

A319/320

Quick Reference Handbook

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Non-Normal Checklists

Chapter NNC

Miscellaneous

Section 0

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Ditching

Condition: Airplane ditching and evacuation are needed.

Additional considerations and preparations are listed in the Additional Information section.

- 1 Transmit a distress message by the appropriate means:

- ATC
- VHF (121.5)
- HF
- ACARS
- USCG HF (4125 kHz)
- Navy HF (2182 kHz)

State the:

Nature of the emergency.

Aircraft's position.

Aircraft's course, speed, and altitude.

- 2 Transponder. 7700 (if required)
- 3 Brief the crew and passengers.
- 4 If possible, reduce fuel load before ditching.
- 5 Checklist Complete Except Deferred Items**

▼ Continued on next page ▼

▼ **Ditching continued** ▼

Deferred Items

Below 5,000 feet

- GPWS SYS pb OFF
- GPWS TERR pb OFF
- CAB PRESS MODE SEL pb Verify AUTO
- CAB PRESS LDG ELEV
rotary selector Set 1,000 feet
- SEAT BELT and NO SMOKING signs ON
- Set the local altimeter setting (if available).
- LANDING GEAR lever Verify UP
 - ▶ If the engines are running:
 - Use the maximum flap setting available.
 - ▶ If the engines are **not** running:
 - Use flaps 3 for landing.
- ENG MODE selector Verify NORM
- DITCHING pb ON
- ENG 1 BLEED, ENG 2 BLEED,
and APU BLEEDS OFF
- EMER EXIT Light switch ON

▼ **Continued on next page** ▼

▼ **Ditching continued** ▼

At 1,000 feet

Announce “BRACE FOR LANDING” via the PA.

Maintain airspeed and rate of descent with thrust, if available.

Just prior to ditching

Attempt to touchdown at a pitch attitude of 11°.

At touchdown

ENG MASTER switches (both) OFF

APU MASTER SW OFF

After ditching

Notify the flight attendants “EASY VICTOR” three times.

Notify the flight attendants:

“THIS IS THE CAPTAIN EVACUATE, EVACUATE.”

ENG and APU FIRE pbsPush

All ENG AGENT and APU AGENT pbsPush

▼ **Continued on next page** ▼

▼ Ditching continued ▼

Perform assigned crew evacuation duties. (See Ditching and Evacuation information in the FCTM.)

Additional Information

- Don life vests.
- Stow loose articles.
- Open the flight deck door.
- Fasten seat belt and shoulder harness and lock.
- Take the flight deck ELT and place the Control switch to ON.



Driftdown

Condition: Engine failure or shutdown during cruise.

- 1 Max continuous thrust (MCT)Set
- 2 A/THR. Disconnect
- 3 FCU SPD/MACHSet
Set Green Dot airspeed (not MACH).
- 4 FCU altitudeSet
Set the REC MAX altitude from MCDU PROG page.
- 5 Maintain altitude while slowing to Green Dot airspeed.
- 6 **When** at Green Dot speed:
FCU altitude knob. Pull
- 7 **When** level, or driftdown no longer required:
A/THR. Re-engage
FCU altitude Set, as desired
Managed speed Activate

Note: Aircraft will remain at green dot airspeed until reaching REC MAX altitude, then accelerate to EO LRC speed.

▼ Continued on next page ▼

▼ Driftdown continued ▼

Additional Information

Speed / Max Altitude Options:

- Terrain avoidance -
Green dot / Driftdown altitude on PERF CRZ
- Long range cruise -
EO LRC (PERF page) / EO REC MAX (PROG page)

When an engine out condition is sensed above the driftdown altitude, the PERF CRZ page displays the “DRIFTDOWN TO” altitude, ETA at the driftdown altitude, and the predicted distance covered in the driftdown. This additional information may be helpful in descent planning and clearing high terrain.

Note: The PERF CRZ page is only available during the cruise phase of flight.



EFB Failure - All

Condition: One of the following occurs:

- All EFBs are inoperative or unavailable.
- A required application has failed on all EFBs.

► If on the ground:

- If not at gate, return to gate.
- Contact Dispatch to obtain spare EFB(s).

> If **two** EFBs available:

- Proceed normally.



> If only **one** EFB available:

- See “EFB Failure - Single”



> If **no** EFB is available:

- Contact Dispatch to obtain the following printed material:

- FOM, Emergency/Irregular Operations
- FOM, Sensitive Security Information
- All Bulletins
- Vol. 1, Limitations
- Vol. 1, NOI section
- Vol. 1, SP material applicable to the flight, e.g., cold weather ops
- Airway manual Ops Specs material applicable to flight

▼ Continued on next page ▼

▼ EFB Failure - All continued ▼

- Applicable Communication Failure pages from Jeppesen text pages, Emergency section
- Applicable Jeppesen charts for departure, destination, and alternates
- ODM, OPERATIONAL LANDING DISTANCES tables

Note: ODM tables are not required if ACARS Landing Performance Request (LPR) is functionality operative.

Caution! No dangerous goods allowed.



► If in flight:

•Contact Dispatch

- EFB may be obtained from a non-working crew member.
- Consider weather, operating region, fuel reserves, and destination airport characteristics.

Note: A flight may continue to destination airport without Jeppesen terminal charts if the captain and dispatcher agree that such a continuation will not adversely affect the safety of flight.

▼ Continued on next page ▼

▼ **EFB Failure - All continued** ▼

- Consider using the FMS to decrease workload and obtain/verify relevant instrument procedure information.
 - Program the FMS for approach (if available).
 - Use the ARRIVAL page to review the runway length, approach frequency/identifier, and course.
 - Use the Flight Plan page to verify all approach and missed approach segments and altitudes.
 - Use the PLAN mode to review the general approach depiction to include the missed approach segment.
- See Additional Information at the end of this checklist and record arrival, approach, and landing data.

▼ **Continued on next page** ▼

▼ EFB Failure - All continued ▼

Additional Information**Terminal chart unavailable:**

Before conducting an instrument approach without an approach chart, obtain the following information as appropriate from Dispatch or ATC.

Note: Use ATC only in time critical situations as a last option.

- NOTAMS
- Arrival (STAR) / fixes, airspeed, altitudes
- Arrival (STAR) waypoints
- ATIS frequency
- Approach / tower / ground frequency
- Wx required / minimums
- MSA
- Navaids
- Approach courses, altitude constraints, and airspeed constraints
- Airport elevation
- Initial approach altitude
- If a procedure turn is required:
 - the direction of the procedure turn from the outbound course
 - the distance from the initial approach fix within which the procedure turn must be completed
 - the procedure turn altitude
- Glideslope intercept altitude
- Step-down altitude/distance
- DA/DH or MDA
- Airport Elevation/TDZE
- Missed approach point (if applicable)
- Missed approach procedure
- Runway length, width, and lighting.



EFB Failure - Single

Condition An EFB is inoperative or unavailable or a required application has failed.

- ▶ If prior to pushback:
 - Attempt to obtain spare EFB.
 - Utilize EFB loaner cart if station is equipped.
 - EFB may be obtained from a non-working crew member.
- > If spare EFB is available:
 - Utilize spare EFB.
 - Obtain EFB password if obtained from another crew member.
 - Coordinate with Dispatch to determine future need of replacement EFB.



- > If no spare EFB is available:
 - Contact Dispatch. Operation with only one operative EFB may be authorized. Additional printed materials may be required.
 - Conserve battery on remaining EFB.

Note: Use powered keyboard or approved charging device.

- >> If battery power is expected to remain above 10%:
 - Continue operation with one operative EFB.



▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

- > > If battery power drops or is expected to drop below 10% in flight:
- Use approved charging device, if available, to charge EFB.
 - See EFB Failure- All checklist.



- If after pushback:
- Attempt to obtain spare EFB.
 - EFB may be obtained from a non-working crew member.
- > If spare EFB is available:
- Utilize spare EFB.
 - Coordinate with Dispatch to determine future need of replacement EFB.



- > If spare EFB is not available:
- Contact Dispatch. Operation with only one operative EFB may be authorized. Additional printed materials may be required.
 - Conserve battery on remaining EFB.

Note: Use powered keyboard or approved charging device.

▼ Continued on next page ▼

▼ EFB Failure - Single continued ▼

>> If battery power is expected to remain above 10%:

- Continue operation with one operative EFB.



>> If battery power drops or is expected to drop below 10% in flight:

- Use approved charging device, if available, to charge EFB to at least 10% prior to TOD.
- If battery is below or is expected to be below 10% at TOD, record all relevant arrival/approach information for all crew members.
- See EFB Failure- All checklist.



EFB or Application Unresponsive

Condition: One of the following occurs:

- An EFB is unresponsive.
- An application within the EFB is unresponsive.

- ▶ If an application within the EFB is unresponsive.
 - Close and restart application.
 - > If Application operates normally
 - Continue normal operation.
- ▶ If EFB is unresponsive.
 - > Verify EFB battery status indicator displays at least 10% battery power available. Connect power source, if necessary.
 - Power button Press and hold
 - Press and hold the power button for ten seconds, then release. This ensures the Surface® shuts down instead of entering sleep mode.
 - Power button Press and release
 - Press and release the power button, Surface® should appear on the screen.

▼ Continued on next page ▼

▼ EFB or Application Unresponsive ▼

- > If EFB fails to restart.
 - Press and hold the power button for forty-five seconds, then release. This forces the Surface® into a hard reset.
- > If EFB normal operation is restored.
 - Accomplish normal logon procedure.



- > If EFB remains unresponsive.
 - See “EFB Failure - Single.”



Emergency Landing Considerations

Condition: The captain has determined a red emergency exists.

Objective: To assist the crew in managing a red emergency.

- Declare an emergency.
- Transponder - 7700 (if required)
- Brief the flight attendants and passengers.
- Consider reducing fuel load.
- SEAT BELTS and NO SMOKING signs - ON
- GPWS SYS pb - OFF (if appropriate)
- OXYGEN CREW SUPPLY - OFF (if appropriate)
- EMER EXIT LT switch - ON
- GALLEY pb - OFF
- If landing at an airport not in the database:
 - CABIN PRESS LDG ELEV - set landing elevation

When below 5,000 feet:

- Verify the cabin preparations are complete.

At 1,000 feet:

- Announce "BRACE FOR LANDING" over the PA.

After landing:

- Perform the EVACUATION checklist, if appropriate.



Overweight Landing

Condition: An overweight landing is a landing made at a weight greater than the certificated maximum structural landing weight (A319:134,481; A320: 142,198 lbs).

Note: The decision to land above the maximum landing weight limitation of the aircraft rests with the captain. The captain may deem an overweight landing the safest course of action based upon the urgency of the situation and other operational factors specific to that particular event. Refer to the FOM, chapter 10 for additional guidance.

Note: Refer to the Overweight Landing Considerations, in this section, as time and conditions allow.

- 1 Send an ACARS Divert message, if applicable.
- 2 Refer to the Operational Landing Distances chart from the ODM. Time permitting contact Dispatch for landing/climb weight restrictions and other assistance.

Note: Maneuvering speeds are close to maximum flap extension speeds due to high gross weights. Avoid excessive maneuvering with landing flaps extended.

► If additional performance is required:

When pressurization no longer required:

•PACK 1 and 2 OFF

▼ Continued on next page ▼

▼ Overweight Landing continued ▼

- ▶ If weight on approach will be above:
A319: 150,000 lbs
A320: 154,000 lbs
 - Select a speed below 200 kts before selecting flaps 2, to avoid flap overspeed.

3 Do not carry excess speed on final

Note: This is especially important when landing during an engine inoperative or other non-normal condition.

4 Use selected speed during approach until configured.

5 Use managed speed for landing.

6 Touch down at 200-300 fpm.

Note: Be aware of increased tail strike potential when attempting a minimum vertical rate touchdown.

7 Note vertical speed at touchdown

- ▶ If approach or landing is abandoned:
 - Use normal go-around procedures.

Landing

8 Apply maximum engine reverse immediately after touchdown.

9 Monitor brake temperatures.

10 Do not attempt an early runway turnoff.

▼ Continued on next page ▼

▼ **Overweight Landing continued** ▼

After Landing

Caution! During taxi, do not exceed 20 kts in a turn.

- ▶ If hot brakes are suspected:
 - Coordinate taxi to an uncongested ramp area
 - Refer to Vol 1, SP.14, for brake temperature information
 - Be alert for the possibility of tire, grease, or hydraulic fire.
- 11 Make a logbook entry including the phrase “overweight landing.”
 - Include actual landing weight, maximum landing weight, and vertical speed at touchdown.



Overweight Landing Considerations

Condition: A decision is being considered or has been made to land over the maximum landing weight limitation.

Note: Refer to the Overweight Landing checklist, in this section, for the procedure.

Note: Exercising captain's emergency authority does not require the declaration of an emergency with air traffic control. Refer to FOM, 10.2, Overweight Landings.

Note: When considering an immediate return to the takeoff runway, the landing distance is generally less than the takeoff distance at all gross weights when landing with flaps 3 or FULL and the runway is dry.

Approach:

- Consider landing on the longest available runway.
- Review landing distance required in the Approach/Landing or Abnormal section of the ODM (normal or reduced landing flap configuration).
- If landing distance is a concern, consider holding to reduce weight.
- If landing distance is not an issue, holding to reduce weight is not necessary.
- Use an autobrake setting commensurate with runway length and conditions. Refer to the Operational Landing Distances table in the ODM.

▼ Continued on next page ▼

▼ Overweight Landing Considerations continued ▼

- The aircraft is not certified to autoland at greater than maximum landing weight. If the captain determines that an autoland is the safest course of action, the approach, flare, and landing must be closely monitored at all times.
- The vertical speed required to maintain glidepath may be significantly higher than normal. The captain should brief contingencies if “SINK RATE” cautions are received on short final.

Landing:

- Do not hold the airplane off waiting for a smooth landing.
- Fly the airplane onto the runway at the normal touchdown point.
- Attempt to touch down at approximately 200 - 300 fpm. If able, note the vertical speed at touchdown.
- If a long landing is likely to occur, a go-around should be accomplished.
- Apply reverse thrust commensurate with runway length and conditions.

After Landing:

- Be alert for the possibility of tire, grease, or hydraulic fire and the possibility of wheel fuse plugs melting. Advise the ground crew of the hot brake hazard.
- Make a logbook entry including the phrase “overweight landing.” Include actual landing weight, maximum landing weight, and vertical speed at touchdown, if known.



Rapid Descent Considerations

Condition: The captain has determined a need for a rapid descent exists.

Objective: To assist the crew in managing a rapid descent.

- If cabin altitude exceeds 10,000 feet ensure oxygen masks are ON and crew communications established.
- Declare an emergency with ATC and squawk 7700.
- Descend to the higher of 10,000 MSL or MEA, as required.
- Use of the autopilot is recommended.
- Turning while initiating descent will counter unloading effect and may aide in traffic avoidance.
- Use EXP DES or OP DES mode after setting target FCU altitude.
- Verify idle thrust once established in descent.
- Deploy speedbrakes after nose is lowered to avoid Alpha Inhibit function.
- A320 Only: Speedbrakes are limited to half with the AP ON. Once established in descent and workload permitting, the AP may be disconnected and FULL speedbrakes applied.
- Normally a rapid descent is made with the landing gear retracted. However, if structural integrity is in doubt and airspeed must be limited, the gear may be lowered when below FL250.
- Verify cabin signs and engine ignition ON.

▼ Continued on next page ▼

▼ Rapid Descent Considerations continued ▼

- Verify local altimeter setting.
- Do not remove masks if cabin altitude remains above 10,000 feet.
- Advise cabin when descent is complete and use of passenger oxygen system can be discontinued.
- Request passenger and cabin status.
- Verify flight deck door status.
- Coordinate with Flight Control on a new course of action based on weather, fuel and oxygen remaining, medical conditions of crew and passengers, terrain, flight deck security, and available diversion airports.
- Obtain a new ATC clearance.



Rejected Takeoff - Post RTO Considerations

Condition: A takeoff has been discontinued after takeoff thrust is set and/or initiation of the takeoff roll has begun.

- Following the RTO:

- Wind direction in case of fire. If able, park with fire on the downwind side of the aircraft.

- The possible need for emergency equipment.

- The possible need to evacuate the aircraft.

- Complete non-normal checklist (if appropriate) for the condition(s) causing the RTO.

- The need to clear the runway. Check entry/exit door status and ensure passengers are seated prior to taxi.

- Refer to FOM, chapter 3.4, Rejected Takeoff (RTO)

- Prior to a subsequent takeoff:

- Contact Flight Control.

- Observe brake cooling schedule and precautions in the ODM.

- Accomplish any required MEL actions.

- Consider additional de-icing requirements.

- Consider additional fueling requirements.

- Cycle flight directors to re-arm SRS.

▼ Continued on next page ▼

▼ Rejected Takeoff - Post RTO Considerations continued ▼

Verify FMS information.

Note: After performing a rejected takeoff (TOGA or FLEX reached) the FMS may be in the Takeoff Phase (indicated by green V-speeds on the PERF page). Inputs to the Takeoff PERF page are not permitted in the Takeoff Phase. A subsequent takeoff with previously inserted TDU information is permitted providing conditions haven't changed.

Note: If takeoff will be accomplished from a different runway or different TDU data is required, a database swap and a full FMS preflight will need to be accomplished if the FMS is in the Takeoff Phase.

Accomplish the appropriate normal checklists (e.g., After Landing checklist, Taxi checklist, Before Takeoff checklist).

- Return to the gate:

Accomplish the After Landing checklist.

Coordinate with station.

Consider the possibility of wheel fuse plugs melting and/or remote parking.

Advise the ground crew of the hot brake hazard.



Tailstrike on Takeoff

Condition: A tailstrike is suspected or reported during takeoff.

Caution! Do not pressurize the aircraft (to prevent further structural damage).

- 1 Limit altitude to less than 10,000, if possible.
- 2 CAB PR MODE SEL pbMAN
- 3 MAN V/S CTLHold to full UP
- 4 Land as soon as possible.



Volcanic Ash

Condition: Volcanic Ash is suspected when one or more of these occur:

- A static discharge around the windshield
- A bright glow in the engine inlets
- Smoke or dust on the flight deck
- An acrid odor.

Caution! Exit volcanic ash as quickly as possible. Consider a 180 degree turn. Attempting to climb above the volcanic cloud is not recommended.

- 1 Don oxygen masks, as needed. Select 100% and use EMERGENCY pb as needed to clear mask.
- 2 Establish crew communications, as needed.
- 3 Do not deploy passenger oxygen if cabin pressure is normal.
- 4 THR LEVERS Reduce to minimum practical

Note: A reduction in thrust reduces the possibility of engine damage or flameout. If possible, reduce thrust to IDLE and avoid further thrust adjustments until clear of ash.

- 5 A/THR OFF
- 6 ENG and WING ANTI ICE ON
- 7 PACK FLOW selector HI

▼ Continued on next page ▼

▼ **Volcanic Ash continued** ▼

8 Engine parametersMonitor
 Volcanic ash may result in increasing EGT,
 engine stall, or flameout(s)

▶ If dual engine flameout, see “ENG DUAL FAILURE
 (Fuel Remaining)” on page 7.61.

9 Airspeed indicationsMonitor

▶ If erroneous airspeed suspected, See “Airspeed
 Unreliable” on page 10.12.

10 Land at nearest suitable airport.

▶ If sufficient visibility is not available:

•Consider use of AUTOLAND

> If AUTOLAND is not available:

•Consider manually opening sliding window
 on PF’s side, after cabin depressurization.

•CAB PRESS MODE SEL pbON

•MAN V/S CTL. Full UP



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COCKPIT DOOR Fault

Condition: The Flight Deck Door Locking System has failed, indicated by an illuminated FAULT light on the center pedestal COCKPIT DOOR panel.

1 Check the overhead Door Control panel.

► If one or more STRIKE lights are illuminated:

Note: The door is not intrusion-proof if two or more STRIKE lights are illuminated.

- Open the flight deck door.
- Hold the door toggle switch in UNLOCK for 10 seconds.
- Verify FAULT and STRIKE lights extinguished.
- Close the flight deck door.
- Make an INFO ONLY logbook write-up if the system is restored.



- If both pressure sensor (CHAN) lights are illuminated:
- The automatic latch release is inoperative and unavailable in case of flight deck depressurization.



- If **no** lights are illuminated on the overhead CKPT DOOR CONT panel:
- The door locking system control unit on the center pedestal is faulty and the door may unlock automatically.

▼ Continued on next page ▼

▼ COCKPIT DOOR Fault continued ▼

- > If the door remains locked, the door may be opened manually by rotating the manual “D” handle, when required.



- > If the door is unlocked:
 - Security is compromised. Contact the OCC for guidance.



DOORS CABIN

Condition: A main cabin door is not locked closed.

Note: The cabin door warning may be confirmed by checking the visual indicator on the door.

- ▶ If the aircraft is on the ground:
 - Contact Maintenance/return to gate.



- ▶ If in flight:
 - No crew action is required as long as the cabin pressure is normal.

> If abnormal cabin vertical speed:

- MAX FL 100/MEA

Note: Abnormal cabin V/S is indicated by decreasing cabin differential pressure. Cabin doors are held in place by both differential pressure and a locking mechanism.

STATUS

	INOP SYS
MAX FL 100/MEA	



DOORS CARGO

Condition: The cargo door indication system is faulty or the cargo door is not locked closed.

- ▶ If the aircraft is on the ground:
 - Contact Maintenance/return to gate.

■ ■ ■ ■

- ▶ If in flight:
 - No crew action is required as long as the cabin pressure is normal.
 - > If abnormal cabin vertical speed:
 - MAX FL100/MEA

Note: Abnormal cabin V/S is indicated by decreasing cabin differential pressure. The cargo door includes multiple latch hooks and safety mechanisms to ensure that the door remains closed.

STATUS	
	<i>INOP SYS</i>
MAX FL 100/MEA	

■ ■ ■ ■

DOORS EMER EXIT

Condition: A cabin emergency exit door is not locked closed.

► If the aircraft is on the ground:

Warning! Do not attempt to reset door or reattach the cover! Slide may deploy.

- Contact Maintenance/return to gate.



► If in flight:

- No crew action is required as long as the cabin pressure is normal.

>If abnormal cabin vertical speed:

- MAX FL100/MEA

Note: Abnormal cabin V/S is indicated by decreasing cabin differential pressure. Emergency exit doors are plug type doors that are held in place by both locking mechanisms and differential pressure.

STATUS

	INOP SYS
MAX FL 100/MEA	



DOORS L / R / FWD / AFT AVIONICS

Condition: The avionics door (left, right, fwd, or aft) is not locked closed.

- ▶ If the aircraft is on the ground:
 - Contact Maintenance/return to gate.
- ▶ If in flight:
 - No crew action is required as long as the cabin pressure is normal.



Note: Positive cabin differential pressure ensures the door remains in place.

- >If abnormal cabin vertical speed:
 - MAX FL100/MEA

Note: Abnormal cabin V/S is indicated by decreasing cabin differential pressure. Reduce cabin differential pressure by descending, but do not depressurize completely before landing.

STATUS	
	<i>INOP SYS</i>
MAX FL 100/MEA	



Oxygen Low Pressure - Crew

Condition: The flight crew oxygen supply is low or depleted during flight.

Warning! When the flight crew oxygen supply is depleted during flight, the flight crew is vulnerable to smoke, fumes, or a loss of cabin pressurization. Initiate an immediate diversion to the nearest suitable airport.

- 1 Position a cabin portable oxygen bottle/mask and a PBE near each pilot.
- 2 Consider a descent to 10,000 feet or MEA which ever is higher, if conditions permit.
- 3 Review rapid depressurization and smoke/fire/fumes procedures.

Caution! If an emergency situation occurs resulting in use of the portable oxygen bottles / masks or PBEs, a lack of communication capability may cause flight crew and ATC coordination problems.



Windshield Arcing

Condition: Electrical arcing is noted in a flight deck windshield or window.

- 1 Pull the circuit breakers that correspond to the affected window:
- Windshield heat, leftX14, AF10
 - Windshield heat, right W14, AF3
- ■ ■ ■

Windshield Cracked

Condition: A flight deck windshield or window is cracked.

Note: To determine if the outer or inner pane of the window is damaged:

- Place the tip of a pen on the crack and move your head. If the crack appears to move, it is in the **outer** pane. If the crack does **not** appear to move, it is in the inner pane.
- A crack in the inner pane may also be detected by running a fingernail or the tip of a pen across the window surface.

- If cracks present on outside layer, there is no limitation.
- The internal layer is not affected. Therefore, the window/windshield is still able to sustain the maximum differential pressure at the current flight level.



- If cracks present on inside layer, max altitude is FL230.
- The internal layer is affected. Descend to FL230 (or MEA, if higher) and reduce differential pressure to 5 PSI.

Note: The maximum flight level is restricted to FL230 to obtain ΔP 5 PSI in manual cabin pressure mode.

▼ Continued on next page ▼

▼ **Windshield Cracked continued** ▼

- CAB PR MODE SEL pb MAN
- MAN V/S CTL as reqd
 - Set the cabin altitude according to the table below:

ΔP = 5 PSI	FL	100	150	200	230
	CABIN ALTUTIDE	0	3,000	6,000	8,000

When When beginning final descent:

- CAB PR MODE SEL pb AUTO
- > If visibility is not sufficient:
- Consider AUTOLAND.
 - > > If AUTOLAND not available, consider opening the sliding window on the PF’s side, after cabin depressurization.
 - To manually depressurize the cabin:
 - CAB PR MODE SEL pb. MAN
 - MAN V/S CTL Full up

Note: Due to increased noise level, pay particular attention to visual warnings.



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Depressurization 2.26**

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or

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Air Systems ECAM Advisories

Condition: A system parameter exceeds its normal range, the associated E/WD page is displayed, and the affected parameter pulses in green.

Air Advisory Displayed	
Condition	Recommended Action
CAB VERT SPD > 1800 ft/min (up or down)	Cabin Pressure Controller (CPC) changeover recommended • MODE SEL pb MAN • After 10 sec: MODE SEL pb AUTO
CAB ALT $\geq$ 8,800 FT	• MODE SEL pb MAN • Use MAN V/S CTL toggle to lower cabin altitude > If cabin continues to climb: • Don oxygen masks prior to cabin altitude reaching 10,000 ft • See “CAB PR EXCESS CAB ALT or Rapid Depressurization” on page 2.26
CAB DIFF PRESS $\geq$ 1.5 psi below 800' AGL	• LDG ELEV ADJUST > If unsuccessful: • MODE SEL pb MAN • Use MAN V/S CTL toggle to raise cabin altitude



AIR AFT CRG VENT FAULT

Condition: Failure of cargo ventilation fan.

- ▶ If on the ground:
 - Reset the system as shown on page NNOI.1.7, CARGO, Computer Resets.
- ▶ If in flight:
 - Crew awareness.

STATUS	
APPROACH PROCEDURES	INOP SYS
	AFT CRG HEAT
	AFT CRG VENT

■ ■ ■ ■

AIR APU BLEED FAULT

Condition: APU is available and the APU bleed valve position disagrees with the selected position.

- ▶ If on the ground:

 - Consult with Dispatch/Maintenance Control for possible MEL relief.

▶ If in flight:

 - Crew awareness.

Note: It may be necessary to select the X BLEED valve open to use APU air.

STATUS	
APPROACH PROCEDURES	INOP SYS
	APU BLEED (if valve closed)
■ ■ ■ ■	

Air Dual Bleed Fault

Condition: Both engine bleed air systems are inoperative or unavailable

- ▶ If ENG 1 BLEED was lost due to a Bleed Leak on left side, ENG 1 FIRE, or ENG 1 Start Air Valve failed open:
 - Initiate descent to 10,000 feet or the MEA, whichever is higher.
 - Avoid icing conditions.



- ▶ If ENG 2 BLEED was lost due to a Bleed Leak on right side, ENG 2 FIRE, or ENG 2 Start Air Valve failed open:
 - X BLEED valve Verify CLOSED
 - Expedite descent to FL200 or below to recover the bleed supply from the APU.

Note: Max FL200 for remainder of flight.

- Start the APU in the descent.

At or below FL200:

- WING ANTI ICE OFF
- APU BLEED ON

Note: Do not use APU Bleed for wing anti-ice.

- Avoid icing conditions.



▼ Continued on next page ▼

▼ **Air Dual Bleed Fault continued** ▼

- In all other cases:
- > If both packs are available and ENG 1 BLEED was lost first, attempt recovery of engine 2 bleed:
 - PACK 1 pb OFF
 - ENG 2 BLEED pb OFF, then ON
 - > If both packs are available and ENG 2 BLEED was lost first, attempt recovery of engine 1 bleed:
 - PACK 2 pb OFF
 - ENG 1 BLEED pb OFF, then ON
 - > If one pack is inoperative, or if engine bleed recovery was not successful:
 - Expedite descent to FL200 or below to recover the bleed supply from the APU.

Note: Max FL200 for remainder of flight.
 - Ensure that the X BLEED valve is OPEN.
 - Start the APU in the descent.
 - At or below FL200:
 - WING ANTI ICE OFF
 - APU BLEED ON

Note: Do not use APU Bleed for wing anti-ice.
 - Avoid icing conditions.



AIR ENG 1 (2) BLEED ABNORM PR

Condition: The regulated pressure is abnormal.

- ▶ If Wing Anti-Ice is OFF:
 - PACK FLOW LO
 - AFT CARGO HOT AIR OFF
 - X BLEED OPEN
 - BLEED Page Select and Monitor

- > If the temperature of the remaining engine bleed exceeds 240° within 2 minutes after X BLEED valve opening:

- PACK (on first affected bleed side) . . .OFF

Note: If Wing Anti-ice is required (icing conditions) while operating with one PACK, consider switching OFF the remaining pack if aircraft's altitude permits.

- ▶ If Wing Anti-Ice is ON:
 - > If both PACKS are ON:
 - PACK (affected side) OFF
 - X BLEED OPEN
 - BLEED Page Select and Monitor
 - > If the temperature of the remaining engine bleed exceeds 240° within 2 minutes after X BLEED valve opening:
 - BLEED AIR DEMAND Reduce

Consider reducing the bleed air demand by:

▼ Continued on next page ▼

▼ **AIR ENG 1 (2) BLEED ABNORMAL PR continued** ▼

Switching OFF the remaining pack
(if aircraft's altitude permits), or
Switching OFF the Wing Anti-Ice
system (if no longer in icing conditions)

STATUS

	<i>INOP SYS</i>
ONE PACK ONLY IF WAI ON.	ENG 1 (2) BLEED PACK 1 (2)



Condition: Engine 1 or 2 is running and a temperature in the engine pylon exceeds a preset limit.

1. ENG 1 (2) BLEED. OFF
2. APU BLEED. OFF
3. X BLEED. SHUT
4. WING A. ICE. OFF
5. AVOID ICING CONDITIONS

- ▶ If left wing or engine 1 bleed leak:
 - APU BLEED Verify OFF

Note: With the ENG BLEED pushbutton switch on, the FAULT light remains on.

Note: With the ENG BLEED pushbutton switch off, the FAULT light extinguishes when the overheat disappears.

STATUS

	INOP SYS
AVOID ICING CONDITIONS	WING A.ICE ENG 1(2) BLEED PACK 1(2)



AIR ENG 1 (2) BLEED NOT CLSD

Condition: The engine bleed valve has not automatically closed.

- ▶ If on the ground:
 - ENG 1 (2) BLEED pb OFF . . then ON
 - > If warning disappears:
 - Make an INFO ONLY logbook write-up.

Note: The warning may occur following engine shutdown, or when APU BLEED is selected OFF. This is due to residual pressure between the HP or IP valves and the engine bleed valve.



- ▶ If in flight:
 - ENG 1 (2) BLEED pb OFF

Caution! One PACK must be OFF when using wing anti-ice with one bleed source.

STATUS	
	INOP SYS
ONE PACK ONLY IF WAI ON	ENG 1(2) BLEED



AIR ENG 1 (2) BLEED FAULT

Condition: Engine 1 or 2 is running and the bleed air pressure or temperature exceeds a preset limit.

1. ENG BLEED affected OFF

► If WING ANTI-ICE is OFF:

- PACK FLOW LO
- AFT CARGO HOT AIR (if installed) OFF
- X BLEED OPEN
- BLEED Page Select and Monitor
 - > If the temperature of the remaining engine bleed exceeds 240° within 2 minutes after X BLEED valve opening:
 - PACK (on first affected bleed side) OFF

Note: If Wing Anti-ice is required (icing conditions) while operating with one PACK, consider switching OFF the remaining pack, if aircraft's altitude permits.

► If WING ANTI-ICE is ON:

- > If both PACKS are ON:
 - PACK (affected side) OFF
- X BLEED OPEN
- BLEED Page Select and Monitor
 - > If the temperature of the remaining engine bleed exceeds 240° within 2 minutes after X BLEED valve opening:
 - Bleed air demand reduce

▼ Continued on next page ▼

▼ **AIR ENG 1 (2) BLEED FAULT continued** ▼

Consider reducing the bleed air demand by:
Switching OFF the remaining pack (if aircraft's altitude permits), or
Switching OFF the Wing Anti-Ice system (if no longer in icing conditions)

STATUS

APPROACH PROCEDURES	<i>INOP SYS</i>
ONE PACK ONLY IF WAI ON	ENG 1(2) BLEED



AIR ENG 1 (2) BLEED LO TEMP

Condition: The bleed air temperature from one engine is inadequate to ensure proper anti-ice protection when the WING ANTI ICE pb is selected ON.

Note: Prior to disconnecting A/THR, first match the THR LVR with the actual N1 to avoid a rapid thrust increase.

1. A/THR OFF
2. THR LEVER 1 (2) ADVANCE

Note: Low bleed temperature may be due to low outside air temperature. Therefore, increasing engine thrust may increase bleed temperature and clear the ECAM caution.

- If the warning disappears and the thrust setting is acceptable:



- IF UNSUCCESSFUL

> If opposite bleed available:

- X BLEED OPEN
- ENG 1 (2) BLEED OFF
- PACK 1 (2) OFF

Caution! One PACK must be OFF when using wing anti-ice with one bleed source.

▼ Continued on next page ▼

▼ AIR ENG 1 (2) BLEED LO TEMP continued ▼

- > If opposite bleed not available:
 - WING A. ICE. OFF
 - AVOID ICING CONDITIONS

Note: Bleed air pressure will be low when the thrust is at idle.

STATUS

APPROACH PROCEDURES	INOP SYS
AVOID ICING CONDITIONS	WING A. ICE
► IF A/C ICING SEVERE:	ENG 1 (2) BLEED
MIN SPD ALPHA PROT	PACK 1 (2)
ONE PACK ONLY IF WAI ON	(if selected OFF)



AIR ENG 1 (2) HP VALVE FAULT

Condition: The HP valve is abnormally closed.

