 to 120.0 %rpm)

EGT = Selected T495 (Exhaust Gas Temperature) (-55 to 999.9 [C)

FF = Engine Fuel Flow(0 to 7000 kg/h)

PS13 = PS13 Static Air Pressure at Position 1.3 (0.0 to 30.000 psia)

P25 = P25 Total Air Pressure at Position 2.5 (0.0 to 50.000 psia)

T25 = Selected T25 (-55.0 to 120.0 C)

P3 = Selected PS3 (Burner Pressure) (0.0 to 550.0 psia)

T3 = Selected T3 (-55.0 to 850.0 [C) ;**T5** = Selected T5 (-55.0 to 850.0 [C)

VSV = Selected Variable Stator Vane Position (-5.0 to 45.0 deg)

VBV = Variable Bleed Valve Position

NOTE = (**VSV&VBV**) Negative values are shown with an '-' in the first position. If there are no negative values then the value starts at the first position.

HPT = Selected High-Pressure Turbine Clearance Position (-9.9 to40.0deg)

LPT = Selected LPTC Positon (-10 to 100 %)

GLE = Engine Generator Load (0 to 100%)

PD = Precooler Inlet Pressure (0 to 50 psi)

TN = Nacelle Temperature (-55 to 300 [C)

PT2 = PT2 Total Air Pressure at Position 2 (0.0 to 25.000 psia)

OIQH = **Oil Consumption from the previous flight** (0.0 to 25.000 psia)

VN = ***FAN** Pick Up N1 Track Vibration (0.0 to 10.0)

VL=***TRF** Pick Up N1 Vibration

PHA= FAN Pick Up Phase Angle(0 to 360 deg)

PHT = TRF Pick Up Phase Angle (0 to 360 deg)

NOTE = (**VN,VL,PHA,PHT**) The values from the **last stable descent** are printed in the **report lines V3 and V4**.

The values from the **last stable climb** are printed in the **report lines V5 and V6**.

VC = ***FAN** Pick Up N2 Track Vibration (0.0 to 10.0)

VH = ***TRF** Pick Up N2 Track Vibration (0.0 to 4.0)

* If value is 10.0 then 99 **is printed.**

EVM = Engine Vibration Status Word ;**OIP** = Engine Oil Pressure (0 to 400 psia)

OIT = Engine Oil Temperature (-60 to 250 C)

ECW1= Engine Control Word 1

SSEL = Engine Control Word 1(Status of different FADEC sensors)

CRUISE PERFORMANCE REPORT <02> CFM

This report is similar to ENGINE CRUISE REPORT <01> except that more information is provided about the aircraft. Data is added:-

- **QA**: Aircraft quality number used as stability indicator for this report **(00: best stability, 99: worst stability).**
- **WFQ**: Inner cell fuel quantity, ;- **ELEV**: Elevator position,
- **AOA, SLP**: Corrected Angle-Of-Attack and side slip angle,
- **CFPG, CIVV**: Last DMU calculated flight path acceleration and inertial vertical speed,
- **ROLL, YAW**: Roll angle and body axis yaw rate (average),
- **THDG, LONP, LATP**: True heading, longitude and latitude positions,
- **WS, WD**: Wind speed and direction (average),
- **FT, FD**: Fuel temperature and density (average),
- **Flight controls positions (average).** E.g. **RSP5**: Roll spoiler 5 position.

NOTE: Data lines X1, X4, X6 are issued from system 1 (e.g. FLAP-system 1) or left (e.g. left spoiler 5) while data lines **X2, X5,X7** are issued from **system 2 or right.**

In addition, the trigger logic for this report differs a little bit from the logic for ENGINE CRUISE REPORT <01> and is performed independently (e.g. the required stability period can be different).