- ▶ If on the ground:
 - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
 - Crew awareness.

Note: The air pressure will be low when the thrust is at idle.

STATUS	
APPROACH PROCEDURES	INOP SYS
AIR PRESS LOW AT IDLE	

AIR PACK 1(2) REGUL FAULT

Condition: The primary channel or the primary and secondary channels on one pack have failed.

- ▶ If only the primary channel has failed:
 The pack air inlet and outlet flaps are driven full open and the pack flow is fixed at the previous setting.



- ▶ If the primary and secondary channels have failed (amber XX on the ECAM BLEED page):

The pack outlet temperature is controlled by the anti-ice valve and is stabilized at a temperature between 5°C (41°F) and 30°C (86°F). The ECAM information relating to the pack is lost.

STATUS

	<i>INOP SYS</i>
PACK 1 (2) AT FIXED TEMP	PACK 1 (2) REGUL



AIR PACK 1 + 2 FAULT

Condition: A fault has been detected in both packs.

- 1. PACK 1 OFF
- 2. PACK 2 OFF
- 3. DESCENT TO FL 100/MEA
 - ▶ IF (**When**) PACK OVHT OUT:
 - PACK 1 ON
 - PACK 2 ON
 - ▶ If no packs available:
 - > If (**When**) DIFF PR < 1 PSI AND FL BELOW 100:
 - RAM AIR ON
 - MAX FL 100/MEA

Note: The FAULT light on the PACK pb indicates pack overheat.

STATUS

	<i>INOP SYS</i>
▶ If packs not recovered: MAX FL 100/MEA	PACK 1 + 2
▶ If FAULT was due to an overheat:	
WHEN PACK OVHT OUT: • PACK(affected) ON	



Condition: Engine 1 or 2 is running and the temperature detected by the wing loop exceeds a preset limit.

1. ENG 1 (2) BLEED. OFF
2. APU BLEED. OFF
3. X BLEED. SHUT
4. WING A. ICE. OFF
5. AVOID ICING CONDITIONS

Note: With the ENG BLEED pushbutton switch on, the FAULT light remains on.

With the ENG BLEED pushbutton switch off, the FAULT light extinguishes when the overheat disappears.

- If left wing or engine 1 bleed leak:
 - Ensure APU BLEED OFF

STATUS

	INOP SYS
AVOID ICING CONDITIONS	ENG BLEED 1 (2) PACK 1 (2) WING A.ICE



AIR L (R) WNG LEAK DET FAULT

Condition: Both wing leak detection loops are inoperative in one wing.

- ▶ If on the ground:
 - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
 - Crew Awareness.

STATUS

	<i>INOP SYS</i>
	L (R) LEAK DET



BLEED MONITORING FAULT

Condition: Both bleed air monitoring computers (BMC) are inoperative.

- ▶ If on the ground:
 - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
 - Crew Awareness.

STATUS

	<i>INOP SYS</i>
	BMC 1+2

Cabin Overpressure

Condition: The automatic or manual pressurization systems are not able to control a cabin overpressurization condition.

1. PACK 1 or 2 OFF
2. BLOWER OVRD
3. EXTRACT OVRD

Note: Cabin air is being extracted overboard through the extract valve.

4. Differential pressure (ΔP) MONITOR

► If the $\Delta P > 9.0$ PSI:

- PACK 1 + 2 OFF
- Descend to 10,000 feet or the MEA, whichever is higher.
- **LAND ASAP**

	STATUS
Approach Procedures	<i>INOP SYS</i>
10 Minutes Before Landing:	CAB PR 1+2
• PACK 1+2 OFF • BLOWER AUTO • EXTRACT AUTO	
Caution! Check that the differential pressure is at zero before opening the doors.	



- ▶ If the outflow valve does not fully open:
 - DITCHING pb. . . Verify not in the ON position.
 - PACK 1 and PACK 2 pbs OFF

CAB PR SAFETY VALVE OPEN

Condition: A safety valve is not fully closed.

- ▶ IF DIFF PR ABV 8 PSI:
 - CAB PR MODE SEL pb MAN
 - MAN V/S CTL AS RQRD

Note: It may take up to 10 seconds before movement of the outflow valve can be observed on the ECAM PRESS page.

- > IF UNSUCCESSFUL:
 - A/C FL REDUCE

STATUS

INOP SYS

MAN CAB PR CTL	
TGT V/S: CLIMB 500 FT/MN	
DES 300 FT/MN	
A/C FL	CAB ALT TARGET
390	8000
350	7000
300	5500
250	3000
<200	0

DURING FINAL APPR
(and differential pressure < 1 PSI):

- MAN V/S CTL FULL UP

Caution! Ensure the cabin differential pressure is zero before opening doors.



CAB PR SYS 1 (2) FAULT

Condition: A pressurization controller fault has been detected.

- ▶ If on the ground:

- Refer the system as shown on page NNOI.1.6, CAB PRESS, Computer Resets.
- ▶ If in flight:

- Crew awareness.

Note: If the second pressurization controller subsequently fails, manual control of the outflow valve will be required.

STATUS	
APPROACH PROCEDURES	INOP SYS
	CAB PR 1(2)

■ ■ ■ ■

CAB PR SYS 1 + 2 FAULT

Condition: Both automatic pressurization controllers have faults.

- ▶ If on the ground:
 - Reset the system as shown on page NNOI.1.6, CAB PRESS, Computer Resets.

▶ If in flight:

- 1. CAB PR MODE SEL pb MAN
- 2. MAN V/S CTL AS RQRD

Note: It may take up to 10 seconds before outflow valve movement is observed on the ECAM PRESS page. Use the cabin V/S indication to confirm the outflow valve operation.

STATUS

		INOP SYS
MAN CAB PR CTL		CAB PR 1 + 2
TGT V/S: CLIMB 500 FT/MN		
DES 300 FT/MN		
A/C FL	CAB ALT TARGET	
390	8000	
350	7000	
300	5500	
250	3000	
<200	0	
DURING FINAL APPR (and differential pressure < 1 PSI): • MAN V/S CTL FULL UP		
Caution! Ensure cabin differential pressure is zero before opening doors.		



COND AFT CRG HEAT FAULT

Condition: Cargo heating controller fault.

- ▶ If on the ground:
 - Reset the system as shown on on page NNOI.1.7, CARGO, Computer Resets.
- ▶ If in flight:
 - Crew awareness.

STATUS

INOP SYS

AFT CRG HEAT



COND AFT CRG ISOL VALVE

Condition: Cargo isolation valve disagreement.

- ▶ If on the ground:
 - Reset the system as shown on on page NNOI.1.7, CARGO, Computer Resets.
- ▶ If in flight:
 - Crew awareness.

STATUS

INOP SYS

AFT CRG HEAT

AFT CRG VENT



Condition: Overheat or failure of both cabin fans.

- ```

1. PACK FLOW HI
 _ _ _ _ _
2. CAB FANS. OFF

```

*INOP SYS*

---

L + R CAB FAN



**COND LAV + GALLEY FAN FAULT**

Condition: The lav and galley fan is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** Cabin zone temperature sensors are normally ventilated by the air extracted by the fan. Therefore, cabin zone temperature regulation is lost. In addition, the lavatory smoke detection system is inoperative.

| STATUS                                                        |                  |
|---------------------------------------------------------------|------------------|
|                                                               | INOP SYS         |
| CAB ZONE AT FIXED TEMP                                        | GALLEY FAN       |
| Cabin zone inlet duct temperature is constant (15°C or 59°F). | <b>3209-3235</b> |
| Cockpit temperature regulation is normal.                     | LAV DET          |
|                                                               |                  |
|                                                               |                  |
|                                                               |                  |
|                                                               |                  |

## COND TRIM AIR SYS FAULT

**Condition:** One trim air valve fault is detected or an overpressure is sensed downstream of the hot air pressure regulating valve.

- ▶ If on the ground and one of the following messages is displayed:
  - AFT CAB TRIM VALVE
  - FWD CAB TRIM VALVE
  - CKPT TRIM VALVE
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight and one of the following messages is displayed:
  - AFT CAB TRIM VALVE
  - FWD CAB TRIM VALVE
  - CKPT TRIM VALVE
  - The corresponding trim air valve has failed.
  - Crew awareness.
- ▶ If the TRIM AIR HI PR message is displayed:
  - An overpressure has been detected downstream of the hot air pressure regulating valve.
  - > If all trim air valves are closed (i.e., during first 30 seconds after packs selected on, or in flight - and all zone heating demands are met):
    - Disregard message.



**COND ZONE REGUL FAULT**

Condition: Zone controller’s primary or both channels failed. Zone regulation is degraded.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

| STATUS                                                                                                                                                                                                                                                                                                                                                                               |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
|                                                                                                                                                                                                                                                                                                                                                                                      | INOP SYS   |
| ▶ If primary channel failed (“ALTN MODE” displayed on the ECAM COND page):<br>CAB ZONE AT FIXED TEMP<br>Zones are controlled to 24°C (75°F) by the packs through the zone controller secondary channel:<br>Pack 1 controls the cockpit.<br>Pack 2 controls the cabin.                                                                                                                |            |
| ▶ If primary and secondary channels failed (“PACK REG” displayed on the ECAM COND page):<br>ENG 1 APPR IDLE ONLY<br>ENG 2 APPR IDLE ONLY<br>(As the FADEC no longer receives a bleed demand correction, only approach idle can be selected.)<br>PACKS AT FIXED TEMP<br>The packs are controlled to deliver a fixed temperature of 20°C (68°F) for pack 1, and 10°C (50°F) for pack 2 | ZONE REGUL |



## Flight Deck and Cabin Temp Excessively Hot or Cold In-flight

**Condition:** The Flight Deck and Cabin temperatures are excessively hot or cold in-flight and are not responding to temperature selectors.

1. Check pack outlet temperatures on ECAM BLEED page.
  - ▶ If difference between packs is  $< 10^{\circ} \text{C}$ :
    - AIR COND HOT AIR switch . . . . . OFF

**Note:** A difference between packs less than 10 degrees C may indicate a mixer temperature sensor failure. Switching the HOT AIR to OFF inhibits this sensor's function and normal temperature control is recovered.



- ▶ If the difference between packs is  $\geq 10^{\circ} \text{C}$ :
  - Pack with highest temperature . . . . . OFF

**Note:** A difference of 10 degrees or more may indicate contamination of the packs, resulting in too hot outflow air. Switching OFF the pack with the higher temperature should reduce the temperature of the flight deck/cabin.

▼ Continued on next page ▼

▼ **Flight Deck and Cabin Temp Excessively Hot or Cold In-flight**  
**continued ▼**

**Note:** If the remaining pack is unable to maintain normal pressurization, descend to an altitude where normal pressurization can be maintained.

| STATUS |                 |
|--------|-----------------|
|        | <i>INOP SYS</i> |
|        | PACK 1 (2)      |

■ ■ ■ ■

Condition: Ventilation controller not powered, avionics system valve disagreement, or the power-up test of the avionics ventilation is unsatisfactory.

- Note:** Triggered when the AEVC is not supplied or when valve position disagrees with the commanded position or when the power-up test is not satisfactory.

INOP SYS

AVNCS VENT

- ▶ If ventilation controller not powered:  
VENT BLOWER  
VENT EXTRACT





VENT EXTRACT FAULT

Condition: Avionic extract air pressure is low.

- ▶ If on the ground:

  - Reset the system as shown on page NNOI.1.6, AVNCS VENT, Computer Resets.

- ▶ If in flight:

1. EXTRACT . . . . .OVRD

**Note:** This action places the ventilation system in the closed circuit configuration and air from the air conditioning system is added to the ventilation air.

**Caution!** When the VENT EXTRACT FAULT and VENT BLOWER FAULT messages are displayed simultaneously, the weather radar image on both NDs may be lost due to insufficient ventilation.

STATUS

INOP SYS

VENT EXTRACT



**VENT SKIN VALVE FAULT**

**Condition:** The extract valve is fully open in flight; the inlet valve is not fully closed in flight; or either valve is fully open on the takeoff roll.

- ▶ If INLET valve not fully closed in flight (amber indication or XX):
  - Crew awareness. No action is required.

**Note:** Aircraft pressurization will be normal because of a one-way check valve installed in the inlet valve area.



- ▶ If the EXTRACT valve is affected (amber indication or XX on PRESS page):
  - BLOWER . . . . . OVRD
  - EXTRACT . . . . . OVRD

▼ Continued on next page ▼

▼ VENT SKIN VALVE FAULT continued ▼

**Note:** This action closes the main (large) flap of the EXTRACT valve and allows for normal pressurization. The ECAM displays the EXTRACT valve partially open because the auxiliary (small) flap is open.

**Caution! The weather radar image on both NDs may be lost, in case of insufficient ventilation.**

- > If successful (the EXTRACT valve is closed or only partially open):



- > IF UNSUCCESSFUL (the EXTRACT valve remains fully open):

- MAX FL . . . . . 100/MEA
- CAB PR MODE SEL pb . . . . . MAN
- MAN V/S CTL . . . . . FULL UP
- Monitor the aircraft rate of descent.

**Note:** The aircraft is manually depressurized. It may take as much as 10 seconds in manual mode before the crew notices a change of the outflow valve position.

▼ Continued on next page ▼

▼ **VENT SKIN VALVE FAULT continued** ▼

| <b>STATUS</b>                                                                                                           |                 |
|-------------------------------------------------------------------------------------------------------------------------|-----------------|
|                                                                                                                         | <i>INOP SYS</i> |
| If EXTRACT valve remains <b>fully</b> open:<br>MAX FL: . . . . . 100/MEA<br>(or minimum obstacle<br>clearance altitude) | AVNCS VALVE     |
| <div>■ ■ ■ ■</div>                                                                                                      |                 |

## **Non-Normal Checklists**

## **Chapter NNC**

### **Anti-Ice, Rain**

### **Section 3**

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WING A. ICE SYS FAULT . . . . . 3.18

## ANTI ICE ALL PITOT

**Condition:** All three pitot heat systems have failed.

1. Avoid icing conditions.

**Caution!** If icing conditions are encountered with this failure, ADR 1, 2 and 3 airspeed data may be incorrect but still in agreement.

2. Turn off a single ADR pb as directed by the ECAM.
  - ▶ If icing conditions cannot be avoided:
    - Turn off ADR pb 2 or 3 as directed by ECAM.
    - Consider applying “Airspeed Unreliable” on page 10.12.

***RVSM Operations affected.***

***CAT II and III approach not authorized.***

### STATUS

|                                                                                                                                                              | INOP SYS                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| ▶ If icing expected: <ul style="list-style-type: none"> <li>• ADR (2) or (3) . . . . OFF</li> <li>• Erroneous Airspeed Procedure . . . . Consider</li> </ul> | CAPT/FO/STBY PROBES<br>CAPT/FO/STBY PITOT |



**ANTI ICE CAPT + FO, CAPT + STBY,  
or  
FO + STBY PITOT HEAT FAULT**

**Condition:** Double pitot heat failure.

Avoid icing conditions.

**Caution!** In case of a double pitot heat failure while in icing conditions, the information provided by the ADRs may be erroneous.

- If icing conditions cannot be avoided:
- Turn off affected ADR pb as directed by ECAM.
  - Consider applying “Airspeed Unreliable” on page 10.12.



|                          |
|--------------------------|
| <b>ANTI ICE CAPT AOA</b> |
|--------------------------|

**Condition:** The captain's angle of attack probe heat has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | CAPT AOA        |



**ANTI ICE CAPT L (R) STAT**

**Condition:** The corresponding captain’s static port heating has failed.

- ▶ If ADR 3 switching is available:
    - AIR DATA SWITCHING . . . . .CAPT 3.
- Note:** ADR 3 supplies data to PFD 1 and ND 1.

**Caution!** When ADR 3 is selected on the captain’s side, deicing of the pitot associated with ADR 1 is lost.

| STATUS |                     |
|--------|---------------------|
|        | INOP SYS            |
|        | L STAT<br>or R STAT |

### ANTI ICE CAPT PITOT

**Condition:** The captain's pitot heat has failed.

- ▶ If ADR 3 switching is available:
    - AIR DATA SWITCHING . . . . .CAPT 3.
- Note:** ADR 3 supplies data to PFD 1 and ND 1.

#### STATUS

|  |            |
|--|------------|
|  | INOP SYS   |
|  | CAPT PITOT |



### ANTI ICE CAPT PROBES

**Condition:** Failure of one probe heat computer.

- ▶ If ADR 3 switching is available:
    - AIR DATA SWITCHING . . . . .CAPT 3.
- Note:** ADR 3 supplies data to PFD 1 and ND 1.

**Caution!** When ADR 3 is selected on the captain's side, deicing of the pitot associated with ADR 1 is lost.

#### STATUS

|  |             |
|--|-------------|
|  | INOP SYS    |
|  | CAPT PROBES |



**ANTI ICE CAPT TAT**

**Condition:** The captain's total air temperature probe heat has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.

**Note:** During push or taxi on contaminated taxiways, the radio altitude indications may compute invalid data, activating false warnings/faults, including ANTI ICE CAPT TAT FAULT. Disregard these warnings.

- ▶ If in flight:
  - Crew Awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | CAPT TAT        |



**ANTI ICE ENG 1 (2) VALVE CLSD**

**Condition:** The valve disagrees with the selected position and is closed.

1. Avoid icing conditions.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | ENG A. ICE      |



**ANTI ICE ENG 1 (2) VALVE OPEN**

**Condition:** The valve disagrees with the selected position and is open.

1. Refer to the MEL for the appropriate performance and fuel burn penalties.

**STATUS**

|                      |                 |
|----------------------|-----------------|
|                      | <i>INOP SYS</i> |
| THRUST LIMIT PENALTY |                 |



**ANTI ICE F/O AOA**

**Condition:** The first officer's angle of attack probe heat has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | <i>F/O AOA</i>  |



ANTI ICE F/O L (R) STAT

**Condition:** The corresponding first officer's static port heating has failed.

- If ADR 3 switching is available:
- AIR DATA SWITCHING . . . . .F/O 3.
- Note:** ADR 3 supplies data to PFD 2 and ND 2.

| STATUS |                     |
|--------|---------------------|
|        | INOP SYS            |
|        | L STAT<br>or R STAT |

■ ■ ■ ■

ANTI ICE F/O PITOT

**Condition:** The first officer's pitot heat has failed.

- If ADR 3 switching is available:
- AIR DATA SWITCHING . . . . . F/O 3.
- Note:** ADR 3 supplies data to PFD 2 and ND 2.

| STATUS |           |
|--------|-----------|
|        | INOP SYS  |
|        | F/O PITOT |

■ ■ ■ ■

ANTI ICE F/O PROBES

**Condition:** Failure of one probe heat computer.

- If ADR 3 switching is available:

  - AIR DATA SWITCHING . . . . . F/O 3.

**Note:** ADR 3 supplies data to PFD 2 and ND 2.

STATUS

|  |            |
|--|------------|
|  | INOP SYS   |
|  | F/O PROBES |



ANTI ICE F/O TAT

**Condition:** The first officer’s total air temperature probe heat has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.

**Note:** During push or taxi on contaminated taxiways, the radio altitude indications may compute invalid data, activating false warnings/faults, including ANTI ICE F/O TAT FAULT. Disregard these warnings.

- ▶ If in flight:
  - Crew Awareness.

STATUS

|  |          |
|--|----------|
|  | INOP SYS |
|  | F/O TAT  |



### ANTI ICE L (R) WINDOW

**Condition:** The left (or right) side window heat has failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.11, WHC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

#### STATUS

|  |                 |
|--|-----------------|
|  | INOP SYS        |
|  | L (R) WNDW HEAT |



### ANTI ICE L (R) WINDSHIELD

**Condition:** The left or (right) forward windshield heat has failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.11, WHC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

#### STATUS

*CAT II or III approach not authorized.*

|  |                  |
|--|------------------|
|  | INOP SYS         |
|  | L (R) WSHLD HEAT |



ANTI ICE L + R WINDSHIELD

**Condition:** Failure of both forward windshield heaters.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.11, WHC, Computer Resets.
- ▶ If in flight:
  - Avoid icing conditions.

STATUS

*CAT II or III approach not authorized.*

|  |            |
|--|------------|
|  | INOP SYS   |
|  | WSHLD HEAT |

■ ■ ■ ■

ANTI ICE STBY AOA

**Condition:** The standby angle of attack probe heat has failed.

1. If the standby instruments are used, monitor the air data information.

STATUS

|  |          |
|--|----------|
|  | INOP SYS |
|  | STBY AOA |

■ ■ ■ ■

### ANTI ICE STBY L (R) STAT

**Condition:** The corresponding standby static port heat has failed.

1. If the standby instruments are used, monitor the air data information.

#### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | STBY L (R) STAT |



### ANTI ICE STBY PITOT

**Condition:** The standby pitot probe heat has failed.

1. If the standby instruments are used, monitor the air data information.

#### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | STBY PITOT      |



**ANTI ICE STBY PROBES**

**Condition:** Failure of one probe heat computer.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | STBY PROBES     |



---

**Double Probe Heat Fault**

---

**Condition:** Double probe heat failure.

1. Avoid icing conditions.

---

**Caution!** In case of double pitot or AOA probe heat failure while in icing conditions, the information provided by the ADRs may be erroneous.

---

2. If icing conditions cannot be avoided,
  - One affected ADR pb . . . . . OFF

---

**Caution!** There will be a disagreement between the two remaining ADRs. Refer to “NAV ADR DISAGREE” on page 11.21

---



WING A. ICE L (R) HI PR

**Condition:** Wing anti-ice has high pressure.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness

**Note:** FADEC will apply the appropriate thrust limit corrections.

STATUS

|  |           |
|--|-----------|
|  | INOP SYS  |
|  | WAI REGUL |



WING A. ICE L (R) VALVE OPEN

**Condition:** One wing anti-ice valve not closed when the wing anti-ice is selected off.

- If the failure is detected on the ground:
- WING ANTI ICE . . . . . OFF
  - ENG BLEED (affected side) . . . . . OFF
  - X BLEED . . . . . SHUT
  - APU BLEED (if left wing affected) . . . . . OFF
  - Return to the gate. Maintenance action is required.



- If the failure is detected in flight.
- Use the wing anti-ice as required.
 

**Note:** Wing anti-ice is continuously on for the affected side.
  - FADEC will apply the appropriate thrust corrections.
  - AFTER LANDING:
    - WING ANTI ICE . . . . . OFF
    - ENG BLEED (affected side) . . . . . OFF
    - X BLEED selector . . . . . SHUT
    - APU BLEED . . . . . OFF

**STATUS**

|  |           |
|--|-----------|
|  | INOP SYS  |
|  | ENG BLEED |



**WING A. ICE OPEN ON GND**

**Condition:** On the ground the valves remain open more than 35 seconds after the wing anti-ice is selected on.

1. WING ANTI ICE . . . . . OFF
- Note:** Wing anti-ice is available in flight.



**WING A. ICE SYS FAULT**

**Condition:** In flight, one wing valve remains closed when wing anti-ice is selected on.

1. Crosscheck the WING ANTI ICE indications on the ECAM BLEED page.
- ▶ If only one wing anti-ice valve indicates open with the WING ANTI ICE pb ON:
    - WING ANTI ICE . . . . . OFF
    - Avoid icing conditions.
  - > If Ice accumulates:
    - Maintain not less than  $V_{LS} + 10$ .
    - LDG DIST PROC . . . . . APPLY (refer to the ODM)

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | WING A. ICE     |



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## AUTO FLT FAC 1 (2) FAULT

**Condition:** Flight augmentation computer 1 (2) is inoperative.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.8, FAC, Computer Resets.
- ▶ If in flight:
  1. FAC (affected). . . . . OFF THEN ON
    - > IF UNSUCCESSFUL:
      - FAC (affected) . . . . . OFF

**Note:** All characteristic speeds displayed on both PFDs are computed by the operational FAC.

### STATUS

*CAT III approach not authorized.*

|                                                                                       |                 |
|---------------------------------------------------------------------------------------|-----------------|
|                                                                                       | <i>INOP SYS</i> |
| BOTH PFD ON SAME FAC                                                                  | CAT 3 DUAL      |
| Characteristic speeds,<br>displayed on the two PFDs, are<br>computed by the same FAC. | FAC 1 (2)       |
| CAT 3 SINGLE ONLY                                                                     |                 |





▼ **AUTO FLT FAC 1 + 2 FAULT continued** ▼

**STATUS**

*CAT II or III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                        | <i>INOP SYS</i> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| MAX SPEED . . . . . 320 KT                                                                                                                        | WINDSHEAR DET   |
| RUD WITH CARE ABV 160 KT                                                                                                                          | F/CTL PROT      |
| APPR PROC                                                                                                                                         | FAC 1 + 2       |
| • FOR LDG . . . . .USE FLAP 3                                                                                                                     | AP 1 + 2        |
| • GPWS LDG FLAP 3 . . . .ON                                                                                                                       | A/THR           |
| • $V_{APP} = V_{LS} (FULL) + 10 \text{ kts.}$<br>Enter the increased $V_{APP}$<br>on the PERF APPR page.                                          |                 |
| • LDG DIST PROC. . . .APPLY<br>(refer to the ODM)                                                                                                 |                 |
| ALTN LAW: PROT LOST                                                                                                                               |                 |
| WHEN L/G DN: DIRECT LAW                                                                                                                           |                 |
| • At landing gear extension,<br>control reverts to direct<br>law in pitch, as well as in<br>roll (refer to “F/CTL<br>DIRECT LAW” on page<br>9.5). |                 |
| CAT 1 ONLY.                                                                                                                                       |                 |





## AUTO FLT FCU 1 + 2 FAULT

**Condition:** Flight Control Units 1 and 2 are inoperative.

PFD BARO REF: STD ONLY

|||||

1. Reset the system as shown on page NNOI.1.8, FCU, Computer Resets.

**Note:** All FCU controls are inoperative. A/THR, AP 1 + 2, and FD 1 + 2 are not available. (Except in LAND or GO AROUND mode, where only A/THR is lost.)

---

---

**Warning! Set the current BARO value in the standby altimeter. Use only this instrument for accurate altitude information.**

---

---

On the PFD:

- The altitude alert system is inoperative
- The ILS deviation scales are displayed
- The Flight Path Vector is displayed
- Mach display indication is inoperative
- The FMA is lost, except in LAND or GA mode.
- The BARO value defaults to 29.92

▼ Continued on next page ▼

▼ **AUTO FLT FCU 1 + 2 FAULT continued** ▼

On the ND:

The ROSE mode with map (80NM range) is displayed

The VOR/ADF needles:

- Needle 1 indicates VOR 1 only
- Needle 2 (green) indicates ADF information
- VOR 2 information is only available on the DDRMI

**Note:** The weather radar image may be lost. Disregard the image, if it remains displayed. In all cases, the red "WXR RNG" message appears.

**STATUS**

*Cat II or III approach or RVSM flight not authorized.*

|                                                                                                                                                                                                          | INOP SYS  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| PFD BARO REF : STD ONLY                                                                                                                                                                                  | FCU 1 + 2 |
|                                                                                                                                                                                                          | FD 1+2    |
| CAT 1 ONLY                                                                                                                                                                                               | AP 1+2    |
| <ul style="list-style-type: none"><li>• Do not insert the MDA (MDH) value on the MCDU PERF APPR page (because the PFD altitude is referenced to STD, and not to the correct barometric value).</li></ul> | A/THR     |
|                                                                                                                                                                                                          | CAT 3     |
| <ul style="list-style-type: none"><li>• The PM must then perform the standard callouts ("HUNDRED ABOVE" and "MINIMUMS"), using the STBY altimeter.</li></ul>                                             | GPWS TERR |





**AUTO FLT RUD TRIM 1 (2) FAULT**

**Condition:** A single rudder trim channel is inoperative.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.8, FAC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

*CAT III approach not authorized.*

|                   |                              |
|-------------------|------------------------------|
|                   | INOP SYS                     |
| CAT 3 SINGLE ONLY | CAT 3 DUAL<br>RUD TRIM 1 (2) |





**AUTO FLT RUD TRV LIM 1 (2)**

**Condition:** A rudder travel limiter is inoperative.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.8, FAC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                   |
|--|-------------------|
|  | INOP SYS          |
|  | RUD TRV LIM 1 (2) |





**AUTO FLT YAW DAMPER 1 (2)**

**Condition:** A single yaw damper system is inoperative.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.8, FAC, Computer Resets.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

*Operations on 100' wide runways not authorized.*  
*CAT III approach not authorized.*

|                   |                                |
|-------------------|--------------------------------|
|                   | INOP SYS                       |
| CAT 3 SINGLE ONLY | CAT 3 DUAL<br>YAW DAMPER 1 (2) |



**CAT 3 Dual**

**Condition:** CAT 3 DUAL is displayed in INOP SYS without any other failure being detected.

- ▶ If on the ground:
  - Consult with Maintenance Control for possible reset.
- ▶ If in flight:
  - Switch the autopilot in use.
  - > If CAT 3 DUAL is no longer displayed:
    - Make an INFO ONLY logbook write-up.

■ ■ ■ ■
  - > If CAT 3 DUAL is still displayed
    - FAC 1 . . . . . OFF, then ON  
Wait for FAC 1 fault message to disappear from ECAM.
    - FAC 2 . . . . . OFF, then ON
  - >> If CAT 3 DUAL is no longer displayed:
    - Make an INFO ONLY logbook write-up.

■ ■ ■ ■
  - >> If CAT 3 DUAL is still displayed:
    - CAT III approach not authorized.

■ ■ ■ ■

WINDSHEAR DET FAULT

**Condition:** Windshear detection is inoperative

- ▶ If on the ground and a spurious message is suspected:
  - Reset the system as shown on page NNOI.1.8, FAC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

STATUS

|  |               |
|--|---------------|
|  | INOP SYS      |
|  | WINDSHEAR DET |



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## ATSU INIT FAULT

**Condition:** ATSU has failed authorization.

1. Reset the system as shown on page on page NNOI.1.6, ATSU, Computer Resets.
2. Re-initialize ATSU following computer reset.



## COM ACARS FAULT

**Condition:** ACARS is inoperative.

1. Contact Maintenance Control to reset the system.

► If the reset is successful:



► If the reset is unsuccessful:

- Refer to the ACARS “NO COMM” procedures in the Airway Manual, ATC Flt Control & Communication.

### STATUS

INOP SYS

ACARS



### COM CIDS 1 + 2 FAULT

**Condition:** The PA system, cabin/flight deck interphone, and cabin signs are inoperative.

**Note:** If desired, reset the system as per on page NNOI.1.7, CIDS, Computer Resets.

- ▶ If the interphone fails in flight, see “Interphone Inoperative” on page 5.7.

| INOP SYS

| CIDS



### COM SINGLE PTT STUCK

**Condition:** A Push to Talk (PTT) transmission is stuck on.

1. Check and cycle each PTT selector.

- ▶ If message remains:
  - Attempt isolate malfunctioning selector by selecting INT on the associated ACP.



**COM VHF 3 DATA FAULT**

**Condition:** Datalink communications on VHF 3 are inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

INOP SYS

VHF3 DATA



**COM VHF (1) (2) (3) or  
HF (1) (2) EMITTING**

**Condition:** Stuck microphone or ACP malfunction.

1. Check all the transmission (push-to-talk) switches on the audio control panels, side sticks, and handheld mikes.
2. Attempt to release any switch that is jammed in the transmit position.

► If successful:



► If the problem persists:

- Deselect the affected VHF/HF transmission key on each ACP (1, 2, 3) one at a time in an attempt to identify the affected transmission key.
- > If a malfunctioning ACP transmission key is identified:
  - Use the ACP transmission key on the opposite side for communications, or
  - Select ACP 3 in lieu of the malfunctioning ACP via the AUDIO SWITCHING selector.



▼ Continued on next page ▼

▼ COM VHF (1) (2) (3) or HF (1)(2) EMITTING continued ▼

- > If emission continues or a jammed switch cannot be released:
  - Locate the affected VHF, HF or ACP C/B (see chart below).

**Note:** Note current ATC frequencies before pulling C/Bs since they may be lost.

- Pull each C/B one at time to see if communications are regained (reset the previous C/B before pulling the next).
  - >> If normal communications are regained:
    - **Do Not** reset the affected C/B.
    - Select ACP 3 in lieu of the malfunctioning ACP via the AUDIO SWITCHING selector.

**VHF/ACP C/B Chart**

| C/Bs     | Location | Panel  |
|----------|----------|--------|
| VHF 1    | G 09     | 49 VU  |
| VHF 2    | L 04     | 121 VU |
| VHF 3    | L 05     | 121 VU |
| HF 1     | HA 14    | 49 VU  |
| HF 2     | L 13     | 121 VU |
| CAPT ACP | G 06     | 49 VU  |
| F/O ACP  | G 07     | 49 VU  |
| 3rd ACP  | M 02     | 121 VU |



**DATALINK ATSU FAULT**

**Condition:** ATSU is inoperative.

1. Reset the system as shown on page NNOI.1.6, ATSU, Computer Resets.
2. Re-initialize ATSU following computer reset.

**DATALINK COMPANY FAULT**

**Condition:** ATSU is inoperative.

1. Reset the system as shown on page NNOI.1.6, ATSU, Computer Resets.
2. Re-initialize ATSU following computer reset.



## Interphone Inoperative

**Condition:** The cabin interphone is inoperative.

1. Coordinate alternate communications with the flight attendants for the remainder of the flight.
2. Avoid use of PA for direct messages to flight attendants except in an emergency.
3. Brief the flight attendants on the following alternate emergency procedure.

| Cabin Interphone System Inoperative |                               |                                                  |                                                                                                                          |
|-------------------------------------|-------------------------------|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Source of Abnormal                  |                               | Pilot Action                                     | Briefing Items                                                                                                           |
| Flight Deck                         | Cabin                         |                                                  |                                                                                                                          |
| Smoke/Fire                          |                               | Use PA.                                          | Pilots will use the PA to contact the flight attendants. Subsequent communication will be face-to-face, time permitting. |
| Emergency Landing                   |                               |                                                  |                                                                                                                          |
| Ditching                            |                               |                                                  |                                                                                                                          |
| Evacuation or Rejected Takeoff      |                               |                                                  |                                                                                                                          |
|                                     | Hijacking/<br>Security Threat | Monitor PA after receiving the emergency signal. | Flight attendant will use the emergency signal to notify pilots to monitor the PA                                        |
|                                     | Smoke/Fire                    |                                                  | Flight attendant will use the emergency signal to notify pilots to monitor the PA.                                       |
|                                     | Passenger Medical Problem     |                                                  |                                                                                                                          |



## PA Inoperative

**Condition:** Passenger address system is inoperative.

The MEL allows dispatch with the PA system inoperative as long as the Flight Deck/Cabin Interphone system is operative and alternate procedures for communication are established.

| <b>Public Address System Inoperative</b>                        |                                          |                                                                            |                                                                                                                                                                        |
|-----------------------------------------------------------------|------------------------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Source of Abnormal</b>                                       |                                          | <b>Pilot Action</b>                                                        | <b>Briefing Items</b>                                                                                                                                                  |
| <b>Flight Deck</b>                                              | <b>Cabin</b>                             |                                                                            |                                                                                                                                                                        |
| Smoke/Fire                                                      | Smoke/Fire                               | Use cabin interphone.                                                      | No changes to current procedures.<br>Any public announcements will be made by the flight attendants using megaphones.                                                  |
|                                                                 | Hijacking                                |                                                                            |                                                                                                                                                                        |
|                                                                 | Passenger Problem (Medical/ Disturbance) |                                                                            |                                                                                                                                                                        |
| Emergency Landing<br>Ditching<br>Evacuation or Rejected Takeoff |                                          | Use emergency signal to alert flight attendants to an emergency situation. | Subsequent communication will be via the interphone or face-to-face, time permitting. Any public announcements will be made by the flight attendants using megaphones. |

- ▶ If both the PA system and interphone system are inop while airborne:
  - Coordinate alternate communication procedures with the flight attendants for the remainder of the flight.
  - See “COM CIDS 1 + 2 FAULT” on page 5.2.