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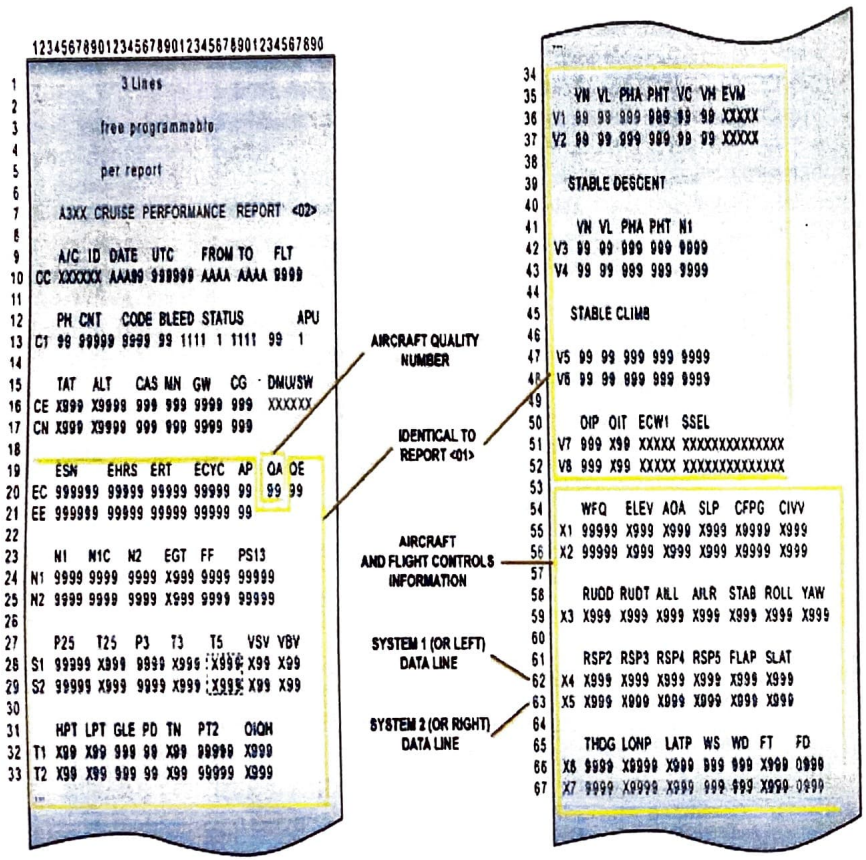


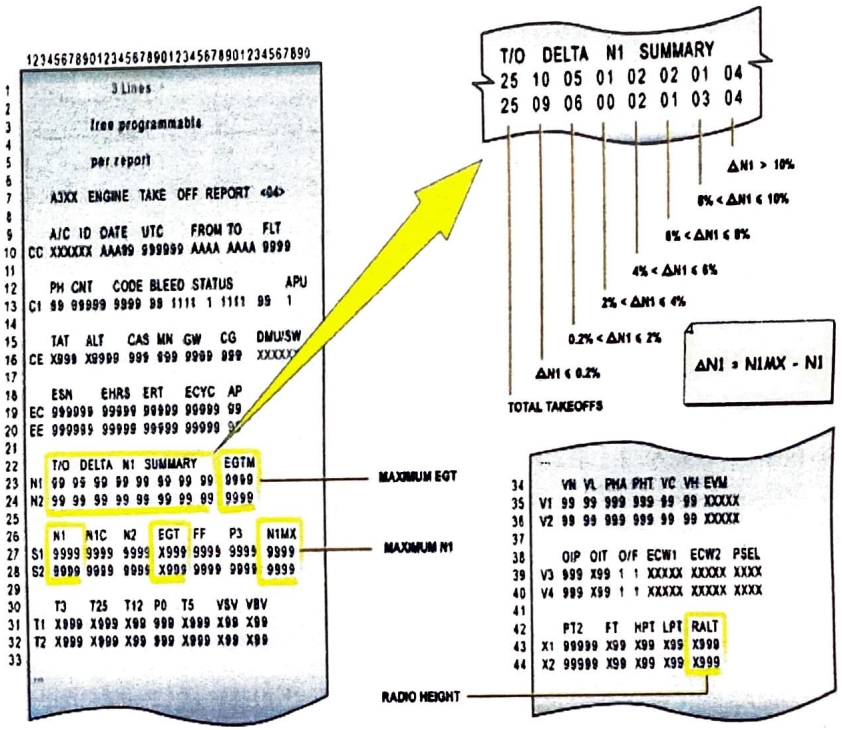
CRUISE PERFORMANCE REPORT <02>

ENGINE TAKE OFF REPORT <04> CFM

This report is generated while in the take off flight phase when the sum of the Exhaust Gas Temperature (EGT) for both engines is maximum. It is used to check the trend and the stress of the engines during take off. Basically, one report is generated per leg (programmable frequency). The report mainly contains data of both engines, including the maximum EGT (EGTM). The radio height (RALT), provided by radio altimeters 1 and 2, is also printed.

"T/O DELTA N1 SUMMARY" DATA:-History of the difference between the maximum value of N1 (N1MX) and the actual N1 during previous take offs is provided for both engines. T/O DELTA N1 SUMMARY data is calculated a few seconds after entry into the take off flight phase, independently from the report trigger.

RALT = Radio Altitude



ENGINE TAKE OFF REPORT <04> - GENERAL & "T/O DELTA N1 SUMMARY" DATA

EGTM = Maximum EGT during Take Off observing time period

N1MX = N1 Maximum ;T12 = T12 Fan Inlet Temperature

P0 = Selected P0 (Ambient Pressure)

O/F (OF) = Oil and Fuel Filter Clogged

Fuel filter clogged = 0 Fuel filter not clogged = 1

Oil filter clogged = 0 Oil filter not clogged = 1

ECW2 = Engine Control Word 2;PSEL = Status of different FADEC sensors

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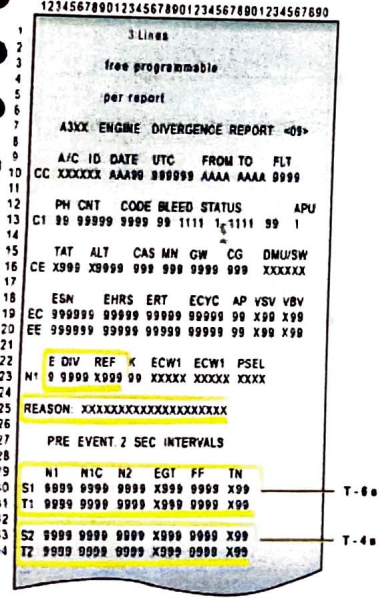
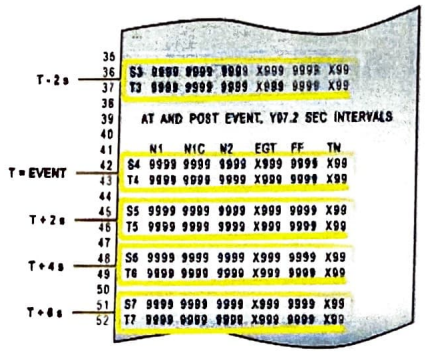
ENGINE DIVERGENCE REPORT <09> CEO





ENGINE DIVERGENCE REPORT <09>

Code	Reason for Exceedance REPORT <09>
4110, 4120, 4130 and 4140	Exhaust Gas Temperature (EGT)
4150, 4160, 4170 and 4180	nacelle temperature (TN)
NOTE: If report was not triggered by a limit exceedance, field contains blanks.	

Report is generated in the climb or cruise flight phases when, under stabilized conditions, any of the following engine divergence conditions is detected:-
- Exhaust Gas Temperature (EGT) divergence exceeding a prog threshold,
- nacelle temperature (TN) divergence exceeding a programmed threshold.

The reason for divergence is displayed (EGT, TN). This report is intended to detect quick degradation in engine performance. 3 sets of parameters for both engines are recorded at 2 seconds intervals before the event, 1 set at the event and 3 sets at 2 seconds intervals after the event. In addition, the following data is provided:
- E: Divergent engine (1 or 2),
- DIV: Absolute divergence value of EGT (or TN),
- REF: Reference delta value of EGT (or TN). Actual delta EGT or delta TN ref value in PH5.1 or PH6. Since two engines do not behave with the same performance characteristics, it is necessary to establish a reference delta for the divergence. DIV = DIFF - REF, DIFF being the actual delta value of EGT (or TN) between both engines. K=Actual Value of K in PH5.1 or PH6

ENGINE START REPORT – 10 CEO

This report is generated in case of aborted engine start or EGT exceedance. The possible aborted start reasons are:-

CODES	Reason for Exceedance
4410	Start Abort-> SAV Demand/Position Disagree
4420	Start Abort->HPSOV Demand/Position Disagree
4430	Start Abort -> EGT Overtemperature Detected
4440	Start Abort -> Stall Detected
4450	Start Abort -> No Engine Light off
4460	HUNG START
4470	Start Abort -> Illegal Start Sequence
4480	Slow Start Detected
5000	EXCEEDANCE of EGTL during engine start.
NOTE: Report was not triggered by a limit exceedance,field contains blanks.	