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Electrical Systems ECAM Advisories . . . . . 6.1

**Flight On Battery Only (A320 Only) . . . . . 6.51**

## Electrical Systems ECAM Advisories

Condition: A system parameter exceeds its normal range, the associated E/WD page is displayed, and the affected parameter pulses in green.

| ELEC Advisory Displayed   |                                                                                                                                                                                                   |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                 | Recommended Action                                                                                                                                                                                |
| IDG OIL TEMP $\geq$ 147°C | > Reduce IDG load, if possible: <ul style="list-style-type: none"> <li>• GALLEY pb . . . . . OFF</li> <li>• APU (if available) . . . . START</li> <li>• Affected GEN . .confirm. . OFF</li> </ul> |



---

**C / B TRIPPED**

---

**Condition:** A green colored circuit breaker has tripped.

**In Flight**

- The crew **MUST NOT** reengage a tripped C/B.

**On Ground**

- Resetting a tripped circuit breaker after a five-minute cooling period, is only permitted if:
  - coordinated with maintenance, and
  - the cause of the tripping is identified.

---

**Caution! Never reset a tripped fuel pump circuit breaker.**

---

- Make an **INFO ONLY** logbook writeup if the failed system is restored
- See Circuit Breaker Policy on page NNCI.1.4.





▼ **ELEC AC BUS 1 FAULT** continued ▼

**STATUS**

*CAT II or III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                      | <i>INOP SYS</i>          |
|-----------------------------------------------------------------|--------------------------|
| 1. LDG DIST PROC . . .APPLY<br>(refer to the ODM)<br>SLATS SLOW | See the following table. |

▼ **Continued on next page** ▼

▼ ELEC AC BUS 1 FAULT continued ▼

| <b>Systems lost with AC BUS 1 FAULT</b>                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADF 1 ***<br>ADR 3 *<br>ACARS<br>Blower fan *<br>Blue electric hydraulic pump *<br>BSCU 1<br>Cabin fan, left<br>Cargo vent *<br>CAT 3 *<br>DMC 3 *<br>EVMU, both engines<br>FDIU *<br>Fuel pump 1, center tank, and both wing tanks *<br>Galley fan *<br>GPWS *<br>GPWS TERR*<br>Heat for captain's TAT *<br>Heat for standby AOA *<br>HF1 (if installed) | Hydraulic quantity indication<br>Ignition B, engine 1<br>Main galley*<br>ND display, captain***<br>N.W. steering<br>Pack 1 controller *<br>Printer<br>RADAR 1<br>Radio altimeter 1 *<br>Reverser 1 **<br>Spoiler 3 *<br>TCAS<br>Vent blower*<br>Window and windshield heat, left *<br>Zone controller, primary channel |
| <p><b>Note:</b> * Items are listed on the ECAM STATUS page.</p> <p><b>Note:</b> ** On ships 3209-3250 only, Reverser 1 remains operational.</p> <p><b>Note:</b> *** Items INOP on ships 3209-3211 only. If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.</p>                                           |                                                                                                                                                                                                                                                                                                                        |



**ELEC AC BUS 2 FAULT**

**Condition:** AC Bus 2 is not powered.

1. EXTRACT pb . . . . . OVRD

**Note:** Avionics system is in closed configuration. Air conditioning air is added to the ventilation air.

**Note:** Due to the loss of Pack 2 controller, the pack outlet temperature is controlled by the anti-ice valve and is stabilized at a temperature between 5°C (41°F) and 30° (86°F).

**Note:** To display system status pages on the upper ECAM, press and hold the appropriate ECAM pb.

**Note:** Both PFDs will display FAC 1 information.

**STATUS**

*CAT II or III approach not authorized.*

|  |                          |
|--|--------------------------|
|  | INOP SYS                 |
|  | See the following table. |

▼ Continued on next page ▼

▼ **ELEC AC BUS 2 FAULT continued** ▼

| <b>Systems lost with AC BUS 2 FAULT</b>                                                                                                                                                                                                                            |                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ADR 2 *<br>ATC transponder 2<br>BSCU channel 2<br>Cabin fan, right<br>DMC 2 *<br>DME 2<br>ECAM (lower unit)<br>Extract fan *<br>FAC 2 *<br>Fuel pump 2, center tank,<br>and both wing tanks *<br>FWC 2*<br>GPS 2<br>Heat for pitot, TAT, and<br>AOA, first officer | Ignition B, engine 2<br>ILS 2 *<br>LGCIU 2<br>Main Galley<br>MCDU 2<br>Pack 2 controller *<br>PFD and ND, right<br>Radio altimeter 2 *<br>Reverser 2<br>SDAC 2 *<br>VOR 2<br>Window and windshield<br>heat, right *<br>Yellow electric pump * |
| <b>Note:</b> * Items are listed on the ECAM STATUS page.<br>If the warning was caused by the failure of a sub<br>bus, only part of the listed systems may be lost.                                                                                                 |                                                                                                                                                                                                                                               |



**ELEC AC ESS BUS ALTN**

**Condition:** The AC essential bus is being supplied from AC BUS 2 with the AC ESS FEED pb in the normal position. (On the ground only.)

► If on the ground:

- Consult with Dispatch/Maintenance Control for possible MEL relief.



**Condition:** Auto switching of the AC ESS FEED has not occurred and the AC ESS BUS is unpowered.

1. AC ESS FEED pb . . . . . ALTN  
(Displayed if auto AC ESS transfer failed)
  2. ATC/XPDR . . . . . SYS 2
- |||||
3. AP and A/THR . . . . . Re-engage, if possible
  4. Desired FMA modes . . . . . Re-engage or verify
    - If the AC essential bus fails to transfer and remains unpowered:
      - SWITCHING EIS DMC . . . . . CAPT 3
      - SWITCHING AIR DATA. . . . . CAPT 3
      - ATC transponder . . . . . SYS 2
      - Do not exceed FL 250.

**Note:** Both PFDs will display FAC 2 information.

## STATUS

*CAT II or III approach not authorized.*

INOP SYS

See the following table.

▼ Continued on next page ▼

▼ ELEC AC ESS BUS FAULT continued ▼

| Systems lost with AC ESS BUS FAULT                                                                                                                                                                  |                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC ESS BUS SHED<br><b>Note:</b> See next page for Systems lost with AC Essential Shed Bus.<br><br>ADF<br>ADR 1 *<br>CVR<br>DDRMI<br>DMC 1 *<br>ECAM upper display<br>ENG IGN A<br>FAC 1 *<br>FWC 1* | GPS 1<br>GPWS<br>GPWS TERR<br>ILS 1 *<br>MCDU 1<br>PFD & ND, captain<br>Pitot & AOA, captain *<br>RMP lighting (RMPs are operative)<br>Rud Trim 1<br>Rud Trv Lim 1<br>SDAC 1 *<br>VOR 1<br>Yaw Damper 1 |
| <b>Note:</b> * Items are listed on the ECAM STATUS page. If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.                                        |                                                                                                                                                                                                         |



## ELEC AC ESS BUS SHED

**Condition:** The AC Essential Shed Bus is not powered.

1. ATC transponder . . . . . SYS 2
2. Do not exceed FL 250 due to PASSENGER OXYGEN.

### STATUS

|  |                      |
|--|----------------------|
|  | INOP SYS             |
|  | See the table below. |

| Systems lost with AC ESS BUS SHED                                                                                                                                                                                                                                                                                                                                                   |                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| ADF 1*<br>APU FUEL PUMP<br>ATC transponder 1<br>Captain's ND*<br>Captain's AOA<br>CVR                                                                                                                                                                                                                                                                                               | DME 1<br>PASSENGER OXYGEN<br>MASKS (automatic and manual)<br>MCDU 1 |
| <p><b>Note:</b> If the warning was caused by a failure on a sub bus, only part of the systems listed may be lost.</p> <p><b>Note:</b> Lights on RMP, FCU, and Center Instrument Panel may be out. Verify status of autoflight, autothrust, and landing gear by alternate means (FMA, ECAM, etc.).</p> <p><b>Note:</b> * Items INOP on aircraft <u>3212-32XX</u> plus all A319s.</p> |                                                                     |



**ELEC APU GEN FAULT**

**Condition:** Protection trip initiated by the GCU or the line contactor has opened with the APU GEN pb ON.

1. APU GEN pb . . . . . OFF then ON
- ▶ If the APU generator reset is unsuccessful:
    - APU GEN . . . . . OFF
  - ▶ If on the ground:
    - Contact Maintenance.
  - ▶ If in flight:
    - APU is limited to emergency use only.

**STATUS**

|  |                                                         |
|--|---------------------------------------------------------|
|  | INOP SYS                                                |
|  | APU GEN                                                 |
|  | MAIN GALLEY (if using only one engine driven generator) |



**ELEC APU GEN OVERLOAD**

**Condition:** APU generator load is above 100% of rated output.

1. GALLEY pb . . . . . OFF

**STATUS**

|  |          |
|--|----------|
|  | INOP SYS |
|  | GALLEY   |



### ELEC BAT 1 (2) FAULT

**Condition:** Charging current has increased at an abnormally high rate and the battery contactor has opened.

**Note:** A battery start of the APU is not available.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

#### STATUS

|  |           |
|--|-----------|
|  | INOP SYS  |
|  | BAT 1 (2) |



### ELEC BAT 1 (2) OFF

**Condition:** A battery is selected OFF.

**Note:** A battery start of the APU is not available.

- ▶ If desired:
  - Affected BAT . . . . . ON



**ELEC BCL 1 (2) FAULT**

**Condition:** The charging current on a battery has increased at an abnormal rate.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

|  |                   |
|--|-------------------|
|  | INOP SYS          |
|  | BCL 1 (2)         |
|  | APU BATTERY START |



## ELEC DC BAT BUS FAULT

**Condition:** DC Battery Bus is not powered.

**Note:** A battery start of the APU is not available.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

### STATUS

|  |                      |
|--|----------------------|
|  | INOP SYS             |
|  | See the table below. |

| Systems lost with DC BAT BUS FAULT                                                                                                                                                                 |                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| APU ECB (APU battery start is not available)<br>APU fuel LP valve<br>Aft Cargo Isolation valves**<br>Aft Cargo Heat **<br>Aft Cargo Fire Ext<br>APU FIRE DET<br>Cross bleed valve manual control** | Manual pressurization<br>Engine 1 and 2 fuel HP valve<br>Side stick and rudder pedals locking function (while AP is engaged) |
| <b>Note:</b> ** Items INOP on aircraft <u>3209-3211</u> only.<br>If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.                               |                                                                                                                              |



**ELEC DC BUS 1 FAULT**

**Condition:** DC Bus 1 is not powered.

- 1. BLOWER pb . . . . . OVRD
- 2. EXTRACT pb . . . . . OVRD

**Note:** Avionic ventilation air is provided by air conditioning and extracted overboard.

**Note:** Pack 1 controls the temperature of the flight deck and produces air at a fixed temperature of 60°F.

Pack 2 controls the temperature of the cabin and produces air at a fixed temperature of 76°F. (Primary channel of the zone controller is inoperative.)

**Note:** With fuel in center tank, watch for imbalance.

**STATUS**

*CAT II or III approach not authorized.*

|  |                          |
|--|--------------------------|
|  | INOP SYS                 |
|  | See the following table. |

▼ Continued on next page ▼

▼ ELEC DC BUS 1 FAULT continued ▼

| <b>Systems lost with DC BUS 1 FAULT</b>                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ACP 3 *<br>Avionics Ventilation *<br>Brake temperature indicators<br>BSCU channel 1<br>Cabin fan, left<br>Cargo Heat *<br>CFDIU<br>Fuel pump 1, center tank *<br>Galley fan *<br>GPS 1<br>Heat for captain and standby static ports *<br>Hot Air *                                                                                             | Oil pressure indication, engine 1<br>Oil quantity indication, engine 1<br>Pack 1 controller *<br>REV 1***<br>SELCAL<br>TR 1 *<br>VHF 3<br>Window and windshield heat, left *<br>Windshield wiper, left<br>Wing anti-ice **<br>Zone controller, primary channel |
| <p><b>Note:</b> * Items are listed on the ECAM STATUS page.</p> <p><b>Note:</b> ** Items INOP on aircraft <u>3209-3211</u> only.</p> <p><b>Note:</b> *** Items INOP on aircraft <u>3251 &amp; subsequent</u>.<br/>                     If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.</p> |                                                                                                                                                                                                                                                                |



**ELEC DC BUS 1 + 2 FAULT**

**Condition:** DC Busses 1 and 2 are not powered.

1. BLOWER pb . . . . . OVRD
2. EXTRACT pb . . . . . OVRD

**Note:** Avionic ventilation air is provided by air conditioning and extracted overboard.

3. Cross-check barometric settings between FCU and PFD.
4. Avoid icing conditions as window heat, windshield heat, and static port heat are inoperative.
5. See Approach Procedures.

**Note:** Pack 1 controls the temperature of the flight deck and produces air at a fixed temperature of 60°F.

Pack 2 controls the temperature of the cabin and produces air at a fixed temperature of 76°F.

**Note:** At idle selection, engines will reduce to approach idle.

**Note:** Both PFDs receive their information from FAC 1.

▼ Continued on next page ▼

▼ ELEC DC BUS 1 + 2 FAULT continued ▼

**STATUS**

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                 | INOP SYS                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| <ol style="list-style-type: none"> <li>Maximum brake pressure should be limited to 1,000 PSI due to the loss of anti-skid.</li> <li>Due to partial loss of ground spoilers and loss of anti-skid:<br/>LDG DIST PROC. . . . Apply<br/>(refer to the ODM).<br/>SLATS SLOW.</li> </ol> | See the following table. |

▼ Continued on next page ▼

▼ ELEC DC BUS 1 + 2 FAULT continued ▼

| <b>Systems lost for DC BUS 1 + 2 FAULT</b> |                                                 |
|--------------------------------------------|-------------------------------------------------|
| ACP 3                                      | Fire loop A, Engine 2 *                         |
| Anti-skid *                                | FQI channel 2                                   |
| AP 2 *                                     | FMGC 2 (Nav function of FMGC 1 still available) |
| APU battery start                          | Fuel pump 2, both wing tanks *                  |
| APU ECB; LP fuel valve                     | Fuel pumps 1 and 2, center tank                 |
| APU fire detection                         | Galley fan *                                    |
| Autobrakes                                 | GPS 1+2                                         |
| Avionic ventilation *                      | Heat for all static ports *                     |
| BMC 2                                      | Heat for window and windshields *               |
| BSCU channel 1+2                           | Hot air *                                       |
| Brake temperature indicator                | Lav smoke detection                             |
| Cabin fans *                               | LGCIU 2 *                                       |
| Cabin pressure controller 2*               | Loudspeaker, right                              |
| Cargo heat *                               | Main galley                                     |
| CFDIU                                      | Manual press control                            |
| Cockpit Door Locking System                | Nose wheel steering *                           |
| Cross bleed controller                     | Oil pressure indication                         |
| ELAC 2 *                                   | Oil quantity indication                         |
| FAC 2 *                                    | Pack 1 and 2 controllers *                      |
| FCU channel 2                              | Reverser, engine 2 * (**1 & 2)                  |
| FCDC 2 *                                   | RMP 2                                           |
| Fire bottle 2 for both engines             | Rudder trim indication                          |
| Fire loop B, Engine 1 *                    |                                                 |

▼ Continued on next page ▼

▼ ELEC DC BUS 1 + 2 FAULT continued ▼

| <b>Systems lost for DC BUS 1 + 2 FAULT (Continued)</b>                                                                                                                                                                                                                                                                     |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| SDCU 1 * and 2 *                                                                                                                                                                                                                                                                                                           | VHF 2 * and VHF 3      |
| SEC 2 * and SEC 3 *                                                                                                                                                                                                                                                                                                        | Windshield wipers      |
| SELCAL                                                                                                                                                                                                                                                                                                                     | Wing anti-ice **       |
| SFCC 2                                                                                                                                                                                                                                                                                                                     | Yellow electric pump * |
| Spoilers 1, 2, and 5 *                                                                                                                                                                                                                                                                                                     | Zone controller *      |
| TR 1 *                                                                                                                                                                                                                                                                                                                     |                        |
| <p><b>Note:</b> * Items are listed on the ECAM STATUS page.</p> <p><b>Note:</b> ** Items INOP on aircraft <u>3209-3211</u> only.</p> <p><b>Note:</b> *** Items INOP on aircraft <u>3251 &amp; subsequent</u>.<br/> If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.</p> |                        |



**ELEC DC BUS 2 FAULT**

**Condition:** DC Bus 2 is not powered.

- 1. SWITCHING AIR DATA selector . . . . . F/O 3
- 2. Cross-check barometric settings between FCU and PFD.

**Note:** Pack 2 controls the temperature of the cabin and produces air at a fixed temperature of 60°F. (Pack controller inoperative.)

**Note:** At idle selection, engine number two will reduce only to approach idle.

**Note:** Both PFDs receive their information from FAC 1.

**STATUS**

*CAT III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                         | INOP SYS                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| <p>► IF DC ESS BUS IS OFF. . LDG GRVTY EXTN</p> <ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN hand crank 3 turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . . DOWN</li><li>• Check for proper gear down indications.</li></ul> <p>LDG DIST PROC . . . . . APPLY<br/>(refer to the ODM)<br/>(due to partial loss of<br/>spoilers.)</p> <p>SLATS &amp; FLAPS SLOW.</p> | <p>See the following table.</p> |

▼ Continued on next page ▼

▼ ELEC DC BUS 2 FAULT continued ▼

| <b>Systems lost with DC BUS 2 FAULT</b>                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AP 2 *<br>Autobrakes<br>Bleed cross feed auto control<br>BMC 2<br>BSCU channel 2<br>Cabin fan, right<br>Cabin pressure controller 2*<br>Cockpit Door Locking System<br>ELAC 2 * - (recovered after L/G extension)<br>FAC 2 *<br>FCDC 2 *<br>FCU 2<br>Fire bottle 2, both engines<br>Fire loop A, engine 2 *<br>Fire loop B, engine 1 *<br>FMGC 2<br>FQI channel 2<br>Fuel pump 2, center tank, and both wing tanks *<br>GPS 2<br>Heat for first officer static port * | LGCIU 2 *<br>Loudspeaker, right<br>Main galley *<br>Oil pressure indicator, engine 2<br>Oil quantity indicator, engine 2<br>Pack 2 controller *<br>Reverser, engine 2<br>RMP 2<br>Rudder trim indication<br>SDCU 2<br>SEC 2 * and SEC 3 *<br>SFCC 2<br>Spoilers 1, 2, and 5 *<br>VHF 2 *<br>Window and windshield heat, right *<br>Windshield wiper, right<br>Yellow electric pump *<br>Zone controller, secondary channel |
| <p><b>Note:</b> * Items are listed on the ECAM STATUS page. If the warning was caused by the failure of a sub bus, only part of the listed systems may be lost.</p>                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                            |



**ELEC DC EMER CONFIG**

**Condition:** The DC Bus 1, DC Bus 2, and DC Essential Bus are unpowered; DC BAT BUS is lost.

- 1. Land As Soon As Possible.
  - 2. EMER ELEC PWR . . . . . MAN ON
- |||||

**Note:** A319 - The emergency generator supplies DC ESS BUS.

A320 - The emergency generator supplies DC ESS BUS as long as the landing gear is up.

But, DC BUS 1, DC BUS 2, and DC BAT BUS are still not supplied.

- 3. Maintain at least 140 knots to ensure that the RAT remains powered.
- 4. Avoid icing conditions.
- 5. Fuel gravity feed only.  
See “Gravity Feed Procedure” on page 12.32.
- 6. (A320 only) All ACPs are lost at landing gear extension.
- 7. Increase landing distance (refer to the ODM).
- 8. See “ELEC DC BUS 1 + 2 FAULT” on page 6.18.

▼ Continued on next page ▼

▼ ELEC DC EMER CONFIG continued ▼

**STATUS**

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                             | INOP SYS       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| MIN RAT SPEED . . . . . 140 KT<br>PROC: GRVTY FUEL FEEDING<br>MAX BRK PR . . . . . 1000 PSI<br>FUEL GRVTY FEED<br>LDG DIST PROC . . . . . APPLY<br>(refer to ODM)<br>ENG 1 APPR IDLE ONLY<br>ENG 2 APPR IDLE ONLY<br>BOTH PFD ON SAME FAC<br>CTR TK FUEL UNUSABLE<br>APU BAT START NOT AVAIL<br>CAB ZONE AT FIXED TEMP<br>PACKS AT FIXED TEMP<br>SLATS/FLAPS SLOW<br>CAT 2 ONLY | See list below |

**INOP SYS displayed on ECAM (A319 and A320)**

|              |              |                |
|--------------|--------------|----------------|
| FCU 2        | GALLEY FAN   | GPS 1 + 2      |
| CAT 3        | CRG HEAT     | SPLR 1 + 2 + 5 |
| FAC 2        | GND COOL     | ELAC 2         |
| FUEL PUMPS   | GPS 1+2      | SEC 2 + 3      |
| ANTI SKID    | MAIN GALLEY  | VHF 2          |
| Y ELEC PUMP  | ACP 3        | N.W. STEER     |
| BSCU CH 1    | CAPT STAT    | LGCIU 2        |
| BSCU CH 2    | F/O STAT     | REVERSER 2     |
| APU FIRE DET | STBY STAT    | CAB PRESS 2    |
| LAV DET      | WSHLD HEAT   | AVNCS VENT     |
| ENG 1 LOOP B | WNDW HEAT    | VENT BLOWER    |
| L+R CAB FAN  | PACK 1 REGUL | ENG 2 LOOP A   |
| FCDC 2       | PACK 2 REGUL | AP2            |

▼ Continued on next page ▼

▼ ELEC DC EMER CONFIG continued ▼

**INOP SYS displayed on ECAM after L/G extension  
(DC ESS BUS Lost)**

**A320 only**

|                |              |               |
|----------------|--------------|---------------|
| BLUE HYD       | FCDC 2       | A/THR         |
| SPLR 3         | FCU 1        | GALLEY FAN    |
| SPLR 1 + 2 + 5 | FCU 2        | CRG HEAT      |
| ELAC 2         | CAT 3        | GND COOL      |
| SEC 2 + 3      | FAC 1        | MAIN GALLEY   |
| VHF 1          | FAC 2        | B ELEC PUMP   |
| VHF 2          | FUEL PUMPS   | Y ELEC PUMP   |
| ACP 1 + 2 + 3  | ANTI SKID    | BSCU CH 1     |
| LGCIU 2        | N.W. STEER   | BSCU CH 2     |
| REVERSER 2     | GPWS         | CAPT STAT     |
| ENG 2 START    | APU FIRE DET | F/O STAT      |
| CAB PRESS 1    | LAV DET      | STBY STAT     |
| CAB PRESS 2    | ENG 1 LOOP A | WING A. ICE   |
| AVNCS VENT     | ENG 1 LOOP B | WSHLD HEAT    |
| VENT BLOWER    | ENG 2 LOOP A | WNDW HEAT     |
| PACK 1 REGUL   | ENG 2 LOOP B | VENT EXTRACT  |
| PACK 2 REGUL   | AP 1 + 2     | L + R CAB FAN |
| FCDC 1         |              |               |

**Note:** To verify the other INOP SYS not displayed on the ECAM, refer to:

“ELEC DC BUS 1 + 2 FAULT” on page 6.18

“ELEC DC BAT BUS FAULT” on page 6.15



**Condition:** The DC Essential Bus is not powered.

1. VHF 2 or 3 . . . . . USE  
2. AUDIO SWTG . . . . . SELECT

**Note:** ACP 1 and 2 are lost. Therefore, set the AUDIO SWTG selector to CAPT 3 or F/O 3 to recover communications.

Use ACP 3 (on the overhead panel) for communication.

**Note:** Ships 3277, 3278, and 3165 - 3171: All audio communications (VHF and HF) may be lost and are unrecoverable. See Airway Manual, OPS-1PF, JEPP Tab.

3. BARO REF. . . . . CHECK  
4. GPWS SYS . . . . . OFF

At idle selection, engines will reduce to approach idle.

- ## 5. Avoid Icing Conditions.

**Note:** Captain's ND will display FMGC 2 data only if first officer and captain EFIS control switches are matched.

6. See Approach Procedures.

**Caution! To shut down the engines on ground, use the ENG FIRE pb(s).**

▼ Continued on next page ▼

**STATUS**

*Cat II or III approach not authorized*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INOP SYS |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <div><div>▶ IF DC BUS 2 IS OFF. . . . LDG GRVTY EXTN</div><div><div>• When landing gear extension is desired:</div><div><div>• Raise and turn the GRAVITY GEAR EXTN hand crank 3 turns until the mechanical stop is reached.</div></div></div><div><div>• LDG GEAR lever . . . . DOWN</div><div>• Check for proper gear down indications.</div></div><div><div>▶ IF ICE ACCRETION:</div><div><div>• APPR SPD . . . . VLS+10KT</div><div>• LDG DIST PROC . . . . APPLY (refer to the ODM)</div></div><div><div>▶ IF NO ICE ACCRETION:</div><div><div>• LDG DIST PROC . . . . APPLY (refer to the ODM)</div></div></div><div>ENG 1 APPR IDLE ONLY</div><div>ENG 2 APPR IDLE ONLY</div><div>BOTH PFD ON SAME FAC</div><div>SLATS AND FLAPS SLOW</div><div>CAT I ONLY</div></div><div>See the following table.</div></div> |          |

▼ ELEC DC ESS BUS FAULT continued ▼

### INOP SYS displayed on ECAM

|             |             |              |
|-------------|-------------|--------------|
| B HYD       | A/THR       | VENT EXTRACT |
| SPLR 3      | FCU 1       | B ELEC PUMP  |
| VHF 1       | FAC 1       | GPWS         |
| ACP 1+2     | REV 2       | ENG 1 LOOP A |
| WING A. ICE | ENG 2 START | ENG 2 LOOP B |
| AP 1        | CAB PR 1    | FCDC 1       |
| CAT 3       |             |              |

### Other inoperative systems

|                                                 |                             |
|-------------------------------------------------|-----------------------------|
| BRK PRESS indicator                             | HP fuel shutoff valves      |
| Flight interphone                               | SFCC 1                      |
| EIU 2 (autothrust, eng start and reverser inop) | RMP 1                       |
| Avionics air cond valve                         | Hyd fire valves Eng 1 and 2 |
| Standby Horizon                                 | Ram air inlet               |
| Standby compass light                           | ECAM Control Panel          |
| FMGC 1                                          | Left loudspeaker            |
|                                                 | DC SHED ESS BUS             |

**Note:** The warning may be caused by a sub BUS failure. Consequently, only a part of the above-listed systems may be lost.



**ELEC DC ESS BUS SHED**

**Condition:** DC Essential Shed Bus is not powered.

1. EXTRACT pb . . . . . OVRD

**Note:** Cooling air is provided by the air conditioning system without overboard extraction.

**Note:** Both PFDs receive information from the same FAC.

2. Avoid icing conditions.

**STATUS**

*Cat III approach not authorized*

|  |                          |
|--|--------------------------|
|  | INOP SYS                 |
|  | See the following table. |

▼ Continued on next page ▼

▼ ELEC DC ESS BUS SHED continued ▼

| Systems lost with DC ESS BUS SHED                                                                                                                                                                                                                                          |                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| AFT CRG HEAT **<br>AFT CRG ISOL VALVES **<br>AP 1<br>AVNCS VALVE<br>BMC 1<br>Cabin oxygen mask auto<br>drop out feature<br>Crew oxygen valve<br>Cross bleed valve manual<br>control **                                                                                     | EXTRACT fan *<br>FAC 1 *<br>FCDC 1 *<br>FQI channel 1<br>FMGC 1<br>SDCU channel 1 **<br>Standby Altimeter Vibrator<br>VENT EXTRACT<br>Wing Anti-ice ** |
| <p><b>Note:</b> * Items are listed on the ECAM STATUS page.</p> <p><b>Note:</b> ** These items INOP on aircraft <u>3212-3278</u> plus all A319s.</p> <p><b>Note:</b> If the warning was caused by a failure in a sub bus, only part of the systems listed may be lost.</p> |                                                                                                                                                        |



## ELEC EMER CONFIG

**Condition:** AC Bus 1 and 2 are not powered.

1. Maintain a minimum speed of 140 knots.
2. GEN 1 and GEN 2 pbs . . . . . OFF, then ON
  - ▶ If both generators are recovered:
    - FAC 1 . . . . . OFF for 5 seconds, then ON
    - FAC 2 . . . . . OFF for 5 seconds, then ON

■ ■ ■ ■
  - ▶ If only one generator is recovered:
    - Start the APU.
    - FAC 1 . . . . . OFF for 5 seconds, then ON
    - FAC 2 . . . . . OFF for 5 seconds, then ON
    - See the appropriate abnormal procedure for the single inoperative generator.

■ ■ ■ ■
  - ▶ If no generators are recovered:
    - ELEC BUS TIE . . . . . OFF
    - GEN 1 and GEN 2 . . . . . OFF, then ON
    - > If one or both generators are recovered:
      - See applicable IF statement above.
    - > If no generators are recovered and time to landing is greater than 5 minutes:
      - LDG GEAR handle . . . . . Verify UP
      - EMER ELEC PWR . . . . . MAN ON
      - ENG MODE selector . . . . . IGN/START

▼ Continued on next page ▼

▼ ELEC EMER CONFIG continued ▼

---

**Caution! (A320 only)** In case of simultaneous engine generator failures, the probability of the APU GEN coming on line is low. Therefore, APU start attempts should be avoided to conserve battery life.

---

**A319 only**

- ELEC BUS TIE. . . . . ON

**When** below FL250:

- Attempt an APU start, if desired.

**Note:** APU start is not available for 45 seconds after the loss of both engine generators.

- Use VHF 1 and ATC transponder 1.

**A320 only**

- ▶ If IR 1 is operating normally:

- IR 2 and IR 3 . . . . . OFF

- MCDU MENU page: . . . . . select FMGC  
(to regain FMGC 1)

- ▶ If the APU is not running:

- APU MASTER . . . . . Verify OFF

**Note:** With the APU MASTER pb ON, the DC BAT BUS is supplied by the batteries for 3 minutes.

- FAC 1 . . . . . OFF for 5 seconds, then ON.

▼ Continued on next page ▼

▼ ELEC EMER CONFIG continued ▼

A320 only

- LDG ELEV control knob. . . . . Manually select the landing field elevation.
- BLOWER . . . . . OVRD
- EXTRACT . . . . . OVRD
- Land As Soon As Possible.

ALTERNATE LAW - PROTECTIONS LOST

- Max Speed . . . . . 320 knots.

Fuel system is in gravity feed due to loss of fuel pumps.

- Avoid any negative G loads.
- Limit altitude to 15,000 feet or the MEA if higher.
- See “Gravity Feed Procedure” on page 12.32.
- Avoid icing conditions.

**Note:** If there is a discrepancy between airspeed values on the captain’s PFD and the STBY airspeed indicator, disregard the STBY indication as the probe is not deiced.

**Note:** Engine anti-ice defaults to ON. Idle speed increased on both engines.

**3212-3278:** Wing anti-ice is available until gear extension.

**3101-3171** (A319 only) Wing anti-ice is available until touchdown.

- See Approach Procedures.

▼ Continued on next page ▼

## Caution! Gear not downlocked warnings lost.

### STATUS

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | INOP SYS                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. GPWS LDG FLAP 3 . . . . . ON</li> <li>2. FOR LDG . . . . . Use FLAPS 3</li> </ol> <p>Slats and flaps slow</p> <ol style="list-style-type: none"> <li>3. Maximum brake pressure should be limited to 1,000 PSI due to the loss of anti-skid.</li> </ol> <p>Fuel consumption is increased.</p> <ol style="list-style-type: none"> <li>4. LDG DIST PROC . . . . . APPLY (refer to the ODM)</li> <li>5. Flight control laws degrade to DIRECT LAW when the landing gear is extended.</li> </ol> <p>A319:</p> <ul style="list-style-type: none"> <li>• After landing gear extension, maintain an approach speed of <math>V_{LS}</math> (from the ODM) + 10KT, but not less than 140 KIAS (minimum RAT speed).</li> </ul> <p><b>Note:</b> The A319 remains on EMER GEN power until after touchdown.</p> <p>A320:</p> <p>Prior to Ldg gear extension:</p> <ul style="list-style-type: none"> <li>• Tune the ILS and VOR navigation frequencies on RMP 1 (FMGC will be lost).</li> <li>• Extend the landing gear at 1,000 ft. AGL.</li> </ul> | <p>A/P 1+2</p> <p>A/THR</p> <p>Automatic Callouts</p> <p>Number 2 Reverser</p> <p>Nose Wheel Steering</p> <p>Anti-Skid</p> <p>See “Main Generators Inop - Systems Remaining Chart” on page 6.37 for other equipment status.</p> |

### STATUS Continued

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>INOP SYS</i>                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>A320 only continued:</p> <p><b>Note:</b> With the landing gear down, electrical power is by batteries only. Battery endurance is estimated at 22 minutes.</p> <ul style="list-style-type: none"> <li>• Maintain an approach speed of <math>V_{LS}</math> (from the ODM) + 10KT (both FACs are inoperative when the landing gear is down).</li> <li>• In case of a go-around, when the landing gear is retracted:             <ul style="list-style-type: none"> <li>• EMER ELEC . . . . . MAN ON (reset emergency generator)</li> </ul> </li> <li>&gt; If the landing gear must remain down or fails to retract on a go-around:             <ul style="list-style-type: none"> <li>• Minimum speed . . 180 kts (for RAT with gear down)</li> <li>• LGCIU 1 CB (C9) . . . .PULL (simulates gear up)</li> <li>• EMER ELEC PWR MAN ON</li> <li>• When emergency generator on-line:                 <p style="margin-left: 20px;">FAC 1: OFF for 5 seconds, then ON.</p> </li> <li>• During Final approach:                 <p style="margin-left: 20px;">Reset LGCIU CB</p> </li> </ul> </li> </ul> | <p>A/P 1+2</p> <p>A/THR</p> <p>Automatic Callouts</p> <p>Number 2 Reverser</p> <p>Nose Wheel Steering</p> <p>Anti-Skid</p> <p>See “Main Generators Inop - Systems Remaining Chart” on page 6.37 for other equipment status.</p> |

▼ ELEC EMER CONFIG continued ▼

## Main Generators Inop - Systems Remaining Chart

| Chapter /Component                                                                                                                                                                                                                                                                                                         | Emer Gen Power          | Battery Power           |                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|-----------------------------|
|                                                                                                                                                                                                                                                                                                                            |                         | In Flight *             | On Ground                   |
| 1 - General -                                                                                                                                                                                                                                                                                                              |                         |                         |                             |
| Door <i>SLIDES ARM</i> Warning                                                                                                                                                                                                                                                                                             | Normal                  | Normal                  | Normal                      |
| Emergency Lights: Cockpit                                                                                                                                                                                                                                                                                                  | Normal                  | Normal                  | Normal                      |
| Emergency Lights: Cabin                                                                                                                                                                                                                                                                                                    | Normal                  | Normal                  | Normal                      |
| Crew Oxygen                                                                                                                                                                                                                                                                                                                | Normal                  | Normal (3)              | Normal (3)                  |
| PAX Oxygen Mask Release (auto and manual)                                                                                                                                                                                                                                                                                  | Normal                  | INOP                    | INOP                        |
| 2 Air Systems (Air Cond/ Press, Bleed)                                                                                                                                                                                                                                                                                     |                         |                         |                             |
| Press. Auto Controller # 1                                                                                                                                                                                                                                                                                                 | Normal                  | Normal                  | Normal                      |
| Manual Press. Control                                                                                                                                                                                                                                                                                                      | INOP                    | INOP                    | INOP (1)                    |
| Ram Air                                                                                                                                                                                                                                                                                                                    | Normal                  | Normal                  | Normal                      |
| Pack Valve 1                                                                                                                                                                                                                                                                                                               | Normal (7)              | Closure Capability INOP | Closure Capability INOP     |
| Pack Valve 2                                                                                                                                                                                                                                                                                                               | Closure Capability INOP | Closure Capability INOP | Closure Capability INOP (1) |
| Avionics Ventilation                                                                                                                                                                                                                                                                                                       | Normal                  | Normal                  | Partial                     |
| Aft Cargo Isolation Valve                                                                                                                                                                                                                                                                                                  | Normal                  | INOP                    | INOP                        |
| Engine 1 Bleed                                                                                                                                                                                                                                                                                                             | Normal                  | BMC 1 INOP              | BMC 1 INOP                  |
| Engine 2 Bleed                                                                                                                                                                                                                                                                                                             | BMC 2 INOP              | BMC 2 INOP              | BMC 2 INOP                  |
| APU Bleed                                                                                                                                                                                                                                                                                                                  | INOP                    | INOP                    | INOP                        |
| Crossbleed (manual control)                                                                                                                                                                                                                                                                                                | Normal (7)              | INOP                    | INOP                        |
| Aft Cargo Heat                                                                                                                                                                                                                                                                                                             | Normal                  | INOP                    | INOP                        |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on “EMER GEN POWER” until after touchdown.<br>(1) The component is restored when the aircraft slows below 100 knots.<br>(3) The valve remains in the last selected position.<br>(7) On aircraft 3209-3211 Closure Capability INOP. |                         |                         |                             |

▼ Continued on next page ▼

▼ **ELEC EMER CONFIG continued** ▼

## Main Generators Inop - Systems Remaining Chart (2of 6)

| Chapter /Component                                                                                                                                                                                                                          | Emer Gen Power | Battery Power  |                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|
|                                                                                                                                                                                                                                             |                | In Flight *    | On Ground      |
| 3 -Anti Ice / Rain                                                                                                                                                                                                                          |                |                |                |
| Wing Anti-ice                                                                                                                                                                                                                               | Normal (7)     | INOP           | INOP           |
| Engine Anti-ice Valve                                                                                                                                                                                                                       | Open           | Open           | Open           |
| Captain's Pitot                                                                                                                                                                                                                             | Normal         | Normal         | Normal (2)     |
| Captain's AOA                                                                                                                                                                                                                               | Normal         | INOP           | INOP           |
| Rain Repellent (Captain)                                                                                                                                                                                                                    | Normal         | Normal         | Normal         |
| 4 - Autoflight                                                                                                                                                                                                                              |                |                |                |
| FAC                                                                                                                                                                                                                                         | No. 1 Only     | INOP           | INOP           |
| FCU                                                                                                                                                                                                                                         | Channel 1 Only | Channel 1 Only | Channel 1 Only |
| 5 - Communication                                                                                                                                                                                                                           |                |                |                |
| VHF 1                                                                                                                                                                                                                                       | Normal         | Normal         | Normal         |
| HF 1 (if installed)                                                                                                                                                                                                                         | Normal         | INOP           | INOP           |
| RMP 1                                                                                                                                                                                                                                       | Normal         | Normal         | Normal         |
| ACP 1 & 2                                                                                                                                                                                                                                   | Normal         | Normal         | Normal         |
| CIDS                                                                                                                                                                                                                                        | Normal         | Normal         | Normal         |
| Interphone                                                                                                                                                                                                                                  | Normal         | Normal         | Normal         |
| CVR                                                                                                                                                                                                                                         | Normal         | INOP           | INOP           |
| Loudspeaker 1                                                                                                                                                                                                                               | Normal         | Normal         | Normal         |
| Mechanic Call Horn                                                                                                                                                                                                                          | Normal         | Normal         | Normal         |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on "EMER GEN POWER" until after touchdown.<br>(2) The component is lost when the aircraft slows below 50 knots.<br>(7)INOP on aircraft 3209 - 3211. |                |                |                |

▼ **Continued on next page** ▼

▼ ELEC EMER CONFIG continued ▼

## Main Generators Inop - Systems Remaining Chart (3 of 6)

| ATA/Component                                                                                                                                                                                                                                                                                                                                                | Emer Gen Power | Battery Power  |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|
|                                                                                                                                                                                                                                                                                                                                                              |                | In Flight *    | On Ground      |
| 7 -Engines / APU                                                                                                                                                                                                                                                                                                                                             |                |                |                |
| FADEC                                                                                                                                                                                                                                                                                                                                                        | A + B (6)      | A + B (6)      | A + B (6)      |
| Ignition                                                                                                                                                                                                                                                                                                                                                     | Channel A Only | Channel A Only | Channel A Only |
| Reversers                                                                                                                                                                                                                                                                                                                                                    | Not Applicable | Not Applicable | #2 INOP        |
| HP Fuel Valve Closure                                                                                                                                                                                                                                                                                                                                        | Normal         | Normal         | Normal         |
| APU ECB - Starter                                                                                                                                                                                                                                                                                                                                            | Normal (4)     | INOP           | INOP (1)       |
| APU Fuel LP Valve                                                                                                                                                                                                                                                                                                                                            | Normal         | Normal         | Normal         |
| APU Fuel Pump                                                                                                                                                                                                                                                                                                                                                | Normal         | Normal         | Normal         |
| 8 - Fire                                                                                                                                                                                                                                                                                                                                                     |                |                |                |
| Engine 1 Detection                                                                                                                                                                                                                                                                                                                                           | Loop A Only    | Loop A Only    | Loop A Only    |
| Engine 2 Detection                                                                                                                                                                                                                                                                                                                                           | Loop B Only    | Loop B Only    | Loop B Only    |
| APU Detection                                                                                                                                                                                                                                                                                                                                                | INOP           | INOP           | INOP (1)       |
| Cargo Smoke Detection                                                                                                                                                                                                                                                                                                                                        | Channel 1 (7)  | INOP           | INOP           |
| Engine Extinguishing                                                                                                                                                                                                                                                                                                                                         | Bottle 1 Only  | Bottle 1 Only  | Bottle 1 Only  |
| APU Extinguishing                                                                                                                                                                                                                                                                                                                                            | Squib A Only   | Squib A Only   | Squib A Only   |
| Cargo Extinguishing                                                                                                                                                                                                                                                                                                                                          | INOP           | INOP           | INOP (1)       |
| APU Auto Extinguishing                                                                                                                                                                                                                                                                                                                                       | INOP           | INOP           | INOP (1)       |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on "EMER GEN POWER" until after touchdown.<br>(1) The component is restored when the aircraft slows below 100 knots.<br>(4) The ECB is available for APU start only.<br>(6) Below 12% N <sub>2</sub> only channel A is available.<br>(7) INOP on aircraft 3209-3211. |                |                |                |

▼ Continued on next page ▼

▼ ELEC EMER CONFIG continued ▼

## Main Generators Inop - Systems Remaining Chart (4 of 6)

| Chapter /Component                                                                                                                                                                                                                         | Emer Gen Power | Battery Power |            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------|------------|
|                                                                                                                                                                                                                                            |                | In Flight *   | On Ground  |
| 9 - Flight Controls                                                                                                                                                                                                                        |                |               |            |
| ELAC                                                                                                                                                                                                                                       | 1 Only         | 1 + 2         | 1 + 2      |
| SEC                                                                                                                                                                                                                                        | 1 Only         | 1             | 1          |
| FCDC                                                                                                                                                                                                                                       | 1 Only         | INOP          | INOP       |
| SFCC                                                                                                                                                                                                                                       | 1 Only         | 1 Only        | 1 Only     |
| Flap Position Indicator                                                                                                                                                                                                                    | Normal         | Normal        | Normal (2) |
| 10 - Flight- Instruments                                                                                                                                                                                                                   |                |               |            |
| PFD 1                                                                                                                                                                                                                                      | Normal         | Normal        | Normal (2) |
| ND 1                                                                                                                                                                                                                                       | Normal (7)     | INOP          | INOP       |
| ECAM Upper Display                                                                                                                                                                                                                         | Normal         | Normal        | Normal (2) |
| DMC 1 or 3                                                                                                                                                                                                                                 | Normal         | Normal        | Normal (2) |
| SDAC 1, FWC 1                                                                                                                                                                                                                              | Normal         | Normal        | Normal (2) |
| ECAM Control Panel                                                                                                                                                                                                                         | Normal         | Normal        | Normal     |
| Clocks                                                                                                                                                                                                                                     | Normal         | Normal        | Normal     |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on "EMER GEN POWER" until after touchdown.<br>(2) The component is lost when the aircraft slows below 50 knots.<br>(7) INOP on aircraft 3209-3211. |                |               |            |

▼ Continued on next page ▼

▼ ELEC EMER CONFIG continued ▼

## Main Generators Inop - Systems Remaining Chart (5 of 6)

| ATA/Component                                                                                                                                                                                                                                                                                                         | Emer Gen Power | Battery Power |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------|------------|
|                                                                                                                                                                                                                                                                                                                       |                | In Flight *   | On Ground  |
| 11 - Flt Management / Navigation                                                                                                                                                                                                                                                                                      |                |               |            |
| IR                                                                                                                                                                                                                                                                                                                    | 1 Only (5)     | 1 Only (5)    | 1 Only (5) |
| ADR                                                                                                                                                                                                                                                                                                                   | 1 Only         | 1 Only        | 1 Only     |
| ADF                                                                                                                                                                                                                                                                                                                   | Normal (7)     | INOP          | INOP       |
| VOR-ILS                                                                                                                                                                                                                                                                                                               | 1 Only         | 1 Only        | 1 Only (2) |
| DME                                                                                                                                                                                                                                                                                                                   | 1 Only         | INOP          | INOP       |
| VOR/DDRMI                                                                                                                                                                                                                                                                                                             | Normal         | Normal        | Normal (2) |
| ATC Transponder                                                                                                                                                                                                                                                                                                       | 1 Only         | INOP          | INOP       |
| Standby Horizon                                                                                                                                                                                                                                                                                                       | Normal         | Normal        | Normal     |
| Magnetic Compass Light                                                                                                                                                                                                                                                                                                | Normal         | Normal        | Normal     |
| Standby Altimeter Vibrator                                                                                                                                                                                                                                                                                            | Normal         | INOP          | INOP       |
| FMGC (Nav function)                                                                                                                                                                                                                                                                                                   | 1 Only         | INOP          | INOP       |
| MCDU                                                                                                                                                                                                                                                                                                                  | 1 Only         | INOP          | INOP       |
| 12 - Fuel                                                                                                                                                                                                                                                                                                             |                |               |            |
| LP Valve                                                                                                                                                                                                                                                                                                              | Normal         | Normal        | Normal     |
| FQI Channel 1                                                                                                                                                                                                                                                                                                         | Normal         | INOP          | INOP       |
| Crossfeed Valve                                                                                                                                                                                                                                                                                                       | Normal         | INOP          | INOP       |
| Transfer Valve                                                                                                                                                                                                                                                                                                        | Normal         | INOP          | INOP       |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on "EMER GEN POWER" until after touchdown.<br>(2) The component is lost when the aircraft slows below 50 knots.<br>(5) If CAPT 3 is selected with the ATT-HDG switching knob, IR3 remains.<br>(7) INOP on aircraft 3209-3211. |                |               |            |

▼ Continued on next page ▼

▼ **ELEC EMER CONFIG continued** ▼

Main Generators Inop - Systems Remaining Chart (6 of 6)

| ATA/Component                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Emer Gen Power | Battery Power |           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------|-----------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                | In Flight *   | On Ground |
| 13 - Hydraulics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                |               |           |
| Fire Valves                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Normal         | Normal        | Normal    |
| 14 - Landing Gear / Brakes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                |               |           |
| LGCIU # 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Normal         | Normal        | Normal    |
| Brake Pressure Indications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Normal         | Normal        | Normal    |
| Parking Brake                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Normal         | Normal        | Normal    |
| * While the RAT is extending or once the gear is extended (A320 only). The A319 remains on "EMER GEN POWER" until after touchdown.<br>(1) The component is restored when the aircraft slows below 100 knots.<br>(2) The component is lost when the aircraft slows below 50 knots.<br>(3) The valve remains in the last selected position.<br>(4) The ECB is available for APU start only.<br>(5) If CAPT 3 is selected with the ATT-HDG switching knob, IR3 remains.<br>(6) Below 12% N <sub>2</sub> only channel A is available.<br>(7) INOP on aircraft 3209-3211. |                |               |           |



**ELEC EMER GEN 1 LINE OFF**

**Condition:** The GEN 1 line pb is in the OFF position.

**Note:** With GEN 1 LINE pb (on EMER ELEC PWR panel) in the OFF position, the GEN 1 line contactor is open and AC BUS 1 is powered from GEN 2.

1. If desired:

- GEN 1 LINE pb . . . . . ON  


## ELEC ESS BUSSES ON BAT

**Condition:** The DC and AC Essential Busses are supplied by batteries (AC through the static inverter).

### 1. Land As Soon As Possible.

- ▶ If the landing gear is up:
  - EMER ELEC PWR . . . . . MAN ON  

■ ■ ■ ■
- ▶ If the landing gear must remain down or fails to retract on a go-around:
  - Maintain at least 180 knots to keep the RAT powered with the gear down.
  - LGCIU 1 circuit breaker (C 9) . . . . . Pull (simulates a gear up condition)
  - EMER ELEC PWR . . . . . MAN ON

**When** emergency generator is on-line:

- FAC 1 . . . . OFF for 5 seconds, then ON

During Final approach:

- LGCIU 1 circuit breaker (C 9) . . . .Reset  

■ ■ ■ ■

**ELEC ESS TR FAULT**

**Condition:** The essential TR is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

INOP SYS

ESS TR



**ELEC GEN 1 (2) FAULT**

**Condition:** Protection trip initiated by the associated GCU or the line contactor has opened with the GEN pb ON.

1. Affected GEN pb . . . . .OFF then ON

- ▶ If the generator reset is **successful**:
  - To assist Tech Ops with Airworthiness Directive compliance, ensure a logbook write-up is made.

**Note:** An info only write-up is allowed if the fault occurs during engine start.



- ▶ If the generator reset is **unsuccessful**:
  - Affected GEN pb . . . . .OFF
  - Start the APU, if available.

**STATUS**

*Cat III approach not authorized.*

|  |                                                |
|--|------------------------------------------------|
|  | INOP SYS                                       |
|  | GEN 1 (2)                                      |
|  | MAIN GALLEY (if APU<br>GEN is not on the line) |



**ELEC GEN 1 (2) OFF**

**Condition:** Generator pb is OFF with no fault.

► If desired

- GEN (affected) . . . . . ON



**ELEC GEN 1 (2) OVERLOAD**

**Condition:** The load of one generator is above 100% of rated output.

1. GALLEY pb . . . . . OFF

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | GALLEY          |



**ELEC IDG 1(2) DISCONNECTED**

**Condition:** IDG is disconnected (after engine start only).

► If on the ground:

- Consult with Dispatch/Maintenance Control for possible MEL relief.



**ELEC IDG 1 (2) OIL LO PR**

**Condition:** IDG oil pressure is low.

Press the IDG pb until the GEN FAULT light comes on but not for more than 3 seconds.

1  IDG (affected) . . . . Confirm . . . . . OFF

**Note:** The IDG must be disconnected with the engine at or above idle thrust to prevent damage to the disconnect mechanism.

**Note:** Disconnect can be confirmed on ECAM ELEC page and by noting IDG FAULT light extinguished.

2. Start the APU, if available.

**Note:** Although the APU may be started up to an altitude of FL 390, the APU GEN will produce less than its maximum rated output above FL 250.

**STATUS**

*Cat III approach not authorized.*

|  |                     |
|--|---------------------|
|  | INOP SYS            |
|  | GEN 1 (2)           |
|  | MAIN GALLEY (if APU |
|  | GEN not on line)    |



## ELEC IDG 1 (2) OIL OVHT

**Condition:** IDG oil outlet temperature exceeds a preset limit.

Press the IDG pb until the GEN FAULT light comes on but not for more than 3 seconds.

1.  IDG (affected) . . . . Confirm . . . . . OFF

**Note:** The IDG must be disconnected with the engine at or above idle thrust to prevent damage to the disconnect mechanism.

**Note:** Disconnect can be confirmed on ECAM ELEC page and by noting IDG FAULT light extinguished.

**Note:** The IDG FAULT light remains illuminated as long as an overheat condition is present or until the IDG is disconnected.

2. Start the APU, if available.

**Note:** Although the APU may be started up to an altitude of FL 390, the APU GEN will produce less than its maximum rated output above FL 250.

### STATUS

*Cat III approach not authorized.*

|  |                                         |
|--|-----------------------------------------|
|  | INOP SYS                                |
|  | GEN 1 (2)                               |
|  | MAIN GALLEY (If APU<br>GEN not on line) |



**ELEC STAT INV FAULT**

**Condition:** The static inverter is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**ELEC TR 1 (2) FAULT**

**Condition:** TR 1 (2) inoperative.

- ▶ If TR 1 or TR 2 has faulted:  
CAT III SINGLE

**STATUS**

*CAT III approach not authorized*

|  |                                    |
|--|------------------------------------|
|  | INOP SYS                           |
|  | TR 1 (2)                           |
|  | CAT 3 DUAL (if TR 1 or TR 2 FAULT) |



**Flight On Battery Only (A320 Only)**

**Condition:** The batteries are the only source of electrical power.

**Note:** The following procedure may increase flight time on batteries only to at least 30 minutes.

1. ENG MODE SEL . . . . . NORM
2. ANTI-ICE PITOT 1 C/B (D 02) . . . . . Pull
3. 26V ADIRU 1 C/B (F 07). . . . . Pull

**Note:** Only the AOA supply to ADIRU 1 is lost when C/B (F 07) is pulled. The IR part is still available and there is no need to re-align ADIRU 1 after the C/B is reset.

4. Use the standby instruments.

**Note:** Altitude, airspeed, and backup VSI on the captain's PFD are inoperative. IVSI is operational.

5. See Approach Procedures.

▼ Continued on next page ▼

▼ Flight on Battery Only continued ▼

STATUS

| APPROACH PROCEDURES                                                                                                                                                                                  | INOP SYS                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| <div><div>1. Seven minutes before landing:</div><div><div>• Reset ANTI-ICE PITOT 1 C/B (D 02).</div></div><div>2. One minute later:</div><div><div>• Reset 26V ADIRU 1 C/B (F 07).</div></div></div> | <div>See “Main Generators Inop - Systems Remaining Chart” on page 6.37 for equipment status.</div> |
| <div><div>Caution!</div><div>This time delay is necessary to ensure reliable speed information even in icing conditions when the ADIRU 1 C/B is reset.</div></div>                                   |                                                                                                    |



**Non-Normal Checklists**  
**Engines and APU**

**Chapter NNC**  
**Section 7**

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**ENG DUAL FAILURE**

**(Fuel Remaining) . . . . . 7.61**

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## Engine and APU Systems ECAM Advisories

**Condition:** A system parameter exceeds its normal range, the associated E/WD page is displayed, and the affected parameter pulses in green.

| Engine and APU Advisory Displayed |                                                                                                                                                                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                         | Recommended Action                                                                                                                                                                                                                                                             |
| APU LOW OIL LEVEL                 | <ul style="list-style-type: none"><li>• Contact Maintenance</li><li>• If there is no oil leak, the APU may be started and operated for several hours</li></ul>                                                                                                                 |
| ENG OIL PRESS<br>< 16 PSI         | <ul style="list-style-type: none"><li>• If oil pressure between 16 and 13 PSI, continue normal operation</li><li>• If oil pressure less than 13 PSI, "See "ENG 1 (2) OIL LO PR" on page 7.33" (continued operation is allowed if no ENG OIL LO PR ECAM is displayed)</li></ul> |

▼ Continued on next page ▼

▼ Engine and APU Systems ECAM Advisories continued ▼

| APU or Engine Advisory Displayed (continued) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ENG OIL TEMP<br>> 140°C                      | <p><b>Note:</b> If OIL TEMP increase follows thrust reduction, increasing thrust may reduce temperature. An oil temp increase during steady state operations indicates a system malfunction and engine should be closely monitored.</p> <p>An OIL TEMP increase may be related to IDG oil cooling. To reduce ENG OIL TEMP before limits are exceeded, the following is recommended:</p> <ul style="list-style-type: none"><li>▶ If low speed:<ul style="list-style-type: none"><li>• Increase fuel flow to improve IDG cooling (May be accomplished by selecting higher speed or altitude, or by increased drag).</li></ul></li><li>▶ If high speed:<ul style="list-style-type: none"><li>• Reduce IDG load if possible:<ul style="list-style-type: none"><li>• GALLEY pb . . . . . OFF</li><li>• APU<br/>(if available). . . . . START</li><li>• Affected GEN...confirm...OFF</li></ul></li></ul></li></ul> <p>&gt; If the oil temperature continues to rise:</p> <ul style="list-style-type: none"><li>• Disconnect IDG per “ELEC IDG 1 (2) OIL OVHT” , page 6.49.</li></ul> |

▼ Continued on next page ▼

▼ **Engine and APU Systems ECAM Advisories continued** ▼

| <b>APU or Engine Advisory Displayed (Continued)</b>       |                                                                                                                                                                                                 |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ENG Oil Qty < 3 qts                                       | <b>Note:</b> If the oil quantity is low at high power setting, expect quantity increase when thrust reduced. <ul style="list-style-type: none"> <li>Continue to monitor oil quantity</li> </ul> |
| ENG NAC TEMP $\geq$ 240°                                  | <ul style="list-style-type: none"> <li>Monitor engine parameters and crosscheck with other engine</li> </ul>                                                                                    |
| ENG VIBRATION:<br>N1 $\geq$ 6.0 units or<br>N2 $\geq$ 4.3 | See “Engine - High Vibration” on page 7.70                                                                                                                                                      |



**APU AUTO SHUTDOWN**

**Condition:** An APU AUTO SHUTDOWN has occurred.

- ▶ **If in flight:**
  - APU MASTER SW . . . . . OFF  

  
- ▶ **If on the ground during the APU start sequence:**
  - Do not attempt another start. Maintenance action is due.  

  
- ▶ **If on the ground after the APU start sequence is complete:**
  - APU MASTER SW . . . . . OFF
  - The flight crew may attempt one APU restart to determine the serviceability of the APU. Monitor the APU N% during the restart attempt, if possible.
    - > If the APU starts normally:
      - Continue to use the APU as required.
      - Verify Flight Deck Door security if after pushback.  


▼ Continued on next page ▼

▼ **APU AUTO SHUTDOWN continued** ▼

- > If the APU does **not** start normally, but the APU N% reaches at least 50%:
  - Two additional start attempts are authorized.
  - >> If the APU does not restart after two additional start attempts:
    - Contact local maintenance or Maintenance Control for application of the appropriate MEL.
- > If the APU N% does **not** reach 50% N during the restart attempt, or you are unable to determine the N%:
  - Maintenance action is due.



**Condition:** An APU fire has been detected while on the ground, the APU FIRE pb has been pushed, or the APU SHUT OFF pb on the external interphone panel has been pushed.

- ▶ If on the ground:
  - Continue to search for signs of APU FIRE by monitoring the ECAM APU page, communicating with the ground crew, or visually inspecting the APU area.

**Note:** On the ground, the APU fire extinguisher discharges automatically after an APU FIRE is detected.

- ▶ If in flight:
  - Monitor the ECAM APU page.



## ENG 1 (2) BLEED STATUS FAULT

**Condition:** The bleed valve, pack valve, wing/engine anti-ice valve, or cross bleed valve position information is not being received by the FADEC.

- ▶ If on the ground:
  - Affected PACK . . . . . OFF
  - Contact maintenance.
- ▶ If in flight:
  - ENG MODE SEL . . . . . IGN

**Note:** Minimum thrust on the ground is high idle and automatic ignition is not available with the ENG ANTI ICE ON.

### STATUS

HI GRND IDLE



## ENG 1 (2) COMPRESSOR VANE

**Condition:** One engine has a **failure** of the Variable Bleed Valve system (VBV) or Variable Stator Vane system (VSV).

- ▶ If on ground:
  - THRUST LEVER (affected engine) . . . . . IDLE
  - ENG MASTER (affected engine) . . . . . OFF
  - Maintenance is required.
- ▶ If in flight and AVOID RAPID THR CHANGES or ENG SLOW RESPONSE is displayed on the ECAM:
  - Make thrust changes more slowly on the affected engine and expect a slower than normal response.

**Note:** If disconnecting A/THR, first match the THR LVR with the actual N1 to avoid a rapid thrust increase.



## ENG 1 (2) CTL VALVE FAULT

**Condition:** Failure of the burner staging valve or the HP turbine clearance system (HPTC).

1. MAX N<sub>2</sub> . . . . . 96%.



## ENG 1 (2) EGT DISCREPANCY

**Condition:** Discrepancy between the ECAM EGT value and the actual EGT value on one engine. CHECK is displayed below the affected indication.

**Note:** This procedure can also be used for fluctuating EGT without an ECAM message.

1. SWITCHING EIS DMC . . . . . CAPT 3.

**Note:** This action may not alleviate the discrepancy or fluctuation.

- ▶ If the discrepancy or fluctuation continues:
  - Compare the EGT indication with the opposite engine.
  - Monitor engine performance. Actual EGT discrepancies would normally be accompanied by actual engine surges or abnormal  $N_1$ ,  $N_2$ , or fuel flow indications.
    - > If there are no indications supporting the EGT discrepancy:

■ ■ ■ ■
  - > If the engine operation is erratic (as confirmed by the supporting engine indications):
    - Operate the engine at a reduced thrust setting in an attempt to maintain the engine parameters within limits.

■ ■ ■ ■

**ENG 1 (2) EGT OVERLIMIT**

**Condition:** EGT is out of limits.

**Note:** The ECAM procedure will command an engine shut down if 935°C is exceeded.

- ▶ If the max pointer indication is between 891°C and 935°C:

**When** safe to do so,

- THR LEVER (affected engine) . . . . Retard, to maintain the EGT below 890°C.
- Normal operation may be continued to the next landing.

**When** time permits:

- Contact Dispatch/Maintenance Control.



- ▶ If the max pointer indication is above 935°C:

**Warning!** If conditions do not permit engine shut down, land as soon as possible using the minimum thrust required to sustain a safe flight.

- THRUST LEVER (affected engine). . . . Confirm.. . . . IDLE
- ENG MASTER switch (affected engine). . . . Confirm.. . . . OFF
- APU (if available) . . . . .Start
- APU BLEED . . . . . off
  - > If wing anti-ice is required:
    - PACK (affected side) . . . . . OFF

**▼ Continued on next page ▼**

▼ **ENG 1 (2) EGT OVERLIMIT continued** ▼

- X BLEED selector . . . . . OPEN
- ENG HYD PUMP pb  
(affected engine). . . . Confirm. . . . . OFF  
(to prevent spurious ECAM messages)
- ENG MODE SEL . . . . . IGN
- Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures if an engine shutdown has been performed.

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                              | <i>INOP SYS</i>                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1. LDG DIS PROC . . . . APPLY<br>(refer to ODM)                                                                                                         | CAT 3 DUAL<br>GEN 1(2)                                                                                                        |
| 2. For performance, delay<br>landing gear configuration<br>(gear down and flaps 3 or<br>FULL) until <u>established on<br/>final descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP)<br>ALPHA FLOOR<br>(Flap lever position 1 or<br>greater)* |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                                |                                                                                                                               |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                              | * Item not listed on the<br>ECAM STATUS page.                                                                                 |



**ENG 1 (2) EIU FAULT**

**Condition:** The data bus between the EIU and the Electronic Control Unit (part of the FADEC) has failed.

**Note:** When idle is selected, the affected engine will reduce to approach idle only.

The bleed corrections to the N<sub>1</sub> limit are lost.

**STATUS**

*CAT II or III approaches not authorized.*

|  |                                            |
|--|--------------------------------------------|
|  | INOP SYS                                   |
|  | ENG 1 (2) START<br>A/THR<br>REVERSER 1 (2) |



**ENG 1 (2) FADEC ALTERNATOR**

**Condition:** There is a loss of auto electrical supply to the FADEC.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



## ENG 1 (2) FADEC A (B) FAULT

**Condition:** There is a loss of one channel of the FADEC.

**Note:** A momentary FADEC fault during engine start can be disregarded.

- ▶ If fault occurs during engine start **on the ground**:
  - ENG MASTER SW (affected engine) . . . . OFF
  - > **When**  $N_2$  is less than 5%:
    - Pull and reset affected C/Bs:
    - FADEC A: A4 or A5
    - FADEC B: Q40 or R41
    - Wait for ECU power-up sequence, restart engine.
  - >> If engine start is normal and fault does not recur:
    - Make an INFO ONLY logbook writeup.
- ▶ If fault occurs in flight:
  - Crew awareness.



## ENG 1 (2) FADEC FAULT

**Condition:** Both FADEC channels have failed.

1. Confirm the engine status on system pages.

**Note:** Since engine indications are lost, use the ECAM system pages (e.g., BLEED, ELEC, HYD) to confirm the engine's status.

- ▶ If the engine is confirmed to be operating, immediate landing is not required.
  - Monitor affected engine's operation.
  - Expect limited or no control of engine.



- ▶ If an engine failure is confirmed:
  - THRUST LEVER  
(affected engine). . Confirm.. . . . . IDLE
  - ENG MASTER switch  
(affected engine). . Confirm.. . . . . OFF
  - APU (if available) . . . . . Start
  - APU BLEED . . . . . off
    - > If wing anti-ice is required:
      - PACK (affected side) . . . . . OFF
      - Wing Anti Ice . . . . . ON
  - X BLEED selector. . . . . OPEN
  - ENG HYD PUMP pb  
(affected engine). . Confirm.. . . . . OFF  
(to prevent spurious ECAM messages.)
  - ENG MODE SEL . . . . . IGN
  - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

▼ Continued on next page ▼

▼ ENG 1 (2) FADEC FAULT continued ▼

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures

**STATUS**

| APPROACH PROCEDURES                                                                                                                                | INOP SYS                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| 1. LDG DIST PROC . . . APPLY<br>(refer to ODM)                                                                                                     | CAT 3 DUAL<br>GEN 1(2)                                                                                        |
| 2. For performance, delay<br>landing configuration (gear<br>down and flaps 3 or FULL)<br>until <u>established on final<br/>descent</u> to landing. | ENG 1 (2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP)<br>ALPHA FLOOR<br>(Flap lever position 1 or<br>greater)* |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                           |                                                                                                               |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                         | * Item not listed on the<br>ECAM STATUS page.                                                                 |



**ENG 1 (2) FADEC HI TEMP**

**Condition** The FADEC temperature is high.

**Note:** A false warning may be generated **before engine start** when IGN/START is selected. If this occurs: select ENG MODE NORM for 30 seconds and ensure the FADEC GND PWR pb (MX section of overhead panel) is OFF before attempting a start.

- ▶ If on the ground:
  - THR LEVER (affected engine) . . . . . IDLE
  - ENG MASTER (affected engine) . . . . . OFF
  - ENG MODE SEL . . . . . NORM
  - ENG FADEC GND PWR pb . . . . . Verify OFF



- ▶ If in flight:
  - Reduce thrust on the affected engine to the minimum practical.

**Note:** Reducing thrust should reduce the temperature in the area of the ECU. Severe heat can result in engine failure.

- >> If FADEC HI TEMP caution disappears, resume normal engine operation.
- >> If abnormal engine operation is noted, shut down the affected engine per the ENG 1 (2) SHUTDOWN procedure this section.



**Condition:** The corresponding engine has failed, is damaged or has separated from the aircraft.

**Note:** If on the ground, consider a restart of the engine if first start of the day and the ENG FAIL is received shortly after the initial start attempt. If the second start is successful, complete and INFO ONLY logbook write up.