E	Engine Position
MAX	Maximal EGT During Engine Start Phase
LIM	Programmed EGT limit (-55 to 999.9 C)
TOL	Time Over Limit for EGT Exceedance
or - Time from SAV = open to N2 = N2 trigger DMU Time in seconds	
TTP	Time from SAV open to max EGT or to start abort
TTF	Time from SAV open to Fuel Shut-Off Valve = open
PD	Precooler Inlet Pressure at SAV = open(0 to 50 psi)
N2	Selected N2 Actual (0 to 120.0 %rpm)
FF	Engine Fuel Flow(0 to 7000 kg/h)
N1	Selected N1 Actual (0 to 120.0 %rpm)
EGT	Selected T495 (Exhaust Gas Temperature (-55 to 999.9 [C)
FMV	Selected Fuel Metering Valve Position (0 to 100%)
T25	Selected Temperature at Stn 2.5
P3	Selected PS3 (Burner Pressure)
T3	Selected at position T3;
T5	Temperature at position T5(-55.0 to 850.0 [C)
VSV	Selected Variable Stator Vane Position(-5.0 to 45.0 deg)
VBV	Variable Bleed Valve Position; (-9.9 to 40.0 deg)
OIT	Engine Oil Temperature(-60 to 250 deg C)

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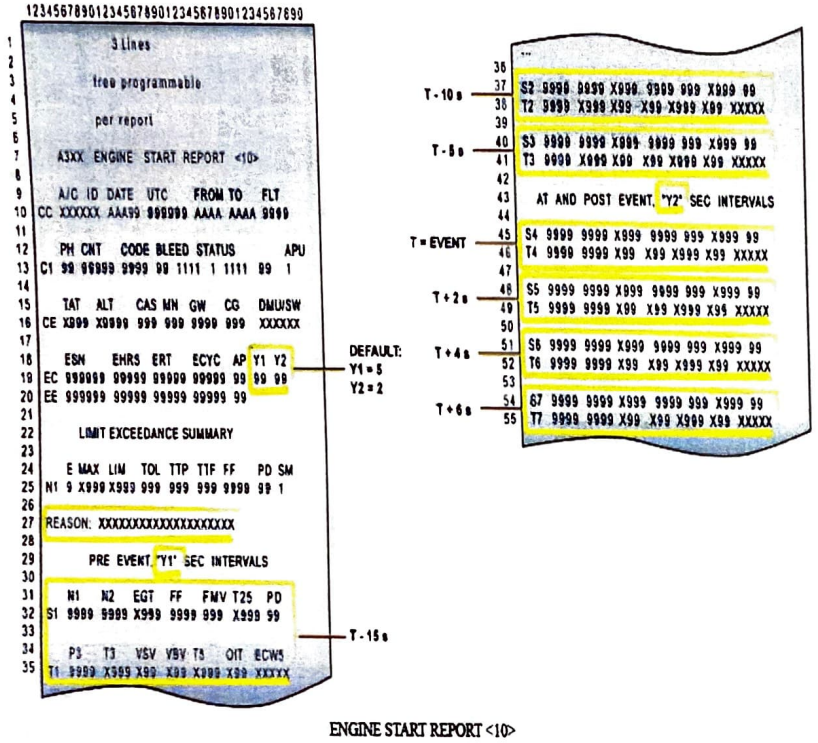
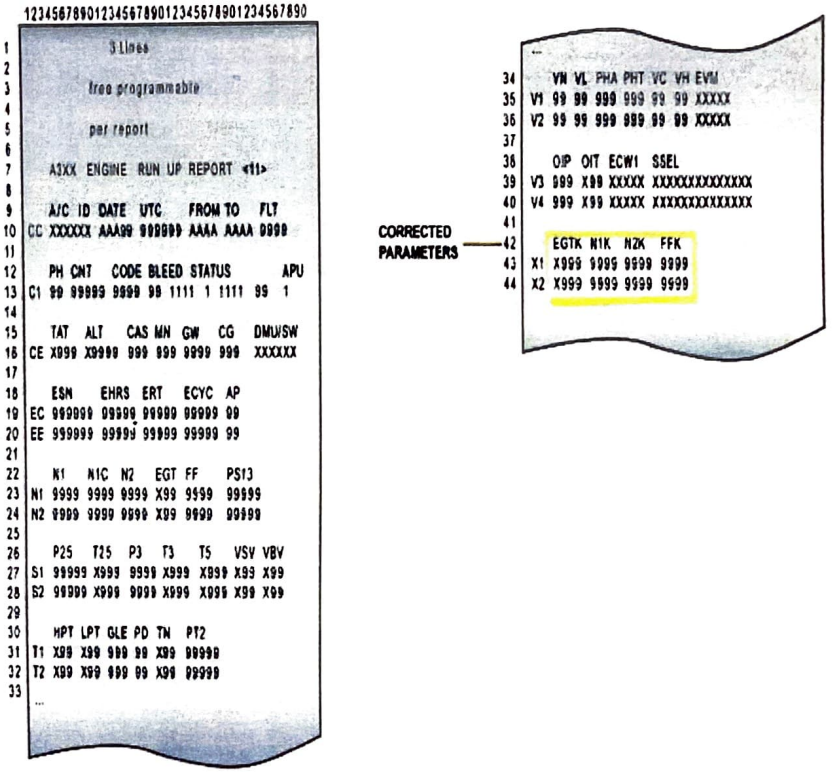