1. ENG MODE SEL . . . . . IGN
  2. THRUST LEVER (affected ENG) . . . CONFIRM . . . IDLE
  3. ENG MASTER (affected ENG) . . . CONFIRM . . . OFF
- ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑

**Warning! Do not attempt a relight of a damaged engine.**

- Abnormal noise or vibration
- Repeated engine stalls
- No hydraulic quantity
- No N1 or N2 rotation
- No oil quantity (Note: low oil pressure alone does not indicate damage)

- ENG FIRE pb (affected engine) . . .CONFIRM . . PUSH
- Affected engine AGENT 1 pb . . . . . PUSH
- APU (if available) . . . . . Start
- APU BLEED . . . . . off
- Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS mode . . . . . TA
- X BLEED selector . . . . . SHUT
- WING Anti Ice . . . . . OFF
  - Avoid Icing Conditions
- See Approach Procedures below

▼ Continued on next page ▼

▼ Engine 1 (2) FAIL continued ▼

| STATUS                                                                                                                                |                                            |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| APPROACH PROCEDURES                                                                                                                   | INOP SYS                                   |
| 1. LDG DIST PROC . . .APPLY (refer to ODM)                                                                                            | WING ANTI ICE                              |
| 2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | CAT 3 DUAL                                 |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                     | GEN 1(2)                                   |
|                                                                                                                                       | PACK 1(2)                                  |
|                                                                                                                                       | REVERSER 1(2)                              |
|                                                                                                                                       | ENG 1(2) BLEED                             |
|                                                                                                                                       | G ENG 1 PUMP (or Y ENG 2 PUMP)             |
|                                                                                                                                       | ALPHA FLOOR                                |
|                                                                                                                                       | (Flap lever position 1 or greater)*        |
|                                                                                                                                       | * Item not listed on the ECAM STATUS page. |



► **IF NO DAMAGE**

- ENG RELIGHT . . . . .Consider

> **If engine relight desired:**

- Maintain an altitude of 27,500 feet or below
- ENG MASTER (affected engine) . . . . . Verify OFF
- THR LEVER (affected engine) . . . . Verify IDLE
- ENG MODE SEL . . . . .Verify IGN
- APU BLEED . . . . .Verify OFF
- X BLEED selector . . . . . OPEN
- WING Anti Ice . . . . . OFF

▼ Continued on next page ▼

▼ Engine 1 (2) FAIL continued ▼

---

**Caution! The FADEC will not abort an abnormal start.**

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**Note:** Engine light off should occur within 18 seconds of fuel flow increase and **must** occur within 30 seconds. If outside the windmilling start envelope (page 7.77) the FADEC will open the start valve to assist the start.

- ENG MASTER (affected engine). . . . . ON

**>> If/when idle is reached:**

- ENG MODE SEL . . . . . NORM
- X BLEED selector . . . . . AUTO
- TCAS Mode . . . . . RA/TA
- Restore any affected systems.



**>> If engine relight is not successful:**

- ENG MASTER  
(affected engine). . . .CONFIRM. . . . . OFF
- Wait 30 seconds before attempting another restart.
- If additional starts are unsuccessful or not desired, continue with “If engine relight unsuccessful or not desired” (below):

▼ Continued on next page ▼

▼ Engine 1 (2) FAIL continued ▼

> **If engine relight unsuccessful or not desired:**

- APU (if available) . . . . . Start
- APU BLEED . . . . . off
- Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- ENG HYD PUMP PB  
(affected engine) . . . . . CONFIRM . . . . . OFF
- X BLEED selector . . . . . Verify OPEN

>> **If WING Anti-Ice Required:**

- PACK (affected side) . . . . . OFF
- WING Anti Ice . . . . . ON
- See Approach Procedures.

**STATUS**

| APPROACH PROCEDURES                                                                                                                                | INOP SYS                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1. LDG DIST PROC . . . APPLY<br>(refer to ODM)                                                                                                     | CAT 3 DUAL<br>GEN 1(2)                                                                                                        |
| 2. For performance, delay<br>landing configuration (gear<br>down and flaps 3 or FULL)<br>until <u>established on final<br/>descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP)<br>ALPHA FLOOR<br>(Flap lever position 1 or<br>greater)* |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                           |                                                                                                                               |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                         | * Item not listed on the<br>ECAM STATUS page.                                                                                 |



## ENG 1 (2) FF DISCREPANCY

**Condition:** There is a discrepancy between the actual and the displayed values.

**Note:** On the ECAM upper display, a CHECK message is displayed below the affected indication.

**Note:** Selecting CAPT 3 on the EIS DMC selector may recover normal indications.

- ▶ If both thrust levers are in the same position:
  - Cross-check the opposite engine's parameters.
  - Monitor engine performance.



## ENG 1 (2) FUEL CTL FAULT

**Condition:** The fuel metering valve has failed.

- ▶ If on the ground:
  - Thrust lever (affected engine) . . . . . IDLE
  - ENG MASTER (affected engine) . . . . . OFF


- ▶ If in flight and AVOID RAPID THR CHANGES or ENG SLOW RESPONSE displayed on ECAM:
  - Make thrust changes more slowly on the affected engine and expect a slower than normal response.



**Note:** If disconnecting A/THR, first match the THR LVR with the actual N1 to avoid a rapid thrust increase.



## ENG 1 (2) FUEL FILTER CLOG

**Condition:** The engine has a clogged fuel filter.

- ▶ If on the ground:
  - Maintenance is required.
- ▶ If in flight:
  - Monitor engine operation
  - Crew Awareness



### ENG 1 (2) HP FUEL VALVE

**Condition:** The HP fuel valve indicates closed.

- ▶ If the affected engine is below idle:
  - The HP fuel valve has failed closed.
    - > If **on the ground**:
      - MAN START pb . . . . . Verify OFF
      - ENG MASTER switch  
(affected engine) . . . . . OFF



- ▶ If the affected engine is at (or above) idle:
  - The HP fuel valve position indication is faulty.



### ENG 1 (2) IGN A + B FAULT

**Condition:** Ignition circuits A and B have failed on one engine.

1. Avoid adverse conditions (e.g., icing, turbulence, rain).

**STATUS**

|  |               |
|--|---------------|
|  | INOP SYS      |
|  | ENG 1 (2) IGN |



**ENG 1 (2) IGN A (B) FAULT**

**Condition:** Ignition circuit A or B on one engine has failed.

- ▶ If on the ground before takeoff:
  - Contact Maintenance.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                     |
|--|---------------------|
|  | <i>INOP SYS</i>     |
|  | ENG 1 (2) IGN A (B) |



**ENG 1 (2) LOW N1**

**Condition:** No N<sub>1</sub> rotation during start.

- ▶ If no N<sub>1</sub> rotation is confirmed during start:
  - ENG MASTER switch (affected engine) . . OFF



**ENG 1 (2) N1 DISCREPANCY**

**Condition:** CHECK message is displayed below the affected indication.

- ▶ If both thrust levers are in the same position:
  - Cross-check the opposite engine's parameters.
  - Monitor engine performance.



**ENG 1 (2) N1 OVERLIMIT**

**Condition:** N<sub>1</sub> is out of limits.

- ▶ If the max pointer indication is between 102.1 and 103.8:
  - Retard the affected THR LEVER to maintain the N<sub>1</sub> within limits.
- ▶ If the max pointer indication is above 103.8 or if the engine does not respond to the thrust lever reduction:
  - THRUST LEVER  
(affected engine). . . . Confirm. . . . . IDLE

---

---

**Warning! If conditions do not permit engine shut down, land as soon as possible using the minimum thrust required to sustain a safe flight.**

---

---

- ENG MASTER switch  
(affected engine). . . . Confirm. . . . . OFF
- APU (if available) . . . . . Start
- APU BLEED. . . . . off
  - > If wing anti-ice is required:
    - PACK pb (affected side) . . . . . OFF
    - Wing Anti Ice . . . . . ON
- X BLEED . . . . . OPEN

▼ Continued on next page ▼

▼ ENG 1 (2) N1 OVERLIMIT continued ▼

- ENG HYD PUMP pb  
(affected side). . . . . Confirm . . . . . OFF  
(to prevent spurious ECAM messages.)
- ENG MODE SEL . . . . . IGN
- Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures if an engine shutdown has been performed.



**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                         | <i>INOP SYS</i>                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| 1. LDG DIST PROC . . . APPLY<br>(refer to ODM)                                                                                                     | CAT 3 DUAL                                                                       |
| 2. For performance, delay<br>landing configuration (gear<br>down and flaps 3 or FULL)<br>until <u>established on final<br/>descent</u> to landing. | GEN 1(2)<br>REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP) |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                           | ALPHA FLOOR<br>(Flap lever position 1 or<br>greater)*                            |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                         | * Item not listed on the<br>ECAM STATUS page.                                    |



## ENG 1 (2) N2 DISCREPANCY

**Condition:** CHECK message is displayed below the affected indication.

- ▶ If both thrust levers are in the same position:
  - Cross-check the opposite engine's parameters.
  - Monitor engine performance.



## ENG 1 (2) N2 OVERLIMIT

**Condition:** N<sub>2</sub> is out of limits.

- ▶ If the max pointer indication is between 105.1 and 105.8:
  - THR LEVER (affected engine) . . . . Retard to maintain the N<sub>2</sub> within limits.
- ▶ If the max pointer indication is above 105.8% or if the engine does not respond to the thrust lever reduction:
  - THR LEVER (affected engine). . . . Confirm.. . . . IDLE

---

**Warning! If conditions do not permit engine shut down, land as soon as possible using the minimum thrust required to sustain a safe flight.**

---

- ENG MASTER switch (affected engine). . . . Confirm.. . . . OFF
- APU (if available) . . . . . Start
- APU BLEED . . . . . off
  - > If wing anti-ice is required:
    - PACK pb (affected side) . . . . . OFF
    - WING Anti Ice . . . . . ON
- X BLEED . . . . . OPEN
- ENG HYD PUMP pb (affected engine) . . . . Confirm.. . . . OFF (to prevent spurious ECAM messages.)

▼ Continued on next page ▼

▼ ENG 1 (2) N2 OVERLIMIT continued ▼

- ENG MODE SEL . . . . . IGN
- Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures if an engine shutdown has been performed.



**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                            | <i>INOP SYS</i>                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1. LDG DIST PROC . . . APPLY (refer to ODM)                                                                                           | CAT 3 DUAL<br>GEN 1(2)                                                                                                  |
| 2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (of Y ENG 2 PUMP)<br>ALPHA FLOOR<br>(Flap lever position 1 or greater)* |
| 3. One pack only if wing anti-ice ON.                                                                                                 |                                                                                                                         |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                     | * Item not listed on the ECAM STATUS page.                                                                              |



**ENG 1 (2) OIL FILTER CLOG**

**Condition:** The engine oil filter is clogged.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



## ENG 1 (2) OIL HI TEMP

**Condition:** The engine oil temperature has been between 140°C and 155°C for more than 15 minutes or the oil temperature is above 155°C.

1. THRUST LEVER  
(affected engine). . . . . Confirm. . . . . IDLE
2. ENG MASTER (affected engine) . . Confirm. . OFF
3. ENG MODE SEL . . . . . IGN
4. Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

5. TCAS mode. . . . . TA
6. APU (if available). . . . . Start
7. APU BLEED . . . . . off
8. ENG HYD PUMP PB  
(affected engine). . . . . Confirm. . . . . OFF
9. X BLEED selector. . . . . OPEN
  - > If WING Anti-Ice required:
    - PACK pb (affected side) . . . . . OFF
    - WING Anti Ice . . . . . ON
10. See Approach Procedures (below)

▼ Continued on next page ▼

## STATUS

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                  | INOP SYS                                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. LDG DIST PROC . . . APPLY (refer to ODM)</li> <li>2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing.</li> <li>3. One pack only if wing anti-ice ON.</li> </ol> <p><b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.</p> | <p>CAT 3 DUAL<br/> GEN 1(2)<br/> REVERSER 1(2)<br/> ENG 1(2) BLEED<br/> G ENG 1 PUMP (or Y ENG 2 PUMP)<br/> ALPHA FLOOR<br/> (Flap lever position 1 or greater)*</p> <p>* Item not listed on the ECAM STATUS page.</p> |



## ENG 1 (2) OIL LO PR

**Condition:** The corresponding engine oil pressure is low.

1. Check the oil pressure on the ECAM ENG page.

**Note:** An oil pressure digital indication below 13 PSI that is not accompanied by a ENG OIL LO PR message may be a result of an oil pressure transducer failure. In this scenario, continued engine operation is acceptable. Continue to monitor engine parameters.

- ▶ If an engine oil pressure of less than 13 PSI (red) is accompanied by an ENG 1 (2) OIL LO PR message:
  - THRUST LEVER  
(affected engine). . Confirm. . . . . IDLE
  - ENG MASTER switch  
(affected engine). . Confirm. . . . . OFF
  - APU (if available) . . . . . Start
  - APU BLEED . . . . . off
  - > If wing anti-ice is required:
    - PACK pb (affected side) . . . . . OFF
    - WING Anti Ice . . . . . ON
    - X BLEED . . . . . OPEN
    - ENG HYD PUMP pb  
(affected engine). . Confirm . . . . . OFF  
(to prevent spurious ECAM messages.)
    - ENG MODE SEL . . . . . IGN
    - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

▼ Continued on next page ▼

▼ **ENG 1 (2) OIL LO PR continued** ▼

- TCAS Mode. . . . .TA
- Land As Soon As Possible.
- See Approach Procedures.

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                         | <i>INOP SYS</i>                                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1. LDG DIST PROC . . .APPLY<br>(refer to ODM)                                                                                                      | CAT 3 DUAL<br>GEN 1(2)                                                                                                        |
| 2. For performance, delay<br>landing configuration (gear<br>down and flaps 3 or FULL)<br>until <u>established on final<br/>descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP)<br>ALPHA FLOOR<br>(Flap lever position 1 or<br>greater)* |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                           |                                                                                                                               |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                         | * Item not listed on the<br>ECAM STATUS page.                                                                                 |



## ENG 1 (2) ONE TLA FAULT

**Condition:** One of the two channels that provide thrust lever angle information is inoperative on one engine.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**ENG 1 (2) OVSPD PROT FAULT**

**Condition:** Engine overspeed protection is inoperative on one engine.

- ▶ If this warning occurs during engine start:
  - ENG MASTER switch . . . OFF (abort the start)
  - Clear the message and attempt another start.
    - > If the message reappears on subsequent start attempt:
      - Maintenance action is required.
    - > If the message does not reappear during the subsequent engine start:
      - Resume normal operations.



- ▶ If this warning occurs in flight:
  - Use caution since the affected engine's overspeed protection is not available.

**ENG 1 (2) PROBES FAULT**

**Condition:** Pressure and temperature probe information is not available to both channels of the Engine Control Unit (ECU) for one engine.

1. Maintenance action is required.



## ENG 1 (2) REVERSER FAULT

**Condition:** The thrust reverser on one engine is inoperative.

- ▶ If on the ground and reverse selected:
  - THR LEVER  
(affected engine). . . . . IDLE
  - Reverser is inoperative.
- ▶ If in flight and thrust is normal:
  - Operate engine normally in flight.
  - Do not use reverse (on affected engine) during landing.
  - Leave affected engine thrust lever at idle during landing.



- ▶ If in flight and FADEC sets affected engine thrust to idle:
  - THR LEVER  
(affected engine). . . . Confirm. . . . . IDLE
  - Do not use reverse (on affected engine) during landing.
  - Leave affected engine thrust lever at idle during landing.
  - See Approach Procedures.

▼ Continued on next page ▼

▼ ENG 1 (2) REVERSER FAULT continued ▼

**STATUS**

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INOP SYS                                                                                                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>1. LDG DIST PROC . . . APPLY<br/>    (refer to ODM)</div> <div>2. For performance, delay<br/>    landing configuration (gear<br/>    down and flaps 3 or FULL)<br/>    until <u>established on final</u><br/>    <u>descent</u> to landing.</div> <div>3. One pack only if wing<br/>    anti-ice ON.</div> <div><b>Note:</b> Alpha Floor protection<br/>          is not available with an<br/>          engine out and<br/>          flaps/slats extended.</div> | <div>REVERSER 1 (2)<br/>ALPHA FLOOR<br/>(Flap lever position 1 or<br/>greater)*</div> <div>*Item not listed on the<br/>ECAM STATUS page.</div> |



## ENG 1 (2) REVERSE UNLOCKED

**Condition:** One or more reverser door are not stowed position and a deploy order has not been given.

- ▶ If on the ground:
  - THRUST LEVER (affected engine) . . . . . IDLE
  - ENG MASTER switch (affected engine) . . OFF



---

**Caution! In flight, the warning alone without buffet or vibrations may be a false warning.**

---

- ▶ If in flight and **no** buffeting present:
  - THR LEVER  
(affected engine). . . . Confirm. . . . . IDLE
  - Maximum Speed . . . . . 300 KIAS/0.78M
  - See Approach Procedures
- ▶ If in flight **with** buffeting present:
  - THR LEVER  
(affected engine). . . . Confirm. . . . . IDLE
  - Maximum Speed . . . . . 240 KIAS
  - ENG MASTER switch  
(affected engine) . . . Confirm. . . . . OFF

▼ Continued on next page ▼

▼ ENG 1 (2) REVERSE UNLOCKED continued ▼

- > If reverser is actually deployed:
  - Apply full rudder trim towards live engine and control heading with roll. Do **not** follow the Beta target.
  - Start the APU if available, (leave APU BLEED - OFF).
  - ENG MODE SEL . . . . . IGN
  - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode. . . . . TA
- ENG HYD PUMP pb  
(affected engine) . . . . Confirm.. . . . OFF
- X BLEED selector. . . . . OPEN
  - >> If WING Anti-Ice is required:
    - PACK pb (affected side) . . . . . OFF
    - WING Anti-Ice . . . . . ON
- See Approach Procedures on the next page.

▼ Continued on next page ▼

▼ **ENG 1 (2) REVERSE UNLOCKED continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>STATUS</b><br>INOP SYS                                                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▶ If little or no buffeting present:                             <ul style="list-style-type: none"> <li>• PERF APPR . select CONF 3</li> <li>• GPWS LDG FLAP 3 pb . . ON</li> <li>• Use FLAPS 3 for landing.</li> <li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li> </ul> </li> <li>▶ If persistent or heavy buffeting present:                             <ul style="list-style-type: none"> <li>• Maintain Green Dot airspeed or greater until established on final. Heavy gross weight conditions may require TOGA thrust.</li> <li>• GPWS FLAP MODE pb . OFF</li> <li>• Use FLAPS 1 for landing.</li> <li>• Slow to <math>V_{LS} + 55</math> knots when established on final and at FLAPS 1.</li> <li>• After established on glideslope, manually trim the rudder (AP OFF) to 5° into live engine.</li> <li>• When landing is assured, landing gear lever...DOWN</li> <li>• At 800 ft. AGL, begin to slow so as to touchdown at <math>V_{LS} + 40</math> kts.</li> <li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li> </ul> </li> </ul> | GEN 1 (2)<br>ENG 1 (2) BLEED<br>G ENG 1 PUMP<br>(or Y ENG 2 PUMP)<br>MAIN GALLEY |



**ENG 1 (2) REV ISOL FAULT**

**Condition:** The reverser shut off valve is failed open.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**ENG 1 (2) REV PRESSURIZED**

**Condition:** One reverser is pressurized. Reverser doors are stowed and locked with no deploy order.

1. As a precautionary measure:
  - THR LEVER (affected engine) . . . . . IDLE



**ENG 1 (2) REV SWITCH FAULT**

**Condition:** The reverser switch is faulty.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



## ENG 1 (2) SENSOR FAULT

**Condition:** A pressure, temperature,  $N_1$ , or  $N_2$  sensor has failed and data is not available to both channels of the Engine Control Unit (ECU) for one engine.

- ▶ If the aircraft is on the ground:
  - Maintenance action is required.



- ▶ If the aircraft is in flight:
  - Avoid rapid thrust changes.



**ENG 1 (2) SHUTDOWN**

**Condition:** The affected engine has intentionally been shut down using the master switch.

- 1. THRUST LEVER (affected) . . . . . IDLE
- 2. ENG MASTER switch (affected) . . . . . Verify OFF
- ▶ If the engine was shut down due to an abnormal, refer to the procedure for the original problem or ECAM message, otherwise:
  - APU (if available) . . . . . Start
  - APU BLEED . . . . . off
  - > If ENG FIRE pb was pushed:
    - X BLEED selector. . . . . SHUT
    - WING ANTI ICE. . . . . OFF
    - Avoid icing conditions.
  - > If ENG FIRE pb was NOT pushed:
    - ENG HYD PUMP pb  
(affected engine). . Confirm.. . . . OFF  
(to prevent spurious ECAM messages.)
    - X BLEED selector. . . . . OPEN
    - >> If WING ANTI ICE required:
      - PACK (affected side) . . . . . OFF
      - WING Anti Ice . . . . . ON
    - ENG MODE SEL . . . . . IGN
    - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures.

▼ Continued on next page ▼

▼ **ENG 1 (2) SHUTDOWN continued** ▼

**STATUS**

**APPROACH PROCEDURES**

1. LDG DIST PROC . . . APPLY (refer to ODM)
2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until established on final descent to landing.

**Note:** Alpha Floor protection is not available with an engine out and flaps/slats extended.

**INOP SYS**

WING ANTI ICE (if ENG FIRE pb pushed)  
 CAT 3 DUAL  
 GEN 1(2)  
 PACK 1(2) (if ENG FIRE pb pushed)  
 REVERSER 1(2)  
 ENG 1(2) BLEED  
 G ENG 1 PUMP (or Y ENG 2 PUMP)  
 ALPHA FLOOR  
 (Flap lever position 1 or greater)\*

\* Item not listed on the ECAM STATUS page.



**ENG 1 (2) STALL**

**Condition:** A stall condition is detected by the Engine Control Unit (ECU) before the N2 speed reaches 58%.

**Note:** This ECAM warning is not displayed above idle and may indicate that an engine returned to sub-idle speed. The warning may also be caused by tailwind conditions, first-flight-of-the-day starts, higher elevations and/or cold ambient temperatures.

**Note:** A stall may be indicated by varying degrees of abnormal engine noises. A stall can be accompanied by flame from the engine exhaust (and possibly from the engine inlet in severe cases), fluctuating performance parameters, sluggish or lack of response, or high EGT and/or a rapid EGT rise when the thrust lever is advanced.

► **If the aircraft is on the ground:**

- ENG MASTER switch (affected engine) . . OFF
  - > If the message is accompanied by abnormal engine noise, vibration, fluctuating parameters or takeoff is rejected due to an engine compressor stall/surge:
    - A maintenance inspection is required prior to flight.

▼ Continued on next page ▼

▼ ENG 1 (2) STALL continued ▼

- > If first-start-of-the-day and the message was not accompanied by abnormal engine noise, vibration or fluctuating parameters:

- Attempt a restart of the engine.

**Note:** The first start attempt warms the engine core and a second start may be successful.

- >> If the restart is successful:

- Complete an INFO ONLY logbook write up.



- >> If the restart is unsuccessful:

- Coordinate with Maintenance Control for corrective actions.



► **If the aircraft is in flight:**

- THRUST LEVER  
(affected engine). . . . Confirm. . . . . IDLE
- Check the affected engine parameters.
  - > If engine parameters are **normal**:

- ENG ANTI ICE (affected engine) . . . ON
    - WING ANTI ICE . . . . . ON

**Note:** Operation of the ENG and WING ANTI ICE will increase the stall threshold by bleeding the engine. However, EGT will increase accordingly.

▼ Continued on next page ▼

▼ **ENG 1 (2) STALL continued** ▼

- Advance the thrust lever slowly.
  - >> If stall recurs:
    - Retard the thrust lever and operate the engine below its stall threshold.


  - >> If stall does not recur:
    - Continue with a normal engine operation.


- > If engine parameters are **abnormal**:
  - ENG MASTER switch  
(affected engine) . . . Confirm . . . . . OFF
  - Do not attempt a restart.
  - APU (if available) . . . . . Start
  - APU BLEED. . . . . off
  - X BLEED selector . . . . . OPEN
    - >> If wing anti-ice is required:
      - PACK pb (affected side). . . . . OFF
      - WING Anti Ice . . . . . ON
  - ENG HYD PUMP pb  
(affected engine) . . . . . Confirm . . . OFF  
(to prevent spurious ECAM messages)
  - ENG MODE SEL. . . . . IGN
  - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures.

▼ **Continued on next page** ▼

▼ ENG 1 (2) STALL continued ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                         | STATUS                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. LDG DIST PROC . . . APPLY (refer to ODM)</li> <li>2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing.</li> <li>3. One pack only if wing anti-ice ON.</li> </ol> | <p>CAT 3 DUAL<br/>GEN 1(2)<br/>REVERSER 1(2)<br/>ENG 1(2) BLEED<br/>G ENG 1 PUMP (or Y ENG 2 PUMP)<br/>ALPHA FLOOR<br/>(Flap lever position 1 or greater)*</p> |
| <p><b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.</p>                                                                                                                                                                                    | <p>* Item not listed on the ECAM STATUS page.</p>                                                                                                              |



**ENG 1 (2) START FAULT**

**Condition:** A start fault has occurred due to EGT overlimit, stalled start, no light off, exceeding the starter time limit or start anomaly.

- ▶ **If on the ground:**
  - > **If auto starting:**
    - Allow the FADEC to perform its programmed start attempts/actions.
      - > When the dry cranking process is complete, **OR** if a normal condition cannot be achieved:
        - ENG MASTER (affected engine) . OFF
        - ENG MODE SEL. . . . . NORM
  - > **If manual starting:**
    - ENG MAN START pb (affected engine) . . . . . OFF
    - ENG MASTER switch (affected engine) . . . . . OFF
    - ENG MODE selector . . . . . NORM
      - > When N<sub>2</sub> is less than 20% and no secondary START TIME EXCEEDED message:
        - ENG MODE selector . . . . . CRANK
        - ENG MAN START pb (affected engine) . . . . . ON
        - Allow the engine to dry crank for 30 seconds.

▼ Continued on next page ▼

▼ **ENG 1 (2) START FAULT continued** ▼

- ENG MAN START pb  
(affected engine) . . . . . OFF
- ENG MODE selector. . . . . NORM

► **If on the ground and ENG 1(2) IGNITION FAULT:**

- Allow the FADEC to perform its programmed start attempts/actions.
  - > If engine start is unsuccessful:
    - ENG MASTER (affected) . . . . . OFF
    - ENG MODE SEL . . . . . NORM
    - Maintenance is required.



- > If engine start is successful:
  - ENG MASTER (affected). . . . . OFF
  - ENG MODE SEL . . . . . NORM
  - Contact MCC through Atlanta radio for guidance.



► **If on the ground and ENG 1 (2) HP FUEL VALVE:**

- No restart attempts are permitted. Contact MCC through Atlanta radio for guidance.



► **If on the ground and START TIME EXCEEDED:**

- Attempt a manual restart of the engine.

▼ **Continued on next page** ▼

▼ **ENG 1 (2) START FAULT continued** ▼

- > If restart is attempted and successful:
  - Complete an INFO ONLY logbook write up.
- > If restart is unsuccessful:
  - No further start attempts are permitted.  
Contact Maintenance Control.



► **If on the ground** and the secondary message reads **LO START AIR PRESS** or **ENG 1 (2) STALL**:

- Check the Bleed Air Pressure on the ECAM.
- Consider an alternative source for starting air pressure or attempt a manual restart.
- Attempt a restart of the engine.
  - > If restart is attempted and successful:
    - Complete an INFO ONLY logbook write up.
  - > If restart is unsuccessful:
    - No further start attempts are permitted.  
Contact Maintenance Control.



► **If on the ground** and the secondary message reads **THR LEVER NOT AT IDLE**:

- Both Thrust Levers . . . . . IDLE



► **If in flight** and the secondary message reads **EGT OVERLIMIT, STALL, or IGNITION FAULT**:

▼ **Continued on next page** ▼

▼ **ENG 1 (2) START FAULT continued** ▼

- **ENG MASTER**  
(affected engine). . . . Confirm. . . . . OFF
- > If an additional relight attempt is desired:
  - Note:** Wait 30 seconds to drain fuel from the engine before attempting a new start.
  - See “Engine Relight” on page 7.74.
- > If an engine shut down is desired:
- See “ENG 1 (2) SHUTDOWN” on page 7.44.



**ENG 1 (2) START VALVE FAULT**

**Condition:** The position of the start valve disagrees with the required position of the valve.

- If the start valve is not closed:
  - **APU BLEED** . . . . . OFF
  - **X BLEED selector** . . . . . SHUT
  - Note:** This prevents aircraft bleed sources from supplying the faulty start valve.
- > If the aircraft is in flight:
  - **ENG BLEED (affected engine)** . . . . . OFF
- > If the aircraft is on the ground:
  - **MAN START pb**  
(affected engine) . . . . . Verify OFF
  - **ENG MASTER**  
(affected engine) . . . . . OFF



▼ **Continued on next page** ▼

▼ ENG 1 (2) START VALVE FAULT continued ▼

- ▶ If the start valve will not open and the opposite engine is running:
  - X BLEED selector . . . . . OPEN
  - > If in-flight below FL200 and the APU available:
    - APU BLEED . . . . . ON
    - > If the start valve still does not open:
      - MAN START pb  
(affected engine) . . . . . OFF (if used)
      - ENG MASTER switch  
(affected engine). . . Confirm. . . . . OFF

**Note:** Attempting a manual start via the MAN START pb in this case is useless since the start valve is controlled by FADEC.



- ▶ If the start valve will not open and the opposite engine is not running:
  - Refer to “Engine Start Valve - External Operation” procedure in Volume 1 Supplemental Procedures section.



**ENG 1 (2) THR LEVER ABV IDLE**

**Condition:** While the RETARD callout is triggered, one TL is above idle while the other is in the reverse detent, or while the other is at idle.

- THR LEVER  
(affected engine) . . . . . IDLE  
■ ■ ■ ■

**ENG 1 (2) THR LEVER DISAGREE**

**Condition:** There is a disagreement between the two thrust lever position sensors for one engine.

- ▶ If the aircraft is **on the ground** and the thrust lever position (at the time of the fault detection) is between IDLE and MCT:

- THRUST LEVER (affected engine) . . . . . IDLE

**Note:** The FADEC selects idle thrust on the ground unless the thrust lever is at the TOGA stop or FLEX detent.



- ▶ If the aircraft is **in flight** and the thrust lever position (at the time of the fault detection) is between IDLE and MCT:

- Engage the auto thrust system if it is not already active.

**Note:** If the failure occurs during takeoff, TOGA or FLEX thrust will be maintained until the thrust levers are moved at the thrust reduction altitude.

**Note:** A/THR will manage the thrust between IDLE and the higher of the two thrust lever positions.

- See Approach Procedures.

▼ Continued on next page ▼

▼ ENG 1 (2) THR LEVER DISAGREE continued ▼

**STATUS**

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | INOP SYS                                                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Use single engine approach procedures since the FADEC will command the affected engine to idle at slat extension.</li> <li>2. LDG DIST PROC . . . APPLY (refer to ODM)</li> <li>3. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing.</li> </ol> <p><b>Note:</b> Expect asymmetric thrust if a go-around is attempted with the slats extended.</p> <p><b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.</p> | <p>ENG 1 (2) THR LEVER ALPHA FLOOR (Flap lever position 1 or greater) *</p> <p>* Item not listed on the ECAM STATUS page.</p> |



**ENG 1 (2) THR LEVER FAULT**

**Condition:** Both position sensors on one thrust lever have failed. Thrust lever position information on the affected engine is not validated.

► If the aircraft is **on the ground**:

- THRUST LEVER (affected engine) . . . . . IDLE

**Note:** Idle thrust is automatically selected by the FADEC. If the associated thrust reverser is deployed, the FADEC commands it to stow.



► If the aircraft is **in flight** and the selected thrust lever position (at the time of the fault detection) is:

- TOGA or FLEX:

The FADEC maintains TOGA or FLEX thrust until slat retraction. At slat retraction it will select MCT.

- Between IDLE and MCT:

> If the auto thrust system (A/THR) is engaged:

- Keep the A/THR engaged.
- See Approach Procedures.

▼ Continued on next page ▼

▼ ENG 1 (2) THR LEVER FAULT continued ▼

- > If the A/THR is not engaged:  
     Before the slats are retracted:
  - A/THR . . . . . ON
  - See Approach Procedures.

**STATUS**

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                            | INOP SYS                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1. Use single engine approach procedures since the FADEC will command the affected engine to idle at slat extension.<br>2. LDG DIST PROC . . . . APPLY (refer to ODM)<br>3. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | ENG 1 (2) THR LEVER REVERSER 1 (2) ALPHA FLOOR (Flap lever position 1 or greater)*<br><br>*Item not listed on the ECAM STATUS page. |
| <b>Note:</b> Expect asymmetric thrust if a go-around is attempted with the slats extended.                                                                                                                                                                                                                     |                                                                                                                                     |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                                                                                                                                                                                              |                                                                                                                                     |



**ENG COMPRESSOR VANE**

**Condition:** A fault is detected in the Variable Bleed Valve system (VBV) or the Variable Stator Vane system (VSV) on both engines.

- ▶ If on the ground before takeoff:
  - Refer to the ECAM Messages tab of the MEL (NO DISPATCH).
- ▶ If in flight:
  - Crew awareness.



**Condition:** Both engines have failed in flight and fuel remains.

[illegible]

- ENG MODE SEL . . . . . IGN
- OPTIMUM RELIGHT SPD . . . . . 280 kts

- VHF 1 / ATC 1 . . . . . USE
  - ▶ If no relight after 30 seconds:
    - APU (BELOW FL 250). . . . . START
    - Begin cycling the ENG MASTERS (OFF for 30 seconds, then ON for 30 seconds) until relight occurs.

▼ Continued on next page ▼

## ▼ ENG DUAL FAILURE (FUEL REMAINING) continued ▼

- ▶ When APU available and <FL 200:
  - WING ANTI ICE. . . . . OFF
  - APU BLEED. . . . . ON
  - OPTIMUM SPEED. . . . 220 kts/ GREEN DOT
  - ENG MASTERS . . . . OFF 30 secs, then ON

Continue attempting start (one engine at a time) using APU Bleed Air.

- ▶ If an engine is recovered:
  - See “Engine Relight”, this section, for continued relight attempts of remaining engine.



- ▶ If neither engine is recovered:
  - Notify flight attendants to secure the cabin.
  - Use rudder with care.

**Caution! Avoid large or rapid rudder deflections because the RAT is the only source of hydraulic power.**

- ▶ If ditching:
  - Go to "Ditching", section 0.



▼ Continued on next page ▼

▼ ENG DUAL FAILURE (FUEL REMAINING) continued ▼

- ▶ If landing:
  - Review “Emergency Landing Considerations” on page 0.16.
  - Use FLAPS 3 for landing.

The control laws will revert to DIRECT LAW when the landing gear is extended.

- Gravity extend the LANDING GEAR:
  - Raise the GRAVITY GEAR EXTN handle.
  - Rotate the handle clockwise 3 turns.
  - LANDING GEAR LEVER . . . . . DOWN
  - Use 150 kts for approach.

At 1,000 feet:

- Announce “BRACE FOR LANDING” via the PA.

At touchdown:

- ENG MASTERS . . . . . OFF
- APU MASTER . . . . . OFF
- Limit the maximum brake pressure to 1,000 psi because the only source of hydraulic pressure is the yellow brake accumulator. Only seven full brake applications are available.
- Perform “Evacuation” checklist, if required.



## ENG DUAL FAILURE (No Fuel Remaining)

**Condition:** Both engines have failed in flight and no fuel remains.

**Note:** With both engines failed, it takes approximately 15 minutes to descend from FL350 to the ground.

1. EMER ELEC PWR . . . . . MAN ON
2. THR LEVERS . . . . . IDLE
3. FAC 1 . . . . . OFF, THEN ON

**Note:** If fuel remains, proceed to the “ENG DUAL FAILURE (Fuel Remaining)”, this section.

- OPTIMUM SPD .....220 kts/GREEN DOT

**Note:** At green dot, the aircraft can fly up to 25nm per 10,000 feet with no wind.

- VHF 1 / ATC 1 . . . . . USE
- Notify flight attendants to secure the cabin.
- Use rudder with care.

**Caution!** Avoid large or rapid rudder deflections because the RAT is the only source of hydraulic power.

- If ditching:
  - Go to page 0.1, “Ditching” .



▼ Continued on next page ▼

▼ ENG DUAL FAILURE (NO FUEL REMAINING) continued ▼

- ▶ If ditching:
  - Go to page 0.1, “Ditching” .  
■ ■ ■ ■
  
- ▶ If landing:
  - Review “Emergency Landing Considerations” on page 0.16.
  - Use FLAPS 3 for landing.

The control laws will revert to DIRECT LAW when the landing gear is extended.

- Gravity extend the LANDING GEAR:
  - Raise the GRAVITY GEAR EXTN handle.
  - Rotate the handle clockwise 3 turns.
  - LANDING GEAR LEVER . . . . . DOWN
  - Use 150 kts for approach.

At 1,000 feet:

- Announce “BRACE FOR LANDING” via the PA.

At touchdown:

- Limit the maximum brake pressure to 1,000 psi because the only source of hydraulic pressure is the yellow brake accumulator. Only seven full brake applications are available.
- Perform “Evacuation” checklist, if required.



**ENG FLEX TEMP NOT SET**

**Condition:** During takeoff, the thrust levers are set at FLEX/MCT without an entered FLEX temperature.

- ▶ If thrust levers are in FLEX detent and no FLEX TEMP is set:
  - THR LEVERS . . . . . TOGA

**Note:** Placing Thrust Levers to TOGA and continuing takeoff is authorized.



**Engine Compressor Stall**

**Condition:** An unannunciated engine stall is suspected or confirmed.

**Note:** An engine compressor stall may be indicated by varying degrees of abnormal engine noises. A stall can be accompanied by flame from the engine exhaust and possibly from the engine inlet in severe cases, fluctuating performance parameters, sluggish or lack of response, or high EGT and/or a rapid EGT rise when the thrust lever is advanced.

- ▶ If on the ground:

**Note:** If an engine compressor surge/stall occurs during ground operations, or takeoff is rejected due to an engine compressor surge/stall, a maintenance inspection is required prior to flight (FOM, chapter 3).

- ENG MASTER switch (affected engine) . . OFF



 **Continued on next page** 

▼ Engine Compressor Stall continued ▼

- ▶ If in flight:
  - THRUST LEVER  
(affected engine). . . . Confirm. . . . . IDLE
  - Check the affected engine parameters.
  - > If engine parameters are **abnormal**:
    - ENG MASTER switch  
(affected engine). . Confirm. . . . . OFF
    - Do not attempt a restart.
    - APU (if available) . . . . . Start
    - APU BLEED. . . . . off
    - X BLEED selector . . . . . OPEN
    - >> If wing anti-ice is required:
      - PACK pb (affected side). . . . . OFF
      - WING Anti Ice . . . . . ON
    - ENG HYD PUMP pb  
(affected engine). . Confirm. . . . . OFF  
(to prevent spurious ECAM messages)
    - ENG MODE SEL. . . . . IGN
    - Fuel Imbalance . . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS Mode . . . . . TA
- Land As Soon As Possible.
- See Approach Procedures.

▼ Continued on next page ▼

▼ Engine Compressor Stall continued ▼

| STATUS                                                                                                                                             |                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| APPROACH PROCEDURES                                                                                                                                | INOP SYS                                                                                                                |
| 1. LDG DIST PROC . . . APPLY<br>(refer to ODM)                                                                                                     | CAT 3 DUAL<br>GEN 1(2)                                                                                                  |
| 2. For performance, delay<br>landing configuration (gear<br>down and flaps 3 or FULL)<br>until <u>established on final<br/>descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG<br>2 PUMP)<br>ALPHA FLOOR<br>(Flap position 1 or<br>greater)* |
| 3. One pack only if wing<br>anti-ice ON.                                                                                                           |                                                                                                                         |
| <b>Note:</b> Alpha Floor protection<br>is not available with an<br>engine out and<br>flaps/slats extended.                                         | * Item not listed on the<br>ECAM STATUS page.                                                                           |

- > If engine parameters are normal:
- ENG ANTI ICE (affected engine) . . . . . ON
  - WING ANTI ICE. . . . . ON

**Note:** Operation of the ENG and WING ANTI ICE will increase the compressor stall threshold by bleeding the engine. However, EGT will increase accordingly.

- Advance the thrust lever slowly.

▼ Continued on next page ▼

▼ **Engine Compressor Stall continued** ▼

> > If stall recurs:

- Retard the thrust lever and operate the engine below its stall threshold.



> > If stall does not recur:

- Continue with a normal engine operation.



**Engine - High Vibration**

**Condition:** Engine vibrations are causing perceptible airframe vibrations or an ECAM Advisory.

**Note:** Crews should monitor engine parameters (especially EGT) when engine vibrations are above the advisory threshold (N1 > 6, N2 > 4.3). High ECAM engine vibration indications alone do not require engine shut down.

**Note:** Perceptible airframe vibrations generally accompany high N1 vibration. High N2 vibration may occur without any other perceptible vibrations. Vibrations may occur following a bird strike.

**Note:** High engine vibration may be accompanied by smoke or a burning smell, due to blade tip contact with abradable material.

- 1. Other engine parameters (especially EGT) . . . . . Check
  - ▶ If icing is suspected:

High N1 vibration in icing conditions (with or without ENG ANTI ICE ON) may be caused by ice build up on the fan blades and/or spinner. Icing should be suspected if N1 vibration occurs and all other engine parameters are normal.

    - A/THR . . . . . OFF

**Note:** When disconnecting A/THR, first match THR LVRs with actual N1 to avoid a rapid thrust increase.

▼ Engine High Vibration continued ▼

- Thrust Lever (one engine at a time) . . IDLE
- ENG ANTI ICE (on that engine). . . . . ON

**Note:** If ENG ANTI ICE is off, turn ON when each engine is at IDLE, with 30 seconds between engines.

- Thrust Lever  
(one engine at a time). . . . . Increase

**Note:** If in icing conditions, several cycles between idle and a thrust compatible with phase of flight may be necessary. For efficient ice shedding, thrust should be increased to at least 80% N1, conditions permitting. After each thrust cycle, vibrations should decrease, indicating progress of the ice shedding. When ice is fully shed, vibration should decrease below advisory threshold and normal engine operations resumed.



► If icing is **not** suspected:

- Engine parameters . . . . . Monitor
- Thrust lever (affected engine) . . . . Retard

If conditions permit, reduce thrust to maintain vibration level below advisory threshold.

**Note:** If VIB indication does not decrease following thrust reduction, this may indicate other problems with the engine.



**Engine - Hung Start**

**Condition:** A hung start is identified by an abnormally slow acceleration after light-off and RPM stabilization below idle.

- If engine acceleration ceases, and there is no stall or over temperature indication:

1. ENG MASTER switch (affected engine) . . . OFF
2. Dry crank the engine using the following procedure:

**When** the  $N_2$  is less than 20%:

- ENG MODE SEL. . . . . CRANK
- MAN START pb (affected engine) . . ON

After 30 seconds:

- MAN START pb (affected engine) OFF
- ENG MODE SEL. . . . . NORM

3. Coordinate with Maintenance personnel regarding corrective action.



## Engine - Low Oil Quantity

**Condition:** Low and/or decreasing oil quantity indications are observed on the System Display.

Low and/or decreasing oil quantity indications may be the result of a number of causes, including:

Indication Fault

Oil Leak

Excessive Oil Consumption, or

Inadequate Servicing

The oil tank quantity sensors do not indicate the total oil actually being used to lubricate an operating engine. There is no ECAM warning for Low Oil Quantity.

- ▶ If low and/or decreasing oil quantity is noted:
  - Continue to monitor engine parameters for abnormal oil pressure, oil temperature, and vibration.
  - > If these indications remain normal,
    - Continue to operate the engine.
  - > If you note a degradation in oil pressure and conditions permit
    - Consider reducing thrust on the affected engine.
    - Contact Dispatch/Maintenance Control for further guidance.
- ▶ If the ECAM ENG OIL HI TEMP and/or ENG OIL LO PR messages appear, confirming an oil loss:
  - Apply the appropriate procedure(s).



**Engine Relight**

**Condition:** In flight engine relight desired.

**Warning! Do not attempt a relight of a damaged engine.**

**Engine damage is indicated by:**

- Abnormal noise or vibration
- Repeated engine stalls
- No hydraulic quantity
- No N1 or N2 rotation
- No oil quantity (Note: low oil pressure alone does not indicate damage)

**► IF DAMAGE:**

- See ENG 1 (2) FAIL procedure (page 7.17).

**► IF NO DAMAGE:**

- Maintain an altitude of 27,500 feet or below.
- ENG MASTER (affected engine) . . . Verify OFF
- THRUST LEVER (affected engine) Verify IDLE
- ENG MODE SEL . . . . . Verify IGN
- APU BLEED . . . . . Verify OFF
- X BLEED selector . . . . . OPEN
- WING ANTI ICE . . . . . OFF

**Caution! The FADEC will not abort an abnormal start.**

**▼ Continued on next page ▼**

▼ Engine Relight continued ▼

**Note:** Engine light off should occur within 18 seconds of fuel flow increase and must occur within 30 seconds. If outside the windmilling start envelope (page 7.77) the FADEC will open the start valve to assist the start.

- ENG MASTER (affected engine) . . . . . ON

**>> If/when idle is reached:**

- ENG MODE SEL . . . . . NORM
- X BLEED selector . . . . . AUTO
- TCAS Mode . . . . . RA/TA
- Restore any affected systems.



**>> If successful engine relight does not occur:**

- ENG MASTER  
(affected engine). . . Confirm. . . . . OFF
- Wait 30 seconds before attempting another start.

**>> If further start attempts are unsuccessful or not desired:**

- ENG MASTER (affected engine) . . . Verify OFF
- APU (if available) . . . . . Start
- APU BLEED . . . . . off
- Fuel Balance. . . . . Monitor

**Note:** If necessary, refer to Vol. 1, SP.12, Fuel Balancing.

- TCAS mode . . . . . TA
- ENG HYD PUMP PB  
(affected engine). . . Confirm. . . . . OFF
- X BLEED selector . . . . . Verify OPEN
- >> If WING Anti-Ice required:**
  - Pack (affected side) . . . . . OFF
  - WING Anti-Ice . . . . . ON
- See Approach Procedures below:

▼ Continued on next page ▼

▼ Engine Relight continued ▼

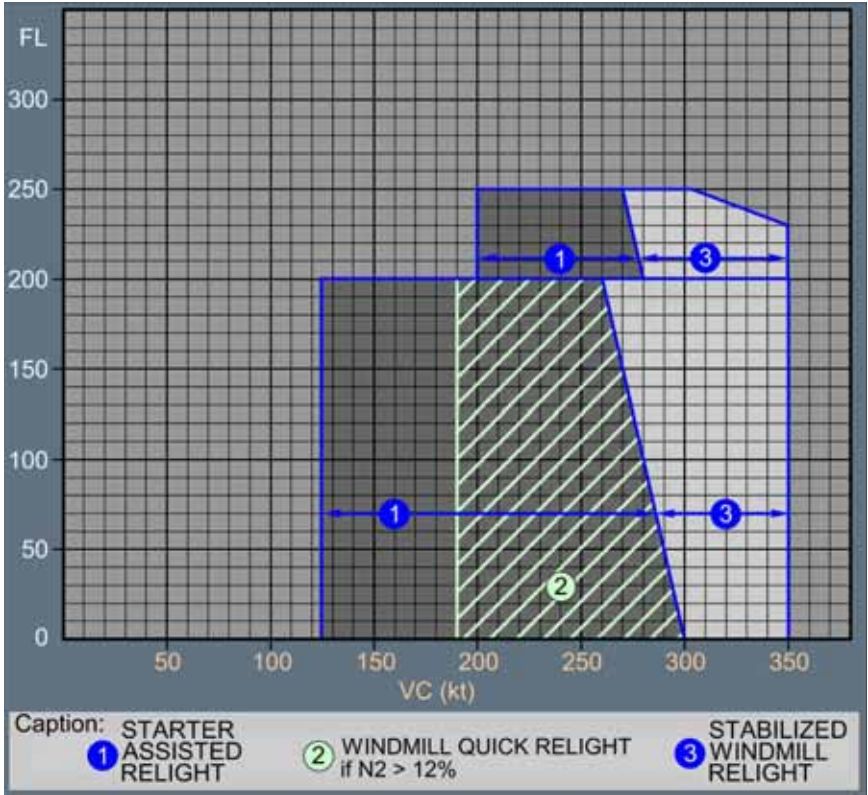
**STATUS**

| APPROACH PROCEDURES                                                                                                                   | INOP SYS                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1. LDG DIST PROC . . . APPLY (refer to ODM)                                                                                           | CAT 3 DUAL<br>GEN 1(2)                                            |
| 2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG 2 PUMP) |
| 3. One pack only if wing anti-ice ON.                                                                                                 | ALPHA FLOOR<br>(Flap lever position 1 or greater)*                |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                     | * Item not listed on the ECAM STATUS page.                        |

▼ Continued on next page ▼

▼ Engine Relight continued ▼

## Engine Relight Envelope Chart



**Note:** Windmilling relights can be attempted in zone (1) while the RPM is decreasing provided N2 has not dropped below 12%.

This chart assumes that both ignitors (A + B) on the failed engine are operative.

WING ANTI ICE must be OFF for a starter assisted start.



**ENG REV SET**

**Condition:** Reverse thrust has been selected in flight.

- > If reverse thrust has been selected in flight:
    - THR LEVER  
(affected engine) . . . . . FWD THRUST
- ■ ■ ■

**ENG SAT ABOVE FLEX TEMP**

**Condition:** The ambient temperature equals (or exceeds) the takeoff FLEX temp prior to setting takeoff thrust.

1. Select a higher FLEX temperature setting (if available), or use TOGA for takeoff.
- ■ ■ ■

### ENG THRUST LOCKED

**Condition:** Engine thrust is fixed after a failure or inadvertent A/THR disconnect.

- THR LEVERS . . . . . MOVE



### ENG THR LEVERS NOT SET

**Condition:** The thrust levers are not in the appropriate detent for takeoff or both thrust levers are not in the same detent during takeoff.

- ▶ If thrust levers are in the FLEX detent and no FLEX TEMP is set, or if the ambient temp equals the FLEX temp:

- THR LEVERS . . . . . TOGA

**Note:** Placing Thrust Levers to TOGA and continuing takeoff is authorized.



- ▶ If thrust levers are in a position less than the MCT/FLX detent and a FLEX TEMP is set:

- THR LEVERS . . . . . MCT/FLX



**ENG TYPE DISAGREE**

**Condition:** A rating discrepancy is detected between the two engines.

1. Maintenance action is required.

**ENG T.O. THRUST DISAGREE**

**Condition:** The two FADECs have selected different takeoff thrust modes (TOGA, FLEX).

1. Select TOGA thrust and continue takeoff.

**ENG VIB SYS FAULT**

**Condition:** There is a failure of the engine vibration detection system.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**Non-Normal Checklists**

**Chapter NNC**

**Fire Protection**

**Section 8**

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## Air Conditioning Smoke

**Condition:** Smoke is originating from the air conditioning system.

1. Oxygen Masks. . . . . ON  
Select 100%  
Rotate EMERGENCY pb as required to clear mask.
2. Establish crew communications, coordinate with flight attendants and ascertain the situation.
3. Begin descent and diversion to nearest suitable airport
4. CAB FANS pb . . . . . OFF
5. APU BLEED . . . . . OFF
6. CARGO HEAT AFT ISOL VALVE . . . . . OFF

**Note:** This may prevent false cargo smoke warnings.

7. PACK 1. . . . . OFF
  - ▶ If the smoke persists after 3 minutes:
    - PACK 1 . . . . . ON
    - PACK 2 . . . . . OFF
  - ▶ If the smoke persists after 3 minutes,
    - PACK 2 . . . . . ON
8. BLOWER and EXTRACT pb . . . . .OVRD
9. See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary.



APU FIRE

**Condition:** APU fire.

1. APU FIRE pb. . . . . Confirm.. . . .PUSH.  
**Note:** The fire light will stay illuminated as long as a fire is detected.

- 2. Wait 10 seconds (countdown on ECAM).
- 3. APU AGENT pb . . . . .PUSH
- 4. APU MASTER SW . . . . . OFF
- 5. Do not attempt a restart of the APU.
- 6. Land As Soon As Possible.

**STATUS**

|  |          |
|--|----------|
|  | INOP SYS |
|  | APU      |

■ ■ ■ ■

### APU FIRE DET FAULT

**Condition:** Both APU fire detection loops are inoperative.

**Note:** The APU fire detection system is inoperative.

1. Do not start or use the APU unless it is needed as an emergency source of electrical power or bleed air.

#### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | APU FIRE DET    |



### APU FIRE LOOP A (B) FAULT

**Condition:** APU fire loop A or APU fire loop B is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.

#### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | APU LOOP A (B)  |



## AVIONICS SMOKE

**Condition:** Smoke has been detected in the ventilation extraction duct.

**Note:** If fault occurs prior to flight and is confirmed to be a false indication, see SMOKE DET FAULT in Computer Resets NNOI.1.9 to prevent 'LAND ASAP' indication when airborne.

- ▶ If smoke is **not** perceived (sight or smell):
  - Continue to search for signs of Avionics Smoke.

**Note:** If “LAND ASAP” is displayed on the ECAM, consider diversion to nearest suitable airport.



- ▶ If smoke is perceived (sight or smell):
  - Oxygen Mask . . . . . ON  
Select 100%  
Rotate EMERGENCY pb as required to clear mask.
  - Establish crew communication, coordinate with flight attendants and ascertain the situation.
  - Begin descent and diversion to nearest suitable airport. Land As Soon As Possible
  - See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary
  - CAB FANS pb . . . . . OFF
  - BLOWER pb . . . . . OVRD
  - EXTRACT pb . . . . . OVRD
  - GALLEY pb . . . . . OFF
- ▶ If the source of the smoke can be identified:
  - Remove power from the affected equipment.

▼ Continued on next page ▼

▼ AVIONICS SMOKE continued ▼

- ▶ If the smoke is **no longer** perceptible after 5 minutes:
  - Leave the BLOWER and EXTRACT pbs in OVRD.

■ ■ ■ ■
  
- ▶ If the smoke is still perceptible after 5 minutes:
  - EMER ELEC PWR GEN 1 LINE pb. . . . . OFF.
 

**Note:** This opens generator 1 line contactor. Generator 1 only powers one fuel pump in each wing tank.
  - EMER ELEC PWR MAN ON pb . . . . . ON
  - Ensure that the emergency generator is operating by checking that the EMER GEN parameters on the ECAM ELEC page are correct.
    - > If the EMER GEN is operating normally:
      - APU GEN pb . . . . . OFF
      - (A320 only) Tune NAV AIDS on RMP 1.
      - GEN 2 pb . . . . . OFF
      - Maintain at least 140 knots for RAT power.
      - Use VHF 1 and ATC transponder 1.
      - FAC 1 pb . . OFF for 5 seconds, then ON
      - (A320 only) Use the CAB PRESS LDG ELEV control to manually select the landing field elevation.
      - The flight law has degraded to ALTERNATE LAW.
      - Avoid icing conditions.
      - Do not exceed 320 knots.

▼ Continued on next page ▼

▼ AVIONICS SMOKE continued ▼

**STATUS**

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | INOP SYS                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <p>► <b>Three minutes prior to landing or 2,000 ft above airport altitude, restore normal electrical supply by selecting:</b></p> <ul style="list-style-type: none"><li>• GEN 2 pb. . . . . ON</li><li>• EMER ELEC PWR GEN 1 LINE pb. . . . . ON.</li><li>• The aircraft will remain in ALTERNATE LAW due to the continued loss of IR 2 and 3. The control law will degrade to DIRECT LAW after gear extension.</li><li>• FOR LDG . . . . USE FLAPS 3</li><li>• GPWS LDG FLAP 3 pb . ON</li><li>• Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) + 10 knots. Enter <math>V_{APP}</math> on the PERF APPR page.</li><li>• LDG DIST PROC . . . .APPLY (refer to the ODM)</li></ul> | <p>AP 1 + 2<br/>A/THR<br/>VENT BLOWER<br/>VENT EXTRACT<br/>L &amp; R CABIN FAN<br/>NORMAL LAW</p> |
| <p>► <b>After landing:</b></p> <ul style="list-style-type: none"><li>• If smoke increases: turn off GEN 2 and EMER ELEC PWR GEN 1 LINE pbs.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>See “ELEC EMER CONFIG” on page 6.32</p>                                                        |



## EFB Battery Overheat or Fire

Condition: Battery for an EFB or PED has overheated or is on fire.

---

---

**Warning! Use this procedure only when an EFB battery overheats or fire is positively identified. If in doubt, Go to the Cabin Smoke / Fire / Fumes checklist on page 8.8.**

---

---

1. External power source . . . . . Unplug  
Remove device from powered keyboard, battery or external power.
2. Fire . . . . . Extinguish  
Use a halon fire extinguisher, water fire extinguisher, or available liquid to extinguish fire.

---

---

**Warning! Do not attempt to pick up or move a smoking or burning device. Do not move the device until certain the fire is extinguished and the device is cool.**

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---

**Warning! Do not cover the device or use ice to cool the device. Ice or other materials insulate the device, increasing the likelihood that additional battery cells will reach thermal runaway.**

---

---

3. **After** extinguishing the fire, immediately douse the device with water or other liquid to cool the device and prevent additional battery cells from reaching thermal runaway.



**Cabin Smoke / Fire / Fumes**

**Condition:** Smoke/Fire is originating from the cabin.

1. Oxygen Mask . . . . . As reqd  
Select 100%  
Rotate EMERGENCY pb as required to clear mask.
2. Establish crew communications, coordinate with flight attendants and ascertain the situation.
3. Begin descent and diversion to nearest suitable airport.

**Caution! Do not use this procedure if the source of the smoke is the air conditioning system. See “Air Conditioning Smoke” on page 8.1**

**Caution! Do not deploy the PASSENGER OXYGEN masks if there is a fire in the cabin.**

4. GALLEY pb . . . . . OFF  
(galleys are unpowered).
5. PAX SYS pb (If Installed) . . . . . OFF
  - If fire cannot be immediately controlled or if smoke persists:
    - EMER EXIT LIGHT . . . . . ON
    - BUS TIE pb. . . . . OFF
    - GEN 2 pb . . . . . OFF  
(F/O PFD, ND, and Lower ECAM are lost).

▼ Continued on next page ▼

▼ Cabin Smoke / Fire / Fumes continued ▼

6. CARGO HEAT AFT ISOL VALVE . . . . . OFF

**Note:** This action may prevent false cargo smoke warnings.

7. SEAT BELTS/ NO-SMOKING SIGNS . . . . . ON

8. Turn off sidewall, ceiling, entrance areas, and passenger reading lights from the cabin lighting panel.

**Note:** The GEN 2 and BUS TIE pbs may be reselected to AUTO if the smoke subsides and the display units are required for landing.

9. See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary.



CARGO SMOKE AFT (FWD) BTL  
SQUIB FAULT

**Condition:** The cargo compartment fire agent bottle is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                               |
|--|-------------------------------|
|  | <i>INOP SYS</i>               |
|  | CARGO COMPARTMENT<br>FIRE BTL |



|                       |
|-----------------------|
| <b>ENG 1 (2) FIRE</b> |
|-----------------------|

**Condition:** Engine fire.

► **If on the ground:**

- Both THRUST LEVERS . . . . . IDLE
- Stop the aircraft and set the PARK BRK.
- ENG MASTER (affected engine) . . . . . OFF
- ENG FIRE pb (affected engine). . . . . PUSH

**Note:** If the fire warnings disappear, it is not mandatory to discharge the fire agent.

- AGENT 1 and 2 (affected engine) . . . . . PUSH
- ENG MASTER (opposite side, if reqd) . . . OFF
- ATC (VHF 1) . . . . . Notify
- Evaluate Situation. Contact AARF, if feasible.

> If Passenger Evacuation required:

- Accomplish the Passenger Evacuation (back cover)



► **If in flight:**

- THRUST LEVER  
(affected engine). . . Confirm. . . . . IDLE

> If the fire warnings disappear:

- It is not mandatory to shut down the engine and discharge the fire agent.
- Fuel Imbalance. . . . . monitor

**Note:** If fuel balancing is required, refer to Vol. 1, SP.12.

- TCAS Mode . . . . . TA

▼ Continued on next page ▼

▼ **ENG 1 (2) FIRE continued** ▼

- Use reduced thrust and idle reverse thrust.
- For performance, delay landing configuration (gear down and flaps 3 or FULL) until established on final descent to landing.
- Land As Soon As Possible.

**Note:** Alpha Floor protection is not available when flap lever position is 1 or greater.



> If the fire warnings **do not** disappear or an engine shut down is desired:

- ENG MASTER  
(affected engine). . Confirm. . . . . OFF
- ENG FIRE pb  
(affected engine). . Confirm. . . . . PUSH
- Wait 10 seconds (countdown on the ECAM).
- AGENT 1 pb (affected engine) . . . . . PUSH

> If the fire warning remains illuminated:

- Wait 30 seconds (ECAM countdown).
- AGENT 2 pb (affected engine) . PUSH
- APU (if available) . . . . . Start
- APU BLEED . . . . . off
- X BLEED selector . . . . . SHUT
- WING Anti Ice . . . . . OFF
- Avoid icing conditions.
- ENG MODE SEL . . . . . IGN

▼ **Continued on next page** ▼

▼ ENG 1 (2) FIRE continued ▼

- Fuel Imbalance . . . . . Monitor
- Note:** If fuel balancing is required, refer to Vol. 1, SP.12, Fuel Balancing.
- TCAS Mode . . . . . TA
  - Land As Soon As Possible.
  - See Approach Procedures.

**STATUS**

| APPROACH PROCEDURES                                                                                                                   | INOP SYS                                   |
|---------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 1. LDG DIST PROC . . . APPLY (refer to ODM)                                                                                           | WING ANTI ICE                              |
| 2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | CAT 3 DUAL                                 |
|                                                                                                                                       | GEN 1(2)                                   |
|                                                                                                                                       | PACK 1(2)                                  |
|                                                                                                                                       | REVERSER 1(2)                              |
|                                                                                                                                       | ENG 1(2) BLEED                             |
|                                                                                                                                       | G ENG 1 PUMP (or Y ENG 2 PUMP)             |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                     | ALPHA FLOOR                                |
|                                                                                                                                       | (Flap lever position 1 or greater)*        |
|                                                                                                                                       | * Item not listed on the ECAM STATUS page. |



**ENG 1 (2) FIRE DET FAULT**

**Condition:** Both fire loops on one engine are inoperative.

**Note:** Fire detection on the affected engine is inoperative.

- 1. Monitor engine parameters more closely than normal for signs of fire and/or over temperature.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | FIRE DET 1 (2)  |



**ENG 1 (2) FIRE LOOP A (B) FAULT**

**Condition:** Engine fire loop A or engine fire loop B is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | ENG LOOP A (B)  |



## Engine Tailpipe Fire

**Condition:** Fire in engine tailpipe during start or after engine shut down.

**Caution!** Do not use external fire agents until after completing this procedure since engine damage could occur.

1. MAN START pb (affected engine). . . . Verify OFF
2. ENG MASTER (affected engine) . . . . . OFF

**Note:** Do not use the ENG FIRE pb at this time (this would prevent the motoring sequence).

3. X BLEED SEL. . . . . OPEN

**Note:** Use bleed air from the opposite engine, APU, or an external source to motor the engine.

4. ENG MODE SEL . . . . . CRANK
5. MAN START pb (affected engine). . . . . ON

**Note:** The start valve automatically reopens, when N2 is below 20%

6. When the fire is extinguished (as reported by the ground crew):

- MAN START pb (affected engine) . . . OFF
- ENG MODE SEL . . . . . NORM
- X BLEED selector . . . . . AUTO



**Removal of Smoke / Toxic Fumes**

**Condition:** Smoke removal is desired due to very dense smoke, toxic fumes, or if smoke generation cannot be stopped.

- 1. Oxygen mask . . . . . ON  
Select 100%  
Rotate EMERGENCY pb as required to clear mask.
- 2. SEAT BELTS/NO-SMOKING SIGNS . . . . Verify ON
  - ▶ **If fuel vapors are not present:**
    - CAB FANS pb . . . . . OFF
    - PACK FLOW selector . . . . . HI
  - ▶ **If fuel vapors are present:**
    - CAB FANS pb . . . . . Verify ON
    - PACK 1 and 2 pbs. . . . . OFF
- 3. Rotate the LDG ELEV control knob out of AUTO and select a setting of 10,000 feet.
- 4. Begin a descent to 10,000 feet MSL or the MEA.
- 5. At 10,000 feet MSL or the MEA:
  - PACK 1 and 2 pbs . . . . . OFF
  - Cabin press MODE SEL pb . . . . . MAN
  - MAN V/S CTL . . . . . Full UP
  - RAM AIR pb . . . . . ON

▼ Continued on next page ▼

▼ Removal of Smoke / Toxic Fumes continued ▼

- ▶ If it is necessary to open the flight deck window to remove smoke:

---

**Caution! Unless the smoke is in the flight deck, do not open the flight deck window to evacuate the smoke.**

---

- Slow to an airspeed of 200 knots or less.
- Don headsets.
- Open one flight deck window.



**SMOKE AFT CARGO SMOKE**

**Condition:** Smoke detected in the aft cargo compartment.

1. AFT ISOL VALVE pb . . . . . OFF

**Note:** If this warning is displayed on the ground with the cargo doors open or after deicing, **do not** immediately initiate the AGENT discharge. Request that the ground crew investigate the source of the smoke (exhaust from adjacent aircraft, ground equipment, or deicing fumes can cause this warning). If false warning is confirmed, pull and reset CARGO VENT C/B (S20 or C7).

2. CAB FANS pb . . . . . OFF

3. AFT CARGO SMOKE DISCH pb. .Confirm. . PUSH

**Note:** The **SMOKE** warning will remain after the agent is discharged, even if the smoke source is eliminated. If the bottle does not empty after one minute, an **AFT BTL SQUIB FAULT** message will appear.

4. Oxygen mask . . . . . As reqd  
Select 100% or EMERGENCY, if donned

5. Monitor the compartment temperature on ECAM.

6. Land As Soon As Possible.

**Note:** Instruct the ground crew to **leave** the cargo **door closed** until all non-essential personnel are off the aircraft and fire services are in a position to fight a possible fire.

▼ Continued on next page ▼

▼ SMOKE AFT CARGO SMOKE continued ▼

7. See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary.

**STATUS**

|  |              |
|--|--------------|
|  | INOP SYS     |
|  | AFT CRG HEAT |
|  | AFT CRG VENT |



**SMOKE DET FAULT**

**Condition:** Both channels of the Smoke Detector Control Unit (SDCU) have failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.10, SMOKE DET FAULT, Computer Resets.
- ▶ If in flight and no live animals are in the aft cargo compartment:
  - AFT ISOL VALVE pb . . . . . OFF

**STATUS**

|  |           |
|--|-----------|
|  | INOP SYS  |
|  | SMOKE DET |



**SMOKE FWD CARGO SMOKE**

**Condition:** Smoke detected in forward cargo compartment.

**Note:** If this warning is displayed on the ground with the cargo doors open or after deicing, **do not** immediately initiate the AGENT discharge. Request that the ground crew investigate the source of the smoke (exhaust from ground equipment, adjacent aircraft, or deicing fumes can cause this warning). If false warning is confirmed, pull and reset CARGO VENT C/B (S20 or C7).

- 1. CAB FANS pb . . . . . OFF
- 2. FWD CARGO SMOKE DISCH. . . Confirm. . . PUSH

**Note:** The **SMOKE** warning will remain after the agent is discharged, even if the smoke source is eliminated. If the bottle does not empty after one minute, an **FWD BTL SQUIB FAULT** message will appear.

- 3. Oxygen mask . . . . . As reqd  
Select 100% or EMERGENCY, if donned
- 4. Land As Soon As Possible.

**Note:** Instruct the ground crew to **leave** the cargo **door closed** until all non-essential personnel are off the aircraft and fire services are in a position to fight a possible fire.

- 5. See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary.



SMOKE AFT CRG DET FAULT

**Condition:** There is a fault in the aft cargo smoke detection system.

**Note:** If SMOKE AFT CRG DET FAULT is annunciated on the ground, reset the system.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.10, SMOKE DET FAULT, Computer Resets.
- ▶ If no live animals are in the aft cargo compartment:
  - AFT ISOL VALVE pb . . . . . OFF

**STATUS**

|  |                        |
|--|------------------------|
|  | INOP SYS               |
|  | AFT CARGO SMOKE<br>DET |



**SMOKE FWD CRG DET FAULT**

**Condition:** There is a fault in the forward cargo smoke detection system.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.10, SMOKE DET FAULT, Computer Resets.
- ▶ If in flight:
  - Crew awareness

**STATUS**

|  |                        |
|--|------------------------|
|  | INOP SYS               |
|  | FWD CARGO SMOKE<br>DET |



SMOKE LAV + CRG DET FAULT

**Condition:** Both channels of the Smoke Detector Control Unit (SDCU) have failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.9, LAVATORY SMOKE (SDCU), Computer Resets.
- ▶ If no live animals are in the aft cargo compartment:
  - AFT ISOL VALVE pb . . . . . OFF

**STATUS**

|  |                                                  |
|--|--------------------------------------------------|
|  | <i>INOP SYS</i>                                  |
|  | SDCU (AFT CARGO<br>SMOKE DET) (LAV<br>SMOKE DET) |



**SMOKE LAVATORY DET FAULT**

**Condition:** A lavatory smoke detection fault exists or lavatory and galley fans are faulty.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.9, LAVATORY SMOKE (SDCU), Computer Resets.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | LAV SMOKE DET   |



## SMOKE LAVATORY SMOKE

**Condition:** Smoke has been detected in a lavatory.

1. Oxygen mask . . . . . as reqd  
Select 100% or EMERGENCY, if donned
2. Establish crew communications, coordinate with flight attendants and ascertain the situation.
3. Begin a descent and diversion to nearest suitable airport

**Note:** The lavatories are identified on the forward attendant panel as:

Forward Left Lav: A

Aft Left Lav: D

Aft Right Lav: E

4. See “Removal of Smoke/Toxic Fumes” on page 8.16, if necessary.

**Note:** While on the ground, high humidity conditions can cause false LAVATORY SMOKE warnings.



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**Non-Normal Checklists**  
**Flight Controls**

**Chapter NNC**  
**Section 9**

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**CONFIG FLAPS NOT IN T.O. CONFIG**

**Condition:** The flaps are not set to an approved takeoff detent.

1. Set the flaps to the required takeoff detent.



**CONFIG L (R) SIDESTICK FAULT**

**Condition:** A TAKE OVER pb has been pressed for more than 40 seconds causing the opposite sidestick to be inoperative.