ENGINE START REPORT <10>

ENGINE RUN UP REPORT <11> CEO

This report is primarily generated on manual request. It contains the same data as the **ENGINE CRUISE REPORT <01>** plus corrected parameters for the ambient temperature. These corrected data are averages over a period of 20 seconds as well as most of the other report data (refer to the ENGINE CRUISE REPORT <01> topic)



ENGINE RUN UP REPORT <11>

EGTK	Corrected Exhaust Gas Temperature(-55 to 999.9 °C)
N1K	Corrected N1(0 to 120%rpm)
N2K	Corrected N2(0 to 120%rpm)
FFK	Corrected Engine Fuel Flow(0 to 70000 kg/h)
PS13	PS13 Static Air Pressure at Position 1.3
P25	P25 Total Air Pressure at Position 2.5
P3	Selected PS3 (Burner Pressure)
T3	Selected T3
T5	T5 Temperature at position T5
VSV	Selected Variable Stator Vane Position
VBV	Variable Bleed Valve Position
HPT	Selected High-Pressure Turbine Clearance Position

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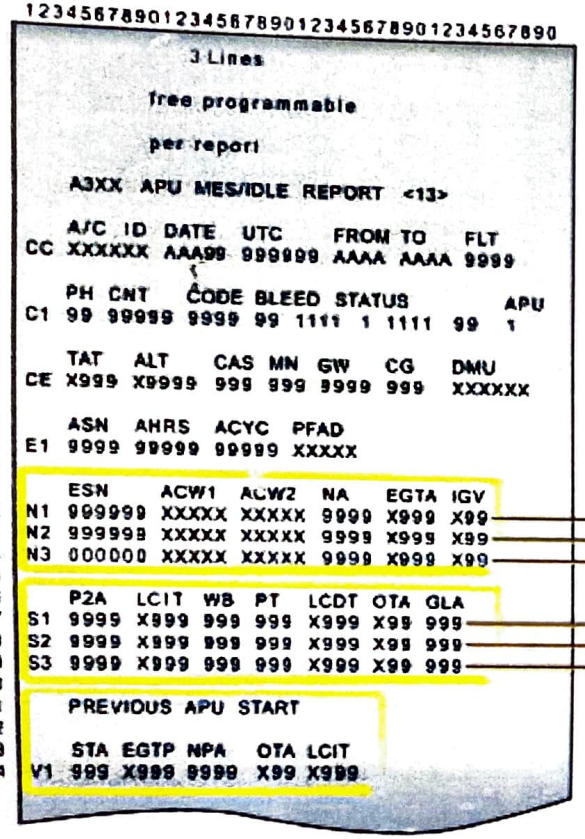
· Repo