1. Momentarily depress the TAKE OVER pb on the inoperative sidestick to regain normal sidestick authority.



**CONFIG PITCH TRIM NOT IN T.O.  
RANGE**

**Condition:** The pitch trim is not set within the approved range.

1. Set the pitch trim to a value that is within the approved range.



**CONFIG RUDDER TRIM NOT IN T.O.  
RANGE**

**Condition:** The rudder trim is not set within the approved range.

1. Set the rudder trim to a value that is within the approved range.

**CONFIG SLATS NOT IN T.O. CONFIG**

**Condition:** The slats are not set to an approved takeoff detent.

1. Set the slats to the required takeoff detent.

**CONFIG SPD BRK NOT RETRACTED**

**Condition:** The speed brakes are not retracted.

1. Retract the speed brakes.



## F / CTL AIL SERVO FAULT

**Condition:** One servojack on one aileron is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.



## F/CTL ALTN LAW

**Condition:** The flight control law has degraded to ALTERNATE LAW.

**Note:** PROT LOST means that all protections except maneuver protection are lost. Depending on the failures involved, speed stabilities may be available.

1. **Do Not** exceed 320 knots (or 0.77M).
  - If an elevator fault is present:
    - **Do Not** use the speed brakes
2. Since protections are lost, respect stall warnings when applying the EGPWS procedure.
3. See Approach Procedures.

### STATUS

#### *APPROACH PROCEDURES*

1. When the landing gear is placed down, the flight control laws will degrade to Direct Law.

**Note:** If the autopilot is still engaged, the flight controls will remain in ALTERNATE LAW. When the autopilot is disconnected, the flight controls will degrade to DIRECT LAW.

2. Refer to “F/CTL DIRECT LAW” on page 9.5

#### *INOP SYS*

ATT LIMIT  
 OVSPD LIMIT  
 ALPHA LIMIT  
 ALPHA FLOOR



## F/CTL DIRECT LAW

**Condition:** The flight control law has degraded to direct law.

1. **Do Not** exceed 320 knots (or 0.77M) due to the loss of high speed protection.
2. Use manual pitch trim if available. Automatic trim is inoperative.
3. Maneuver with care. Smaller control inputs are required due to the increased deflection of the flight controls. Avoid large thrust changes.
4. **Do Not** use speed brakes at high Mach numbers due to strong nose up tendencies.
5. See Approach Procedures.

### STATUS

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                       | INOP SYS    |
|-----------------------------------------------------------------------------------------------------------|-------------|
| 1. Use FLAPS 3 for landing.                                                                               | F/CTL PROT  |
| 2. GPWS LDG FLAP 3 pb . ON                                                                                | ELAC PITCH  |
| 3. Use a $V_{APP}$ of $V_{LS}$ (FULL) plus 10 knots. Enter the increased $V_{APP}$ on the PERF APPR page. | ATT LIMIT   |
| • LDG DIST PROC. . . APPLY (refer to the ODM) (to compensate for the higher approach speed.)              | OVSPD LIMIT |
|                                                                                                           | ALPHA LIMIT |
|                                                                                                           | ALPHA FLOOR |



## F/CTL ELAC 1 (2) FAULT

**Condition:** Failure of one (or both) ELAC (pitch and roll channel).

**Caution!** Do not reset an ELAC if uncommanded maneuvers occurred in flight.

- If one ELAC failed:
- ELAC (affected) . . . . . OFF for 5 seconds, then ON

**Caution!** Recheck the stabilizer trim before takeoff (the computer reset procedure may cause the stabilizer trim to reset to zero).

- > If the affected ELAC is regained:



- > If the ELAC FAULT remains:

- ELAC (affected). . . . . OFF

**Note:** The functions of the failed ELAC are performed by the other ELAC.

CAT III approach not authorized.



▼ Continued on next page ▼

▼ F/CTL ELAC 1 (2) FAULT continued ▼

- ▶ If both ELACs failed:
  - ELAC 1. . . . . OFF for 5 seconds,  
then ON
  - ELAC 2. . . . . OFF for 5 seconds,  
then ON
- > If both ELACs are recovered:

---

**Caution! Recheck the stabilizer trim before takeoff (the computer reset procedure may cause the stabilizer trim to reset to zero).**

---



- > If one ELAC continues to have a fault:
    - ELAC (affected). . . . . OFF
- Note:** The functions of the failed ELAC are performed by the other ELAC.



- > If both ELACs continue to have faults:
    - Both ELACs. . . . . OFF
- Flight control ALTERNATE LAW (PROT LOST) is active.
- Maximum airspeed is 320 knots (or 0.77M).
  - See Approach Procedures.

▼ Continued on next page ▼

▼ F/CTL ELAC 1 (2) FAULT continued ▼

**STATUS**

*CAT II and III approach not authorized.*

| APPROACH PROCEDURES                                                                                       | INOP SYS                                                  |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. When the landing gear is down, the flight control law will degrade to DIRECT LAW.                      | ELAC 1 + 2<br>THS MOTOR 1<br>BOTH AILERONS<br>ALPHA FLOOR |
| 2. Use FLAPS 3 for landing.                                                                               | AP 1 + 2                                                  |
| 3. GPWS LDG FLAP 3 . . . . ON                                                                             |                                                           |
| 4. Use a $V_{APP}$ of $V_{LS}$ (FULL) plus 10 knots. Enter the increased $V_{APP}$ on the PERF APPR page. |                                                           |
| • LDG DIST PROC . . . APPLY (refer to the ODM) (to compensate for the higher approach speed.)             |                                                           |



## F/CTL ELAC 1 (2) PITCH FAULT

**Condition:** The pitch function of one ELAC is inoperative.

**Caution! Do not reset an ELAC if uncommanded maneuvers occurred in flight.**

- ▶ If the aircraft is on the ground:
  - Reset the system as shown on page NNOI.1.7, ELAC, Computer Resets.

**Caution! Recheck the stabilizer trim before takeoff (the computer reset procedure may cause the stabilizer trim to reset to zero).**



- ▶ If the aircraft is in flight:
  - The pitch function is performed by the other ELAC.

### STATUS

*CAT III approach not authorized.*

|  |                  |
|--|------------------|
|  | INOP SYS         |
|  | ELAC PITCH 1 (2) |



**F/CTL ELEV SERVO FAULT**

**Condition:** One servojack on one elevator is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

*CAT III approach not authorized.*

|  |            |
|--|------------|
|  | INOP SYS   |
|  | CAT 3 DUAL |



## F/CTL FCDC FAULT

**Condition:** One or both flight control data concentrator(s) has failed.

**Note:** If F/CTL FCDC FAULT is annunciated on the ground, reset the system as shown on page NNOI.1.8, FCDC, Computer Resets.

- ▶ If number 1 FCDC has failed:
  - No action is required. This message is for your information only.
- ▶ If number 2 FCDC has failed:
  - No action is required. This message is for your information only.
- ▶ If both 1 and 2 FCDC have failed:
  - Monitor the flight control fault lights on the overhead panel.

**Note:** Normal law is active but the information on the ECAM F/CTL page is lost. The flight control law indications on the PFDs are incorrect and erroneous stall warnings may be triggered.

### STATUS

|  |                             |
|--|-----------------------------|
|  | INOP SYS                    |
|  | FCDC 1 (2) or<br>FCDC 1 + 2 |



**F/CTL FLAP ATTACH SENSOR**

**Condition:** The flap attachment detection sensor has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**F/CTL FLAP LVR NOT ZERO**

**Condition:** The flap lever is not in the zero position and aircraft is above FL 200.

1. Return flap handle to the up position.



## F/CTL FLAP SYS 1 (2) FAULT

**Condition:** Failure of one SFCC flap system.

- ▶ If the aircraft is in flight:  
The flaps will operate more slowly than usual.
  - > If FLAP SYS 1 is faulted.
    - GPWS FLAP MODE. . . . . OFF

---

**Caution! Do NOT pull any circuit breakers while airborne.**

---

**Note:** When idle is selected (by the pilot or the autothrust), the associated engine will reduce to approach idle only.



- ▶ If the aircraft is on the ground and the message above is displayed along with a F/CTL SLAT SYS 1 (2) FAULT message:
  - Return to the gate. Maintenance action is required.
- ▶ If the aircraft is on the ground with no additional messages, contact Maintenance control for possible reset procedures.



**F/CTL FLAP TIP BRK FAULT**

**Condition:** One flap wing tip brake has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.



## F/CTL FLAPS FAULT

**Condition:** Failure of **both** SFCC flap systems.

**Note:** On the ground only, if the F/CTL FLAPS FAULT is annunciated, reset the system as shown on page NNOI.1.10, SFCC, Computer Resets.

1. MAX SPEED . . . . .  $V_{FE}$  (If displayed on ECAM)

**Note:** Observe the maximum speed displayed on the ECAM and minimum airspeed consistent with the actual flap and slat position. F and S speeds displayed on the PFD may be inaccurate. If the flaps/slats are retracted, maintain green dot.

2. FLAP HANDLE . . . . . recycle

**Note:** Return the flap handle to the previous position and then re-attempt desired flap selection. This step is not required if the flaps/slats indicate up and the flap lever is at 0. However, plan on an abnormal flap landing.

- ▶ If the FLAPS FAULT is corrected:



- ▶ If the FLAPS FAULT remains:

---

**Caution! Do Not pull any flap or slat control circuit breakers while airborne.**

---

▼ Continued on next page ▼

## ▼ F/CTL FLAPS FAULT continued ▼

**Note:** Fuel consumption may be considerably higher, possibly as much as doubled. Establish time parameters for beginning approach.

- Plan on an abnormal flap landing.
- Thrust will reduce to approach idle only when idle is selected.

**Note:** CAT II or CAT III approach and/or autoland not authorized.

- See Approach Procedures.

▼ Continued on next page ▼

▼ F/CTL FLAPS FAULT continued ▼

**STATUS (Continued)**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                   | <i>INOP SYS</i>                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <p>► If the flaps are locked in a position greater than 3:</p> <ol style="list-style-type: none"> <li>1. Select flap handle position FULL for landing. Slats will be in the full position.</li> <li>2. GPWS FLAP MODE . . . OFF</li> <li>3. Use normal approach procedures.</li> <li>4. LDG DIST PROC . . . APPLY (refer to ODM)</li> <li>5. End.</li> </ol> | <p>FLAPS</p> <p>AP 1+ 2 (may be inoperative)</p> <p>A/THR (may be inoperative)</p> |

▼ Continued on next page ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | INOP SYS                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| <p>► If the flaps are locked in position 3 or less:</p> <hr/> <p><b>Caution! If flaps are at or near zero - Approximately 8° of pitch on final. Increased chance of tail strike exists.</b></p> <hr/> <ol style="list-style-type: none"> <li>GPWS FLAP MODE . . . OFF</li> <li>GPWS LDG FLAP 3 . . . ON</li> <li>Use flap handle position 3 for landing.</li> <li><b>Do Not</b> use the autopilot below 500 feet AGL.</li> <li>Enter the increased <math>V_{APP}</math> on the PERF APPR page</li> </ol> <p><b>Note:</b> Ensure FULL (5R) selected on the MCDU PERF APPR page.<br/> <math>V_{APP} = V_{LS} (FULL) +</math><br/> the speed additive<br/> displayed on the ECAM STATUS page.<br/> See table on next page if the ECAM is unavailable.</p> <ol style="list-style-type: none"> <li>LDG DIST PROC . . . APPLY (refer to ODM)</li> </ol> | <p>FLAPS</p> <p>AP 1+ 2 (may be inoperative)</p> <p>A/THR (may be inoperative)</p> |

▼ F/CTL FLAPS FAULT continued ▼

- If the ECAM is unavailable, use the following table to determine  $V_{APP}$ :

| <b>Speed Additives:</b>                |                        |
|----------------------------------------|------------------------|
| SPEED ADDITIVE FROM ECAM               | FLAP CONDITION         |
| $V_{APP} = V_{LS} \text{ (FULL)} + 25$ | FLAPS < 1              |
| $V_{APP} = V_{LS} \text{ (FULL)} + 15$ | FLAPS 1 TO LESS THAN 2 |
| $V_{APP} = V_{LS} \text{ (FULL)} + 10$ | FLAPS 2 TO 3           |

▼ Continued on next page ▼

▼ F/CTL FLAPS FAULT continued ▼

**Deferred Items**

**Descent Checklist**

- Altimeters . . . . . \_\_\_\_, xckd C&F
- Minimums . . . . . \_\_\_\_, \_\_ C&F
- Landing Data . . . . . \_\_\_\_, \_\_ C&F
- Approach briefing . . . . . complete PM
- Autobrakes . . . . . as reqd PM
- Seat belt sign . . . . . ON PM

**Approach Checklist**

- Flight & nav instruments . . . . . verified C&F
- Cabin notification . . . . . complete C
- FMS flight phase . . . . . APPR/DES PM
- Altimeters . . . . . \_\_\_\_, xckd C&F

**Note:** Consider reviewing Go-around Procedure at the end of this checklist.

▼ Continued on next page ▼

▼ F/CTL FLAPS FAULT continued ▼

*APPROACH PROCEDURES*

*INOP SYS*

If possible, configure the aircraft on an extended final approach after all maneuvering is complete. Use the following procedure to configure the aircraft:

- ▶ **If the flap handle is at 0:**  
 Maintain green dot airspeed.
- For flaps 1, select “S” speed (PERF APPR page) or 190 knots whichever is greater.
- Select flap handle position 1.

**FLAPS**

AP 1+ 2 (may be inoperative)  
 A/THR (may be inoperative)

▼ Continued on next page ▼

▼ F/CTL FLAPS FAULT continued ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <i>INOP SYS</i>                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p>► <b>If the flap handle is at 1:</b><br/> Maintain “S” speed or 190 knots whichever is greater.</p> <ul style="list-style-type: none"> <li>• For flaps 2, select speed 190 knots.</li> <li>• When below 200 knots, select flap handle position 2.</li> </ul> <p>► <b>If the flap handle is at 2:</b><br/> Maintain 190 knots until ready for the approach.</p> <ul style="list-style-type: none"> <li>• For flaps 3, <b><u>select</u></b> <math>V_{APP}</math> speed (PERF APPR Page).</li> <li>• As the speed slows below 185 knots, select gear down, flap handle position 3, and accomplish Landing Checklist as follows:</li> </ul> | <p>FLAPS</p> <p>AP 1 + 2 (may be inoperative)</p> <p>A/THR (may be inoperative)</p> |

▼ Continued on next page ▼

▼ F/CTL FLAPS FAULT continued ▼

## Landing Checklist

|                        |                    |     |
|------------------------|--------------------|-----|
| Landing gear . . . . . | down               | C&F |
| Flaps . . . . .        | ____, ____         | C&F |
|                        | <b>as directed</b> |     |
| Spoilers . . . . .     | ARMED              | PM  |

### Go-around Procedure Review:

- Perform normal Go-around procedure.
- If desired, retract flaps/slats to position where fault occurred.
- Select a speed of 10 kts below the appropriate flap/slat limit speed (red barber pole on PFD).
- F and S speeds displayed on the PFD may be inaccurate.
- If the flaps/slats are retracted, maintain green dot.



**F / CTL FLAPS LOCKED**

**Condition:** Flap wing tip brakes have been applied or a misalignment has been detected between two flaps.

1. MAX SPEED. . . . .  $V_{FE}$  (If displayed on ECAM)

**Note:** Observe the maximum speed displayed on the ECAM and minimum airspeed consistent with the actual flap and slat position. F and S speeds displayed on the PFD may be inaccurate. If the flaps/slats are retracted, maintain green dot.

**Caution! Do Not pull any flap or slat control circuit breakers while airborne.**

**Note:** Fuel consumption may be considerably higher, possibly as much as doubled. Establish time parameters for beginning approach.

- Plan on an abnormal flap landing.
- Thrust will reduce to approach idle only when idle is selected.

**Note:** CAT II or CAT III approach and/or autoland not authorized.

- See Approach Procedures.

▼ Continued on next page ▼

▼ F/CTL FLAPS LOCKED continued ▼

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                             | <i>INOP SYS</i> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <p>► If the flaps are locked in a position <b>greater than 3</b>:</p> <ol style="list-style-type: none"> <li>1. Use normal approach procedures.</li> <li>2. GPWS FLAP MODE. . . .OFF</li> <li>3. Select flap handle position FULL for landing. Slats will extend to the full position.</li> <li>4. LDG DIST PROC . . . APPLY (refer to ODM)</li> <li>5. End</li> </ol> | FLAPS           |

▼ Continued on next page ▼

▼ F/CTL FLAPS LOCKED continued ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | INOP SYS     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| <p>► If the flaps are locked in a position of <b>3 or less</b>:</p> <hr/> <p><b>Caution!</b> If flaps are at or near zero - Approximately 8° of pitch on final. Increased chance of tail strike exists.</p> <hr/> <p>1. GPWS FLAP MODE . . . . . OFF<br/>2. GPWS LDG FLAP 3 . . . . . ON<br/>3. Use flap handle position 3 for landing.<br/>4. <b>Do not</b> use the AP below 500 ft AGL.<br/>5. Enter the increased <math>V_{APP}</math> on the PERF APPR page.<br/><b>Note:</b> Ensure FULL (5R) selected on the MCDU PERF APPR page.<br/><math>V_{APP} = V_{LS} \text{ (FULL)} + \text{the speed additive displayed on the ECAM STATUS page. See table on next page if the ECAM is unavailable.}</math><br/>6. LDG DIST PROC . . . . . APPLY (refer to ODM)</p> | <p>FLAPS</p> |

▼ Continued on next page ▼

- If the ECAM is unavailable, use the following table to determine  $V_{APP}$ :

| <b>Speed Additives:</b>                |                        |
|----------------------------------------|------------------------|
| SPEED ADDITIVE FROM ECAM               | FLAP CONDITION         |
| $V_{APP} = V_{LS} \text{ (FULL)} + 25$ | FLAPS < 1              |
| $V_{APP} = V_{LS} \text{ (FULL)} + 15$ | FLAPS 1 TO LESS THAN 2 |
| $V_{APP} = V_{LS} \text{ (FULL)} + 10$ | FLAPS 2 TO 3           |

**Deferred Items**

**Descent Checklist**

|                              |            |     |
|------------------------------|------------|-----|
| Altimeters . . . . .         | ____, xckd | C&F |
| ■Minimums . . . . .          | ____, ____ | C&F |
| ■Landing Data . . . . .      | ____, ____ | C&F |
| ■Approach briefing . . . . . | complete   | PM  |
| ■Autobrakes . . . . .        | .as reqd   | PM  |
| Seat belt sign . . . . .     | .ON        | PM  |

**Approach Checklist**

|                                     |            |     |
|-------------------------------------|------------|-----|
| ■Flight & nav instruments . . . . . | .verified  | C&F |
| Cabin notification . . . . .        | complete   | C   |
| ■FMS flight phase. . . . .          | APPR/DES   | PM  |
| Altimeters . . . . .                | ____, xckd | C&F |

**Note:** Consider reviewing Go-around Procedure at the end of this checklist.

▼ F/CTL FLAPS LOCKED continued ▼

### STATUS (Continued)

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <i>INOP SYS</i> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <p>If possible, configure the aircraft on an extended final approach after all maneuvering is complete. Use the following procedure to configure the aircraft:</p> <ul style="list-style-type: none"> <li>▶ <b>If the flap handle is at 0:</b><br/>Maintain green dot airspeed. <ul style="list-style-type: none"> <li>• For flaps 1, select "S" speed (PERF APPR page) or 190 knots, whichever is greater.</li> <li>• Select flap handle position 1.</li> </ul> </li> <li>▶ <b>If the flap handle is at 1:</b><br/>Maintain "S" speed or 190 knots whichever is greater. <ul style="list-style-type: none"> <li>• For flaps 2, select speed 190 knots.</li> <li>• When below 200 knots, select flap handle position 2.</li> </ul> </li> </ul> | <p>FLAPS</p>    |

▼ Continued on next page ▼

▼ F/CTL FLAPS LOCKED continued ▼

**STATUS (Continued)**

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                           | INOP SYS |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <p>► <b>If the flap handle is at 2:</b><br/>Maintain 190 knots until ready for the approach.</p> <ul style="list-style-type: none"><li>• For flaps 3, activate managed speed.</li><li>• As the speed slows below 185 knots, select gear down, flap handle position 3, and accomplish Landing Checklist, as follows:</li></ul> | FLAPS    |

**Landing Checklist**

|                        |                           |     |
|------------------------|---------------------------|-----|
| Landing gear . . . . . | down                      | C&F |
| Flaps . . . . .        | ____, ____<br>as directed | C&F |
| Spoilers . . . . .     | ARMED                     | PM  |

**Go-around Procedure Review:**

- Perform normal Go-around procedure.
- If desired, retract flaps/slats to position where fault occurred.
- Select a speed of 10 kts below the appropriate flap/slat limit speed (red barber pole PFD).
- F and S speeds displayed on the PFD may be inaccurate.
- If the flaps/slats are retracted, maintain green dot.



**F/CTL GND SPLR 1 + 2 (3 + 4) FAULT**

**Condition:** A loss of ground spoiler function has occurred in SEC 1 or SEC 3.

1. See Approach Procedures.

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                  | <i>INOP SYS</i>      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <p>▶ If two or less spoiler pairs are affected:</p> <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li> </ul> <p>▶ If three or more spoiler pairs are affected:</p> <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li> </ul> | GND SPLRS (affected) |



**F/CTL GND SPLR 5 FAULT**

**Condition:** A loss of ground spoiler 5 function has occurred in SEC 2.

1. See Approach Procedures.

**STATUS**

| <i>APPROACH PROCEDURES</i>                       | <i>INOP SYS</i> |
|--------------------------------------------------|-----------------|
| LDG DIST PROC . . . . . APPLY (refer to the ODM) | GND SPLRS 5     |



**F/CTL GND SPLR FAULT**

**Condition:** A loss of ground spoiler function has occurred in SEC 1+3, SEC 1+2, SEC 2+3, or SEC 1+2+3.

1. See Approach Procedures.

**Note:** If two or more SECS have faulted, auto ground spoilers will be inoperative. With no auto ground spoilers, auto braking will not be available.

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                | <i>INOP SYS</i>      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| <p>► If two or less spoiler pairs are affected:</p> <ul style="list-style-type: none"><li>• LDG DIST PROC. . . . APPLY (refer to the ODM)</li></ul> <p>► If three or more spoiler pairs are affected:</p> <ul style="list-style-type: none"><li>• LDG DIST PROC. . . . APPLY (refer to the ODM)</li></ul> | GND SPLRS (affected) |



**F/CTL GND SPLR NOT ARMED**

**Condition:** The ground spoilers are not armed for landing.

- 1. Ground spoilers . . . . . Arm
- 2. Landing Checklist . . . . . Perform



## F/CTL IR DISAGREE

**Condition:** With one IR failed, a disagreement occurs between the other two IRs.

**Caution! The flight control law has degraded to DIRECT LAW.**

1. Cross-check the attitude on both PFDs against the standby horizon to determine the faulty IR.
  - ▶ If a disagreement is confirmed:
    - Faulty IR SEL knob . . . Confirm. . . . OFF
    - ELAC 2 . . . . . OFF for 5 seconds,  
then ON
    - ELAC 1. . . . . OFF for 5 seconds,  
then ON

**Caution! After corrective action (faulty IR switched off and ELACs reset), control laws should revert to ALTERNATE LAW. Do Not exceed 320 knots.**

- ▶ If a disagreement is not confirmed:
  - Leave the two IRs ON.

The flight control system will remain in DIRECT LAW.

| <b>STATUS</b>                              |                 |
|--------------------------------------------|-----------------|
| <i>APPROACH PROCEDURES</i>                 | <i>INOP SYS</i> |
| 1. Refer to "F/CTL DIRECT LAW" on page 9.5 |                 |



**F / CTL L (R) AIL FAULT**

**Condition:** Both servojacks on one aileron are inoperative.

- ▶ If on the ground:
    - Consult with Dispatch/Maintenance Control for possible MEL relief.
  - ▶ If in flight:
- Crew awareness.

**Note:** If BOTH ailerons fault, flight control ALTERNATE LAW is active. See “F/CTL ALTN LAW” on page 9.4 for procedure.

**Note:** With one or both aileron faulted, fuel consumption will increase by approximately 6%.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | L (R) AIL       |



## F/CTL L (R) ELEV FAULT

**Condition:** Both servojects on one elevator are inoperative.

**Caution! The flight control law is degraded to ALTERNATE LAW (PROT LOST).**

1. **Do Not** exceed 320 knots (or 0.77M) due to the loss of high speed protection.
2. **Do Not** use the speed brakes.
3. See Approach Procedures.

### STATUS

*Autolands not authorized.*

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                       | INOP SYS                                              |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| 1. When the landing gear is placed down the control law will degrade to DIRECT LAW.                       | L (R) ELEV<br>ATT LIMIT<br>OVSPD LIMIT<br>ALPHA LIMIT |
| 2. Use FLAPS 3 for landing.                                                                               | ALPHA FLOOR                                           |
| 3. GPWS LDG FLAP 3 . . . ON                                                                               | AP 1 + 2                                              |
| 4. Use a $V_{APP}$ of $V_{LS}$ (FULL) plus 10 knots. Enter the increased $V_{APP}$ on the PERF APPR page. |                                                       |
| 5. LDG DIST PROC . . . APPLY (refer to the ODM)<br>(to compensate for the higher approach speed.)         |                                                       |



F / CTL L (R) SIDESTICK FAULT

**Condition:** The transducers on the pitch or roll axis have failed on one sidestick.

- If on the ground:
- Return to the gate. Maintenance action is required.



- If in flight:
- **Do Not** use the failed sidestick for the remainder of the flight.

**Note:** Both autopilots should operate normally.

**STATUS**

|  |                 |
|--|-----------------|
|  | INOP SYS        |
|  | L (R) SIDESTICK |



## F / CTL L + R ELEVATOR FAULT

**Condition:** Both elevators are inoperative.

**Caution!** The control laws have reverted to **PITCH BACKUP** and **ROLL DIRECT LAWS**.

1. **Do Not** exceed 320 knots due to loss of high speed protection.
2. Use manual pitch trim (pitch is controlled by manual THS trim only).
3. **Do Not** use the speed brakes since the resultant pitch moment is difficult to control with trim only.
4. Avoiding rapid or large thrust changes will aid in pitch control (consider disconnecting autothrust).
5. See Approach Procedures.

### STATUS

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                       | INOP SYS                                               |
|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| 1. Use FLAPS 3 for landing.                                                                               | AP 1 + 2                                               |
| 2. GPWS LDG FLAP 3 . . . .ON                                                                              | L + R ELEV                                             |
| 3. Use a $V_{APP}$ of $V_{LS}$ (FULL) plus 10 knots. Enter the increased $V_{APP}$ on the PERF APPR page. | ATT LIMIT<br>OVSPD LIMIT<br>ALPHA LIMIT<br>ALPHA FLOOR |
| 4. LDG DIST PROC . . . .APPLY (refer to the ODM) (to compensate for the higher approach speed.)           |                                                        |



## F / CTL SEC FAULT

**Condition:** One or more SECs have failed.

**Note:** If the F/CTL SEC FAULT is annunciated, reset the system as shown on page NNOI.1.10, SEC, Computer Resets.

1. SEC (affected). . . . . OFF for 5 seconds,  
then ON

▶ If the affected SEC is regained:



▶ If the SEC FAULT remains:

- SEC (affected). . . . . OFF

**Note:** The associated spoilers will be inoperative.

▶ If SEC 1 is inoperative:

- **Do Not** use the speed brakes since  $V_{LS}$  is incorrect.

▶ If all three SECs have failed:

Flight control ALTERNATE LAW is active.

DIRECT LAW will be active when the landing gear is down and the autopilot is off.

2. See Approach Procedures.

▼ Continued on next page ▼

▼ F/CTL SEC FAULT continued ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | STATUS<br>INOP SYS                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▶ If SEC 1 or 2 is inoperative:                             <ul style="list-style-type: none"> <li>• LDG DIST PROC. . . .APPLY (refer to the ODM)</li> <li>• End.</li> </ul> </li> <li>▶ If SEC 3 is inoperative:                             <ul style="list-style-type: none"> <li>• LDG DIST PROC. . . .APPLY (refer to the ODM)</li> <li>• End.</li> </ul> </li> </ul>                                                                                                                                                                                                                                           | SEC (affected)<br>SPLR (associated)                                                      |
| <ul style="list-style-type: none"> <li>▶ If two SECs are inoperative:                             <ul style="list-style-type: none"> <li>• LDG DIST PROC. . . .APPLY (refer to the ODM)</li> <li>• Cat III approach not authorized.</li> <li>• End.</li> </ul> </li> </ul>                                                                                                                                                                                                                                                                                                                                                                                  | REVERSER 1 (If SECs 1+2 are failed)<br>REVERSER 2 (If SECs 1+3 are failed)<br>AUTOBRAKES |
| <ul style="list-style-type: none"> <li>▶ If all three SECs failed:                             <ul style="list-style-type: none"> <li>• Cat II or III approach not authorized.</li> <li>• LDG DIST PROC. . . .APPLY (refer to the ODM)</li> <li>• Do Not perform an autoland.</li> <li>• When the landing gear is lowered, the control law will degrade to DIRECT LAW.</li> <li>• Use FLAPS 3 for landing.</li> <li>• GPWS LDG FLAP 3 . . . .ON</li> <li>• VAPP = VLS (FULL on the PERF APPR page) + 10 kts. Ensure <b>FULL</b> (5R) selected on the MCDU PERF APPR page.</li> <li>• Enter the increased VAPP on the PERF APPR page.</li> </ul> </li> </ul> | REVERSERS 1+2<br>AUTOBRAKES<br>SPEED BRAKES<br>SPLRS<br>SEC 1, 2, 3                      |



## F/CTL SIDESTICK PRIORITY

**Condition:** A failure is detected in the sidestick priority logic.

- ▶ If the aircraft is in flight:
    - Consider the sidestick priority system inoperative. Write up the discrepancy at your destination.
- ■ ■ ■
- ▶ If the aircraft is on the ground:
    - ELAC 1 pb. . . . .OFF, then ON
    - ELAC 2 pb. . . . .OFF, then ON
    - > If the warning disappears, complete the following check (moving the sidestick is not required):
      - Captain takeover pb . . . . Hold for 3+secs
      - Verify . . . . F/O red arrow light illuminates
      - Verify . . aural PRIORITY LEFT annunciates
      - F/O takeover pb . . . . . Hold for 3+ secs
      - Verify . . . CAPT red arrow light illuminates
      - Verify . aural PRIORITY RIGHT annunciates

---

**Caution! Recheck stabilizer trim before takeoff (the computer reset procedure may reset the stabilizer trim to zero).**

---

- > If the warning does not disappear or if the message reappears after the above check:
  - Return to the gate. Maintenance action is necessary.



---

**F/CTL SLAT SYS 1 (2) FAULT**

---

**Condition:** One SFCC slat channel has failed.

- ▶ If the aircraft is in flight:  
The slats will operate more slowly than normal.

---

**Caution! Do Not pull any flap / slat system circuit breakers while airborne.**

---



- ▶ If the aircraft is on the ground before departure:
  - Return to the gate. Maintenance action is required.



---

**F/CTL SLAT TIP BRK FAULT**

---

**Condition:** One slat wing tip brake has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**F/CTL SLATS FAULT**

**Condition:** Failure of **both** SFCC slat systems.

1. MAX SPEED. . . . .  $V_{FE}$  (If displayed on ECAM)

**Note:** Observe the maximum speed displayed on the ECAM and minimum airspeed consistent with the actual flap and slat position. F and S speeds displayed on the PFD may be inaccurate. If the flaps/slats are retracted, maintain green dot.

2. FLAP HANDLE . . . . . recycle

**Note:** Return the flap handle to the previous position and then re-attempt desired flap selection. This step is not required if the flaps/slats indicate up and the flap lever is at 0. However, plan on an abnormal slat landing.

► If the SLATS FAULT is corrected:



► If the SLATS FAULT remains:

**Caution! Do Not pull any flap or slat control circuit breakers while airborne.**

**Note:** If both slat channels of the SFCC have failed, the flight controls will be in ALTERNATE LAW. The flight control law will degrade to DIRECT LAW when the landing gear is lowered.

• FUEL MODE SEL . . . . . MAN

▼ Continued on next page ▼

- Manually control the center tank fuel pumps as required.
- Note:** Select the center tank pumps OFF when the tank is empty or before beginning the approach.
- Note:** Fuel consumption may be considerably higher, establish time parameters for beginning approach.
- Note:** CAT II/CAT III approach not authorized. Autoland not authorized.
- See Approach Procedures.