EGTK
N1K
N2K
FFK
ESN
EHRS
ERT
ECYC

APU MAIN ENGINE START/IDLE REPORT <13>



```
1234567890123456789012345678901234567890
                3 Lines
              free programmable
              per report
      A3XX APU MES/IDLE REPORT <13>
      A/C ID DATE  UTC    FROM TO   FLT
CC    XXXXX AAA99 999999 AAAA AAAA 9999
      PH CNT   CODE BLEED STATUS        APU
C1    99 99999 9999 99 1111 1 1111 99  1
      TAT  ALT   CAS MN GW   CG   DMU
CE    X999 X9999 999 999 9999 999  XXXXX
      ASN   AHRS  ACYC  PFAD
E1    9999  99999 99999 XXXXX
      ESN    ACW1  ACW2  NA   EGTA IGV
N1    999999 XXXXX XXXXX 9999 X999 X99
N2    999999 XXXXX XXXXX 9999 X999 X99
N3    000000 XXXXX XXXXX 9999 X999 X99
      P2A  LCIT WB  PT  LCDT OTA GLA
S1    9999 X999 999 999 X999 X99 999
S2    9999 X999 999 999 X999 X99 999
S3    9999 X999 999 999 X999 X99 999
      PREVIOUS APU START
      STA EGTP NPA  OTA LCIT
V1    999 X999 9999 X99 X999
```

PARAMETERS:

- N1, N2, N3: FROM ENG 1 START / FROM ENG 2 START / AT APU IDLE
- S1, S2, S3: FROM ENG 1 START / FROM ENG 2 START / AT APU IDLE

The APU MES/IDLE Report is an average collection of APU related parameters during the starting of each main engine as well as during APU idle conditions.
APU MES/IDLE Report Data Lines The description of the report lines is:

- Report lines N1 and S1 contain parameters from the 1st engine start.
- Report lines N2 and S2 contain parameters from the 2nd engine start.
- Report lines N3 and S3 contain parameters from APU cooldown no Load/Idle

EGTK	Corrected Exhaust Gas Temperature
N1K	Corrected N1
N2K	Corrected N2
FFK	Corrected Engine Fuel Flow
ESN	Engine Serial Number
EHRS	Engine Flight Hours
ERT	Engine Running Time
ECYC	Engine Cycle

N1	Selected N1 Actual
N2	Selected N2 Actual
N1C	N1 Command
EGT	Selected T495 (Exhaust Gas Temperature)
FF	Engine Fuel Flow
PS13	PS13 Static Air Pressure at Position 1.3
P25	P25 Total Air Pressure at Position 2.5
P3	Selected PS3 (Burner Pressure)
T3	Selected T3
T5	Temperature at position T5
VSV	Selected Variable Stator Vane Position
VBV	Variable Bleed Valve Position
HPT	Selected High-Pressure Turbine Clearance Position
LPT	Selected LPTC Posiiton
GLE	Engine Generator Load
PD	Precooler Inlet Pressure
TN	Nacelle Temperature
PT2	PT2 Total Air Pressure at Position 2
VN	FAN Pick Up N1 Track Vibration
VL	TRF Pick Up N1 Vibration
PHA	FAN Pick Up Phase Angle
PHT	TRF Pick Up Phase Angle
VC	FAN Pick Up N2 Track Vibration
VH	TRF Pick Up N2 Track Vibration
EVM	Engine Vibration Status Word
OIP	Engine Oil Pressure
OIT	Engine Oil Temperature
ECW1	Engine Control Word 1
EGTK	Corrected Exhaust Gas Temperature
N1K	Corrected N1
N2K	Corrected N2
FFK	Corrected Engine Fuel Low

APU SHUTDOWN REPORT <14.

ASN	APU Serial Number
AHRS	APU Operating Hours
ACYC	APU Start Cycles
PFAD	APU Performance Adjustment
ESN	Engine Serial Number
ACW1	APU Control Word 1

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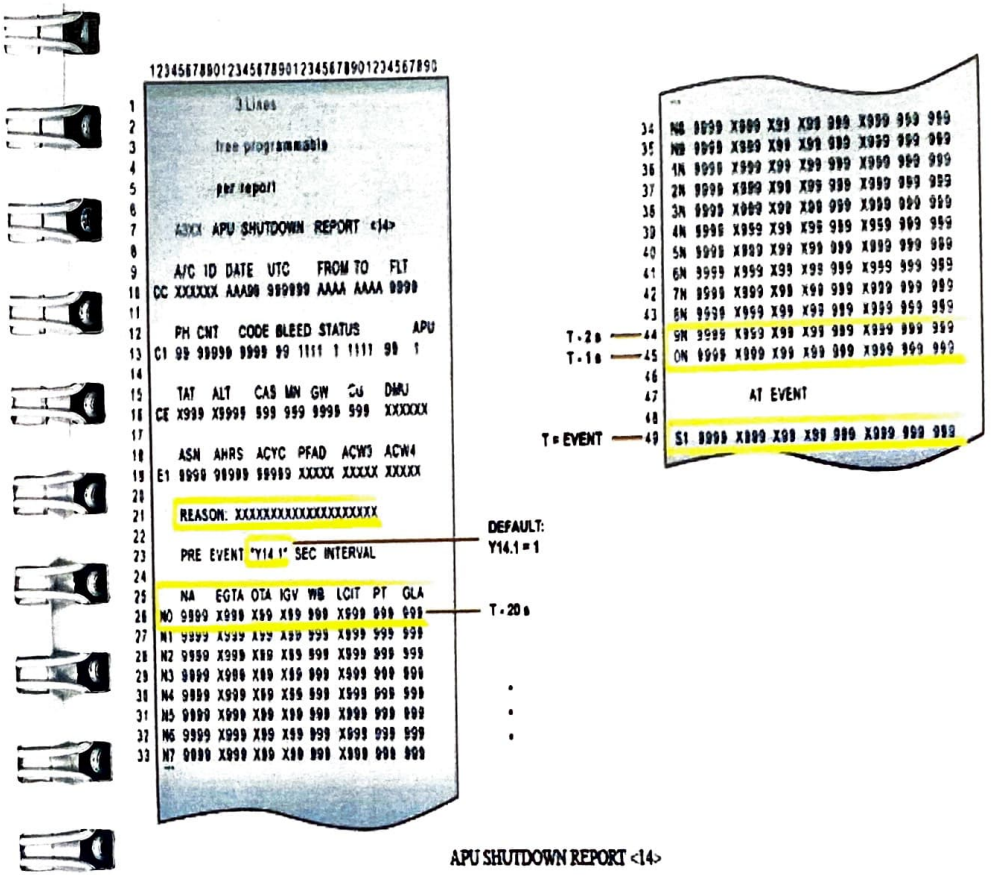
ACW2	APU Control Word 2
NA	APU Rotation Speed
EGTA	APU Exhaust Gas Temperature
IGV	IGV Position
P2A	APU Inlet Pressure
LCIT	Load Compressor Inlet Temperature
PT	Bleed Air Pressure
WB	Bleed Air Flow
LCDT	Bleed Air Temperature
OTA	APU Oil Sump Temperature
GLA	APU Generator Load
STA	APU Start Time
EGTP	APU EGT Peak
NPA	NA at EGTP
LCIT	Load Compressor Inlet Temperature
LCDT	Bleed Air Temperature
OTA	APU Oil Sump Temperature
EGTP	APU EGT Peak
STA	APU Start Time

The APU Shut Down Report is a time series collection of APU related parameters during the abnormal Shut Down of the APU.

CODES/REASON -Reason for Exceedance	
4110	No Flame CODE
4120	Reverse Flow CODE
4130	Loss of DC Power
4140	High Oil Temperature
4160	Air Intake not open
4170	Generator High Oil Temp
4180	Over temperature
4190	Sensor Failure
4200	No Acceleration
4210	Start Time Exceeded
4220	Over speed
4230	ECB Failure
4240	Low Oil Pressure
4250	Loss of Speed
4260	IGV Failure CODE



APU SHUTDOWN REPORT <14>

APU EMERGENCY SHUTDOWN

The ECB starts an emergency shutdown when the APU FIRE P/B, in the cockpit, is released out or when the APU SHUT OFF P/B, on the external power receptacle panel, is pushed.

The ECB starts an automatic emergency shutdown when an APU fire is found on ground. The APU stops immediately without time delay, even if the APU bleed air system is in use.

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