STATUS (Continued)

| APPROACH PROCEDURES                                                                                                                                                                                           | INOP SYS                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1. CTR TK fuel pumps . . . . OFF                                                                                                                                                                              | SLATS                        |
| 2. GPWS LDG FLAP 3 . . . . . ON                                                                                                                                                                               | AP 1+ 2 (may be inoperative) |
| 3. Use flap handle position 3 for landing.                                                                                                                                                                    | A/THR (may be inoperative)   |
| 4. <b>Do Not</b> use the AP below 500 feet AGL.                                                                                                                                                               | FDs                          |
| 5. Enter the increased $V_{APP}$ on the PERF APPR page.                                                                                                                                                       |                              |
| <b>Note:</b> Ensure FULL (5R) selected on the MCDU PERF APPR page.<br>$V_{APP} = V_{LS} (FULL) +$ the speed additive displayed on the ECAM STATUS page.<br>See table on next page if the ECAM is unavailable. |                              |
| 6. LDG DIST PROC . . . . . APPLY (refer to ODM)                                                                                                                                                               |                              |

- If the ECAM is unavailable, use the following table to determine  $V_{APP}$ :

| <b>Speed Additives:</b>                |                |
|----------------------------------------|----------------|
| SPEED ADDITIVE FROM ECAM               | SLAT CONDITION |
| $V_{APP} = V_{LS} \text{ (FULL)} + 25$ | SLATS < 1      |
| $V_{APP} = V_{LS} \text{ (FULL)} + 10$ | SLATS 1 TO 3   |
| $V_{APP} = V_{LS} \text{ (FULL)} + 5$  | SLATS > 3      |

▼ F/CTL SLATS FAULT continued ▼

Deferred Items

Descent Checklist

|                             |            |     |
|-----------------------------|------------|-----|
| Altimeters. . . . .         | ____, xckd | C&F |
| ▪Minimums. . . . .          | ____, ____ | C&F |
| ▪Landing Data. . . . .      | ____, ____ | C&F |
| ▪Approach briefing. . . . . | complete   | PM  |
| ▪Autobrakes . . . . .       | as reqd    | PM  |
| Seat belt sign . . . . .    | ON         | PM  |

Approach Checklist

|                                    |            |     |
|------------------------------------|------------|-----|
| ▪Flight & nav instruments. . . . . | verified   | C&F |
| Cabin notification. . . . .        | complete   | C   |
| ▪FMS flight phase . . . . .        | APPR/DES   | PM  |
| Altimeters. . . . .                | ____, xckd | C&F |

**Note:** Consider reviewing Go-around Procedure at the end of this checklist.

▼ Continued on next page ▼

## ▼ F/CTL SLATS FAULT continued ▼

**STATUS (Continued)**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <i>INOP SYS</i>                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| <p>If possible, configure the aircraft on an extended final after all maneuvering is complete. Use the following procedure to configure the aircraft:</p> <p><b>Note:</b> With 0 slats expect a pitch attitude of 0° during final.</p> <p>► <b>If the flap handle is at 0:</b><br/>Maintain green dot airspeed.</p> <ul style="list-style-type: none"><li>• For flaps 1, select flap handle position 1.</li></ul> <p>► <b>If the flap handle is at 1:</b><br/>Maintain green dot airspeed.</p> <ul style="list-style-type: none"><li>• For flaps 2, select speed 190 knots.</li><li>• When below 200 knots, select flap handle position 2.</li></ul> | <p>SLATS</p> <p>AP 1+ 2 (may be inoperative)</p> <p>A/THR (may be inoperative)</p> <p>FDs</p> |

▼ Continued on next page ▼

▼ F/CTL SLATS FAULT continued ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                             | INOP SYS                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| <p>► <b>If the flap handle is at 2:</b> Maintain 190 knots until ready for the approach.</p> <ul style="list-style-type: none"> <li>• For flaps 3, <b>select</b> <math>V_{APP}</math> speed (PERF APPR page).</li> <li>• As the speed slows below 185 knots, select gear down, flap handle position 3, and accomplish Landing Checklist, as follows:</li> </ul> | <p><b>SLATS</b></p> <p>AP 1+ 2 (may be inoperative)</p> <p>A/THR (may be inoperative)</p> <p><b>FDs</b></p> |

## Landing Checklist

|                        |             |     |
|------------------------|-------------|-----|
| Landing gear . . . . . | down        | C&F |
| Flaps . . . . .        | ____, ____  | C&F |
|                        | as directed |     |
| Spoilers . . . . .     | ARMED       | PM  |

## Go-around Procedure Review:

- Perform normal Go-around procedure.
- If desired, retract flaps/slats to position where fault occurred.
- Select a speed of 10 kts below the appropriate flap/slat limit speed (red barber pole on PFD).
- F and S speeds displayed on the PFD may be inaccurate.
- If the flaps/slats are retracted, maintain green dot.



**F / CTL SLATS LOCKED**

**Condition:** Slat wing tip brake applied.

1. MAX SPEED. . . . .  $V_{FE}$  (If displayed on ECAM)

**Note:** Observe the maximum speed displayed on the ECAM and minimum airspeed consistent with the actual flap and slat position. F and S speeds displayed on the PFD may be inaccurate. If the flaps/slats are retracted, maintain green dot.

2. FUEL MODE SEL pb . . . . . MAN

3. Manually use the center fuel pumps as required.

**Note:** Select the center tank fuel pumps OFF when the tank is empty or before beginning approach.

---

**Caution! Do Not pull any flap or slat control circuit breakers while airborne.**

---

**Note:** Fuel consumption may be considerably higher. Establish time parameters for beginning approach.

**Note:** CAT II/CAT III approach not authorized.  
Autoland not authorized.

- See Approach Procedures.

▼ Continued on next page ▼

## STATUS

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | INOP SYS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ol style="list-style-type: none"> <li>CTR TK fuel pumps . . . OFF</li> <li>GPWS LDG FLAP 3. . . . ON</li> <li>Use flap handle position 3 for landing.</li> </ol> <p><b>Note:</b> Select the center tank fuel pumps OFF when the tank is empty or before beginning approach.</p> <ol style="list-style-type: none"> <li><b>Do Not</b> use the AP below 500 feet AGL.</li> <li>Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li> </ol> <p><b>Note:</b> Ensure FULL (5R) selected on the MCDU PERF APPR page.</p> <p><math>V_{APP} = V_{LS} \text{ (FULL)} +</math> the speed additive displayed on the ECAM STATUS page. See table on next page if the ECAM is unavailable.</p> <ol style="list-style-type: none"> <li>LDG DIST PROC . . . APPLY (refer to ODM)</li> </ol> | SLATS    |

▼ Continued on next page ▼

▼ F/CTL SLATS LOCKED continued ▼

► If the ECAM is unavailable, use the following table to determine  $V_{APP}$ :

| Speed Additives:                       |                |
|----------------------------------------|----------------|
| SPEED ADDITIVE FROM ECAM               | SLAT CONDITION |
| $V_{APP} = V_{LS} \text{ (FULL)} + 25$ | SLATS < 1      |
| $V_{APP} = V_{LS} \text{ (FULL)} + 15$ | SLATS 1 TO 3   |
| $V_{APP} = V_{LS} \text{ (FULL)} + 5$  | SLATS > 3      |

**Deferred Items**

Descent Checklist

- Altimeters . . . . . \_\_\_\_, xckd C&F
- Minimums . . . . . \_\_\_\_, \_\_ C&F
- Landing Data . . . . . \_\_\_\_, \_\_ C&F
- Approach briefing . . . . . complete PM
- Autobrakes . . . . . as reqd PM
- Seat belt sign . . . . . ON PM

Approach Checklist

- Flight & nav instruments . . . . . verified C&F
- Cabin notification . . . . . complete C
- FMS flight phase. . . . . APPR/DES PM
- Altimeters . . . . . \_\_\_\_, xckd C&F

**Note:** Consider reviewing Go-around Procedure at the end of this checklist.

▼ Continued on next page ▼

▼ F/CTL SLATS LOCKED continued ▼

**STATUS (Continued)**

*APPROACH PROCEDURES*

*INOP SYS*

If possible, configure the aircraft on an extended final after all maneuvering is complete. Use the following procedure to configure the aircraft:

SLATS

**Note:** With 0 slats expect a pitch attitude of 0° during final.

► **If the flap handle is at 0:**  
Maintain green dot airspeed.

- For flaps 1, select flap handle position 1.

► **If the flap handle is at 1:**  
Maintain green dot airspeed.

- For flaps 2, select speed 190 knots.
- When below 200 knots, select flap handle position 2.

▼ Continued on next page ▼

▼ F/CTL SLATS LOCKED continued ▼

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                           | INOP SYS |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <p>► <b>If the flap handle is at 2:</b><br/>Maintain 190 knots until ready for the approach.</p> <ul style="list-style-type: none"><li>• For flaps 3, activate managed speed.</li><li>• As the speed slows below 185 knots, select gear down, flap handle position 3, and accomplish Landing Checklist, as follows:</li></ul> | SLATS    |

**Landing Checklist**

|                        |                           |     |
|------------------------|---------------------------|-----|
| Landing gear . . . . . | down                      | C&F |
| Flaps . . . . .        | ____, ____<br>as directed | C&F |
| Spoilers . . . . .     | ARMED                     | PM  |

**Go-around Procedure Review:**

- Perform normal Go-around procedure.
- If desired, retract flaps/slats to position where fault occurred.
- Select a speed of 10 kts below the appropriate flap/slat limit speed (red barber pole on PFD).
- F and S speeds displayed on the PFD may be inaccurate.
- If the flaps/slats are retracted, maintain green dot.



**F / CTL SPD BRK DISAGREE**

**Condition:** A disagreement exists between the position of the speed brake surfaces and the position of the speed brake lever.

- ▶ If only surface pairs 3 and 4 are affected:
  - SPEED BRAKE lever . . . . . RETRACT
  - **Do Not** use the speed brakes.



- ▶ If surface pairs 2 and 3 and 4 are affected:

**Note:** This message is displayed after automatic speed brake retraction (due to FLAPS FULL or ALPHA protection) and is caused by the disagreement between the speed brake lever position and the position of the surfaces.

- SPEED BRAKE lever . . . . .RETRACT



**F/CTL SPD BRK FAULT**

**Condition:** Speedbrakes are lost due to failure of the speedbrake lever transducers. Associated ground spoilers are available through reverse selection.

- 1. See Approach Procedures.

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                        | <i>INOP SYS</i> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <ul style="list-style-type: none"><li>• LDG DIST PROC . . .APPLY (refer to the ODM)</li><li>• Arm ground spoilers normally for landing.</li></ul> | SPD BRK         |



## F / CTL SPD BRK 2 (3+4) FAULT

**Condition:** Specified speedbrakes are lost due to failure if the speedbrake lever transducer(s). Associated ground spoilers are available through reverse selection.

- ▶ If SPD BRK 2 affected:
  - Crew awareness.
  - See Approach Procedures.
- ▶ If SPD BRK 3+4 affected:
  - SPD BRK . . . . . DO NOT USE

**Note:** Speedbrakes should not be used in flight, as it is inefficient to use only the number 2 speedbrake. Also, use of speedbrakes in this condition activates the SPD BRK DISAGREE caution. Ground spoilers should be armed normally for landing.

- See Approach Procedures.

### STATUS

| <i>APPROACH PROCEDURES</i>                                                                           | <i>INOP SYS</i> |
|------------------------------------------------------------------------------------------------------|-----------------|
| <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . APPLY<br/>(refer to the ODM)</li> </ul> | SPLR (2 OR 3+4) |



**F / CTL SPD BRK STILL OUT**

**Condition:** Speedbrakes are extended with thrust above idle for more than 5 seconds or are extended below 750 feet AGL during the approach phase.

- SPD BRAKES . . . . . Retract  
    ■ ■ ■ ■

## F/CTL SPLR FAULT

**Condition:** One or more spoiler pairs are inoperative.

**Note:** If fault occurs on the ground following a flight control check, reset system by cycling all SECs OFF for 5 seconds, then all back ON. If fault clears, verify trim setting and accomplish another flight control check prior to takeoff. An info only logbook write-up should be made.

- ▶ If all amber-colored spoilers indicate retracted:
    - > If spoiler pairs 3 and 4 are affected:
      - Do Not use the speedbrakes. Using only the remaining speedbrakes is ineffective and would cause a SPD BRK DISAGREE caution.
      - See Approach Procedures.
    - > If aerodynamic vibrations are experienced:
      - PERF APPR page . . . . . Select LDG CONF 3
      - GPWS LDG FLAP 3 pb . . . . . ON
      - Use FLAPS 3 for landing.
      - See Approach Procedures.
  - ▶ If one or more amber-colored spoilers are extended:
    - Autopilot . . . . . OFF
    - Speed . . . . . Maintain Green Dot
- Note:** If buffet is encountered at green dot airspeed, increase speed as necessary to fly out of buffet.

---

**Caution! Do not attempt to trim rudder to a zero sideslip position.**

---

▼ Continued on next page ▼

**▼ F/CTL SPLR FAULT continued ▼**

- Cruise Altitude. . . . . As reqd  
It may not be possible to maintain current FL due to increased drag. Maintain highest possible cruise altitude.
- Fuel Consumption Increased
  - FMS FUEL PRED . . . . . Disregard
  - Fuel Consumption . . . . . Monitor
- See Approach Procedures

**▼ Continued on next page ▼**

▼ **F/CTL SPLR FAULT continued** ▼

**STATUS**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <i>INOP SYS</i>                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▶ If all amber-colored spoilers indicate retracted:                             <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . .APPLY                                     <ul style="list-style-type: none"> <li>&gt; If two or less spoilers affected:<br/>(refer to the ODM)</li> <li>&gt; If more than two spoilers affected:<br/>(refer to the ODM)</li> </ul> </li> </ul> </li> <li>▶ If one or more amber-colored spoilers are extended:                             <ul style="list-style-type: none"> <li>• FOR LDG . . . . USE Flaps 3</li> <li>• GPWS LDG FLAP 3 . . . . On</li> <li>• Use a VAPP of VLS (FULL) plus 10 kts. Enter the increased VAPP on the PERF APP page.</li> <li>• LDG DIST PROC . . . .Apply (refer to the ODM)</li> <li>• To configure aircraft:                                     <ul style="list-style-type: none"> <li>&gt; If the VLS hook is above the next flap extension speed:                                             <ul style="list-style-type: none"> <li>• Disengage A/THR,</li> <li>• Decelerate to below flap extension speed</li> <li>• Select next flap setting</li> </ul> </li> <li>&gt;&gt; When FLAPS 3:                                             <ul style="list-style-type: none"> <li>• Reengage A/THR</li> <li>• Use managed speed for landing</li> </ul> </li> </ul> </li> </ul> </li> </ul> | <p>SPLR (affected)<br/>SPD BRK (if spoilers 2, 3 and 4 are affected)</p> |



**F/CTL STABILIZER JAM**

**Condition:** The ELACS have detected that the horizontal stabilizer has jammed.

**Caution!** The flight control law has degraded to **ALTERNATE LAW**. Do not exceed 320 knots (or 0.77M) due to the loss of the high speed protection.

**Note:** Manual pitch trim may or may not be available.

1. Determine if manual pitch trim is available.  
(The force required to move the trim wheel may be greater than usual.)
  - ▶ If manual pitch trim is available:
    - Continue to trim for neutral elevator (as displayed on the ECAM F/CTL page).
    - See Approach Procedures.
  - ▶ If manual pitch trim is not available:
    - See Approach Procedures.

▼ Continued on next page ▼

▼ F/CTL STABILIZER JAM continued ▼

**STATUS (Continued)**

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                     | <i>INOP SYS</i>                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 1. CAT II or CAT III approach not authorized.<br>2. When the landing gear is extended, the control law will degrade to DIRECT LAW.<br>3. GPWS LDG FLAP 3. . . . ON<br>4. Use FLAPS 3 for landing.                                                                                              | AP 1 + 2<br>ATT LIMIT<br>OVSPD LIMIT<br>ALPHA LIMIT<br>STABILIZER<br>ELAC PITCH<br>ALPHA FLOOR |
| <hr style="border: 1px solid orange;"/> <p> <b>Caution! Do Not select FLAPS FULL as the aircraft handling characteristics will be degraded.</b> </p> <hr style="border: 1px solid orange;"/>                                                                                                   |                                                                                                |
| 5. Use a $V_{APP}$ of $V_{LS}$ (FULL) plus 10 knots. Enter the increased $V_{APP}$ on the PERF APPR page.<br>6. LDG DIST PROC . . . APPLY (refer to the ODM)<br>(due to the higher approach speed.)<br>7. <b>Do Not</b> extend the landing gear until configured at FLAPS 3 and at $V_{APP}$ . |                                                                                                |



## Rudder Jam / Rudder Pedal Jam

**Condition:** The rudder or rudder pedals appear to be jammed or feedback from the rudder pedals appears to be jerky.

1. Check the rudder position on the ECAM F/CTL page.
  - If the rudder or rudder pedals are jammed.
  - Check for foreign objects obstructing rudder pedals.
    - ▶ If no obstructions are found:
      - See Approach Procedures.

### APPROACH PROCEDURES:

- Avoid landing with a crosswind from the side where the rudder is deflected.
- Max crosswind for landing is 15 kts.
- Do not use AUTO Brakes.

### After Touchdown:

- Be prepared to use differential braking to maintain directional control.
- Do not use asymmetrical reverse thrust.
- Use steering tiller below 70 kts.



## Sidestick and / or Rudder Pedals Stiff

**Condition:** At least one flight deck control is unusually rigid with the autopilot disconnected.

**Note:** The aircraft will still respond to control inputs; however, extra force is required.

1. Confirm that the autopilot is disconnected by checking the FMA, and the AP lights on the FCU.
  - ▶ If one of either, the CAPT or F/O controls, are not stiff:
    - Transfer flying duties to that pilot.
  - ▶ If both sets of rudder pedals are affected:
    - On landing be prepared to apply extra force on the rudder pedals for de-crabbing and rollout.

**Note:** If both sets of rudder pedals are affected and an engine fails, additional force will be required on the rudder to counter yaw.



## Stabilizer Jam

**Condition:** A horizontal stabilizer or pitch trim wheel jammed condition exists that was not detected by the ELACs (no ECAM Message).

**Note:** The flight controls remain in NORMAL LAW.

1. Disconnect the autopilot.
2. Attempt to trim the aircraft using the manual pitch trim wheel.

**Note:** The force needed to move the pitch trim wheel may be higher than normal if the trim wheel is not fully jammed.

- ▶ If manual pitch trim is available:
  - Trim the elevator to the zero (neutral) position as indicated on the ECAM F/CTL page.
- ▶ If manual pitch is not available:
  - Use FLAPS 3 for landing.
  - GPWS LDG FLAP 3 . . . . . ON
  - Use a  $V_{APP}$  of  $V_{LS}$  (FULL) plus 10 knots. Enter the increased  $V_{APP}$  on the PERF APPR page.
  - LDG DIST PROC . . . . . Apply (refer to ODM)

Autolands not authorized.

CAT II or CAT III approach not authorized.



## Zero Flap / Zero Slat Approach and Landing

**Condition:** A zero flap/zero slat approach is required.

1. Maintain GREEN DOT airspeed while maneuvering.
2. GPWS FLAP MODE pb. . . . . OFF.

**Note:** Plan on a longer than normal final as airspeed will be difficult to dissipate.

3. LDG DIST PROC . . . . . Apply  
(refer to ODM)
4. Prior to approach, CTR TK pumps - OFF

### Deferred Items

#### Descent Checklist

|                             |           |     |
|-----------------------------|-----------|-----|
| Altimeters. . . . .         | ___, xckd | C&F |
| ■Minimums . . . . .         | ___, ___  | C&F |
| ■Landing Data. . . . .      | ___, ___  | C&F |
| ■Approach briefing. . . . . | complete  | PM  |
| ■Autobrakes . . . . .       | as reqd   | PM  |
| Seat belt sign . . . . .    | ON        | PM  |

#### Approach Checklist

|                                    |           |     |
|------------------------------------|-----------|-----|
| ■Flight & nav instruments. . . . . | verified  | C&F |
| Cabin notification. . . . .        | complete  | C   |
| ■FMS flight phase . . . . .        | APPR/DES  | PM  |
| Altimeters. . . . .                | ___, xckd | C&F |

▼ Continued on next page ▼

▼ Zero Flap / Zero Slat Approach and Landing continued ▼

**Alternate Configuration**

Extend the landing gear early to increase the drag.

After landing gear is extended:

- Flap handle . . . . . 1  
(So that approach idle and the go-around mode are available.)

**When** established on final approach and significant maneuvering is complete:

- Select an approach speed of  $V_{LS}$  (FLAPS FULL) + 60.

**Landing Checklist**

- Landing gear . . . . . down C&F
- Flaps . . . . . **1, 1** C&F
- Note: Flaps & slats positions will be amber on ECAM.
- Spoilers . . . . . ARMED PM

One mile from touchdown:

- Reduce airspeed to cross the threshold at  $V_{LS}$  (FLAPS FULL) + 50 knots.

**Caution!** In this configuration deceleration will be slow and acceleration rapid. Do not allow the aircraft to float just off the runway surface. Fly the aircraft onto the runway at the recommended touchdown point. Expeditiously select reverse thrust after touchdown. Use of autobrakes medium, if available, is recommended.



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## Table of Contents

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## Display Unit Failure

**Condition:** The display unit screen is flashing, blank, distorted, or has a diagonal line. The display is on the wrong screen.

► If affected DU flashes intermittently:

**Note:** This phenomenon may be due to intermittent electrical power supply interruptions.

> If the Captain side (PFD, ND, Upper ECAM or MCDU 1) is affected:

- APU Start . . . . . Consider
- GEN 1 . . . . . OFF

>> If DUs do not stop flashing:

- GEN 1 . . . . . ON

>> If DUs stop flashing:

- GEN 1 . . . . . Keep OFF
- RUD TRIM . . . . . Check/Reset

**Caution:** Intermittent electrical power supply interruptions may cause offset in the rudder trim. Check the need of the rudder trim to be reset using the sideslip indication.

- AP and/or A/THR . . . . . as reqd

***RVSM flight is not authorized with only one PFD.***



> If the First Officer side (PFD, ND, Lower ECAM or MCDU 2) is affected:

- APU Start . . . . . Consider
- GEN 2 . . . . . OFF

▼ Continued on next page ▼

▼ **Display Unit Failure continued** ▼

- >> If DUs do not stop flashing:
  - GEN 2 . . . . . ON
- >> If DUs stop flashing:
  - GEN 2 . . . . . Keep OFF
  - RUD TRIM . . . . . Check/Reset

**Caution:**     *Intermittent electrical power supply interruptions may cause offset in the rudder trim. Check the need of the rudder trim to be reset using the sideslip indication.*

- AP and/or A/THR . . . . . As reqd
- APU Start. . . . . Consider

***RVSM flight is not authorized with only one PFD.***



- ▶ If the affected DU is blank or distorted:
  - DU (affected) . . . . .OFF, then ON
- > If not recovered:
  - DU (affected) . . . . .OFF
  - Use the SWITCHING ECAM/ND XFR selector or PFD/ND XFR button as required. The System Display may be transferred to F/O or CAPT ND

***RVSM flight is not authorized with only one PFD.***



▼ **Continued on next page** ▼

▼ Display Unit Failure Continued ▼

- ▶ If the DU has a diagonal line across the display:
  - SWITCHING DMC EIS . . . . . CAPT 3 or F/O 3
- > If DU not recovered:
  - Affected DU . . . . . OFF
  - EFIS CSTR . . . . . OFF
  - ND range . . . . . Decrease
- >> If the DU is not recovered:
  - DU (affected) . . . . . OFF
  - Use the ECAM/ND XFR switch or PFD/ND XFR button as required.

RVSM flight is not authorized with only one PFD.



- ▶ If the E/WD is on the lower ECAM and the System Display is on the upper ECAM:
  - Upper and lower DUs . . . . . OFF then ON



**EFB Suspected Electronic Interference**

**Condition:** Electronic interference is suspected while using EFB(s).

- 1. Airplane Mode (all EFBs). . . . . Verify/select ON
  - 2. WiFi and Bluetooth (all EFBs) . . Verify/select Off
  - 3. All PEDS . . . . . Off
- Ensure all PEDs (except EFBs), including those being used in the cabin, are turned off.
- ▶ If interference does not continue:
    - Continue normal EFB operation.
    - Ensure all other PEDs remain off for the duration of the flight.



- ▶ If interference continues:
  - EFBs (all) . . . . . Off
- > If interference does not continue:
  - If possible, determine which EFB is causing the interference by turning one EFB on at a time.
  - >> If interference does not continue with a specific EFB:
    - Complete flight using unaffected EFB(s).
    - See “EFB Failure - Single.”



▼ Continued on next page ▼

▼ **EFB Suspected Electronic Interference continued** ▼

> > If interference resumes with all EFB(s).

- All EFBs . . . . .Off
- See “EFB Failure - All.”



> If interference continues:

- EFBs (all) . . . . .On
- Resume normal EFB operation.
- Attempt to determine the source of the interference.



EIS DMC FAULT

**Condition:** Display management computer 1, 2, or 3 has failed.

- ▶ If DMC 1 has failed:
  - SWITCHING EIS DMC selector . . . . . CAPT

**Note:** DMC 3 replaces DMC 1.



- ▶ If DMC 2 has failed:
  - SWITCHING EIS DMC selector . . . . . F/O

**Note:** DMC 3 replaces DMC 2.



- ▶ If DMC 3 has failed on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If DMC 3 has failed in flight:
  - Crew awareness.

***RVSM flight not authorized with two DMCs failed.***

**STATUS**

|  |               |
|--|---------------|
|  | INOP SYS      |
|  | DMC 1 (2) (3) |



**FWS FWC 1 (2) FAULT**

**Condition:** One flight warning computer has failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.9, FWC, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

*CAT III approach not authorized.*

|  |           |
|--|-----------|
|  | INOP SYS  |
|  | FWC 1 (2) |



**FWS FWC 1 + 2 FAULT**

**Condition:** Both flight warning computers have failed.

- 1. Monitor the overhead panel for abnormal indications.
- 2. Periodically check the ECAM SYSTEM pages to monitor systems.

**STATUS**

*CAT II or III approach or RVSM flight not authorized.*

|  |                |
|--|----------------|
|  | INOP SYS       |
|  | ECAM WARNINGS  |
|  | ALT ALERT      |
|  | STATUS         |
|  | AUTO CALL OUT  |
|  | MEMO           |
|  | MASTER CAUTION |
|  | MASTER WARNING |
|  | AURAL WARNINGS |



### FWS OEB / FWC DISCREPANCY

**Condition:** There is a discrepancy between the FWS and the Operations Engineering Bulletin databases.

1. Maintenance action is required.



### FWS SDAC 1 (2) FAULT

**Condition:** One SDAC has failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** Although the ECAM may display some symbols and/or parameters in amber, this does not always signify that additional systems are failed.

#### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | SDAC 1 (2)      |



**FWS SDAC 1 + 2 FAULT**

**Condition:** Both system data acquisition concentrators are inoperative.

- 1. Monitor the overhead panel for abnormal lights since amber cautions on the ECAM are lost.
- 2. ECAM system pages for ENG, FUEL, F/CTL, and WHEEL are available.

**Caution!** Only red warnings, engine, and fuel parameters are available on the upper ECAM display unit.

**Note:** Autopilot status information on the ECAM STATUS page is lost.

**Note:** Disregard the ENG 1 (2) APPR IDLE ONLY messages.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | SDAC 1+2        |



## RECORDER DFDR FAULT

**Condition:** The digital flight data recorder contains a fault.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | DFDR            |



## RECORDER SYS FAULT

**Condition:** The recorder FDIU contains a fault.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | RECORDER SYS    |



**Airspeed Unreliable**

**Condition:** Unreliable airspeed indications caused by pitot/static probe obstruction or radome damage.

- 1. Autopilot . . . . . OFF
- 2. Autothrust . . . . . OFF
- 3. Flight Directors . . . . . OFF
- ▶ If necessary to stabilize the aircraft or to climb to a safe altitude, set the following (gear-up) pitch attitude and thrust:
  - Flap lever position 1 or greater . . . 10° and CL
  - Flap lever position 0 . . . . . 5° and CL (Flaps and slats retracted)
- - - - -
- 4. Adjust pitch attitude and thrust referencing the chart on page 10.14 to stabilize aircraft safely within flight envelope.
  - ▶ If the unreliable airspeed indications persist, refer to the charts starting on page 10.17 for the remaining phases of the flight.
  - ▶ If suspected radome damage:
    - An increase in N1 up to 5% above table values may be required due to increased drag. Fuel flow may increase by as much as 27%.

▼ Continued on next page ▼

▼ Airspeed Unreliable continued ▼

5. Do not change flap selection until safe to do so.

**Note:** If at Flaps Full and go-around is initiated, select Flaps 3.

**Note:** Respect Stall Warnings if in Alternate Law.

6. Speedbrakes. . . . . Verify retracted

7. Use MCDU GPS GS (DATA/GPS MONITOR) and ND groundspeed to monitor airspeed trends.

8. PROBE/WINDOW HEAT . . . . . ON

▶ If **altitude** indications **are** reliable:

- Use of Flight Path Vector (FPV) may aid pitch control.

▶ If **altitude** indications **are not** reliable:

- Do not use FPV, or V/S which are affected
- ATC altitude readout may be affected
- Refer to GPS altitude as an altitude cue
- Refer to radio altimeter

▼ Continued on next page ▼

▼ **Airspeed Unreliable continued** ▼

**A320**

| <b>Flight Phase</b>     | <b>Weight</b>          | <b>Flt. Level</b>        | <b>Pitch Att</b> | <b>N<sub>1</sub></b> |
|-------------------------|------------------------|--------------------------|------------------|----------------------|
| Takeoff                 | 140,000                | <5,000'                  | + 13°            | TO/FLX               |
| Climb<br>(280 KT)       | 130,000                | <FL 200                  | + 6°             | CL                   |
| Cruise<br>(280 KT)      | 130,000<br>130,000     | FL 150<br>FL 250         | + 2°<br>+ 2°     | 74%<br>81%           |
| Descent<br>(280 KT)     | (DO NOT USE SPD BRKS.) |                          | - 2°             | IDLE                 |
| Approach<br>FLAPS 1 - 3 | 130,000                | SEA LEVEL                | + 7              | 58%                  |
| Approach<br>FLAPS FULL  | 130,000                | SEA LEVEL                | + 7              | 63%                  |
| Approach<br>GEAR/FULL   | 130,000                | FINAL - ON<br>GLIDESLOPE | + 5.5            | 52%                  |

**A319**

| <b>Flight Phase</b>     | <b>Weight</b>          | <b>Flt. Level</b>        | <b>Pitch Att</b> | <b>N<sub>1</sub></b>    |
|-------------------------|------------------------|--------------------------|------------------|-------------------------|
| Takeoff                 | 140,000                | <5,000'                  | + 15°            | TO/FLX                  |
| Climb<br>(250/275 KT)   | 130,000                | 10,000<br>FL 250         | + 11°<br>+ 5°    | CL                      |
| Cruise<br>(275 KT)      | 130,000                | FL 250                   | + 2.5°           | As req for<br>Level flt |
| Descent<br>(280 KT)     | (DO NOT USE SPD BRKS.) |                          | - 2°             | IDLE                    |
| Approach<br>FLAPS 1 - 3 | 110,000                | SEA LEVEL                | + 7°             | 54%                     |
| Approach<br>FLAPS FULL  | 110,000                | SEA LEVEL                | + 3.5°           | 65%                     |
| Approach<br>GEAR/FULL   | 110,000                | FINAL - ON<br>GLIDESLOPE | + 4°             | 53%                     |

▼ **Continued on next page** ▼

▼ Airspeed Unreliable continued ▼

9. See ADR CHECK PROCEDURE, below.

### ADR CHECK PROCEDURE

Cross check airspeed/altitude indications (ADRs 1, 3, 2, and standby instruments). Attempt to identify faulty ADR(s) through comparison of primary and secondary instruments for erratic operation.

**Note:** ADR 1 and 2 provide data to the CA's and FO's PFD respectively; ADR 3 provides data after selecting AIR DATA SWITCH to CAPT 3 or F/O 3.

- ▶ If at least one ADR is reliable:
  - Keep one ADR on to maintain STALL WARNING protection
  - Faulty ADR(s) . . . . . OFF

---

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

---

- Confirm remaining air data is correct using GPS altitude and GPS or IRS ground speeds (taking into account altitude and wind effect)
- See Approach Procedures



▼ Continued on next page ▼

▼ **Airspeed Unreliable continued** ▼

- ▶ If affected ADR(s) cannot be identified or all ADRs are affected:
  - Keep one ADR on to maintain STALL WARNING protection
  - Remaining two ADR(s) . . . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

- ECAM Switching Panel AIR DATA . . . As required
- See Approach Procedures

**STATUS**

| Approach Procedures                                                                                                                                                                                                                                                                                                    | <i>INOP SYS</i>                    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| The control law will degrade to DIRECT LAW when the landing gear is lowered.<br>1. Use FLAPS 3 for landing.<br>2. GPWS LDG FLAP 3 ON.<br>3. Use a VAPP of VLS (FULL) plus 10 knots. Enter the increased VAPP on the PERF APPR page.<br>4. LDG DIST PROC APPLY (refer to the ODM)<br>(due to the higher approach speed) | ADR 1, 2, and/or 3 (if turned OFF) |

▼ **Continued on next page** ▼

▼ **Airspeed Unreliable continued** ▼

## Pitch / Thrust for Initial Level Off (A319)

| <b>PITCH THRUST FOR INITIAL LEVEL OFF</b> |              |                                 |                                 |                            |
|-------------------------------------------|--------------|---------------------------------|---------------------------------|----------------------------|
| <b>SLATS / FLAPS EXTENDED</b>             |              |                                 |                                 |                            |
| <b>CONF</b>                               | <b>Speed</b> | <b>Above<br/>145,000 lb</b>     | <b>145,000 -<br/>125,000 lb</b> | <b>Below<br/>125,000lb</b> |
|                                           |              | <b>Pitch (°) / Thrust (%N1)</b> |                                 |                            |
| 3                                         | F            | 7.0 / 66.6                      | 7.0 / 62.8                      | 7.0 / 57.3                 |
| 2                                         | F            | 8.5 / 65.9                      | 8.5 / 61.2                      | 8.5 / 56.6                 |
| 1 + F                                     | S            | 3.5 / 65.3                      | 3.5 / 60.7                      | 3.5 / 55.7                 |
| 1                                         | S            | 7.5 / 64.7                      | 7.5 / 60.1                      | 7.5 / 55.2                 |
| <b>CLEAN</b>                              |              |                                 |                                 |                            |
| <b>FL</b>                                 | <b>Speed</b> | <b>Pitch (°) / Thrust (%N1)</b> |                                 |                            |
| Below FL<br>200                           | 250kt        | 3.5 / 73.8                      | 3.0 / 71.3                      | 2.0 / 69.2                 |
| FL 200 -<br>FL 320                        | 275 kt       | 2.5 / 83.3                      | 2.0 / 81.4                      | 1.5 / 79.7                 |
| Above FL<br>320                           | M 0.76       | 2.5 / 88.4                      | 2.5 / 86.8                      | 2.0 / 84.5                 |

▼ **Continued on next page** ▼

▼ **Airspeed Unreliable continued** ▼

**Pitch / Thrust for Initial Level Off (A320)**

| PITCH THRUST FOR INITIAL LEVEL OFF |        |                          |                         |                    |
|------------------------------------|--------|--------------------------|-------------------------|--------------------|
| SLATS / FLAPS EXTENDED             |        |                          |                         |                    |
| CONF                               | Speed  | Above<br>145,000 lb      | 145,000 -<br>125,000 lb | Below<br>125,000lb |
|                                    |        | Pitch (°) / Thrust (%N1) |                         |                    |
| 3                                  | F      | 7.0 / 68.4               | 7.0 / 63.9              | 7.0 / 59.3         |
| 2                                  | F      | 8.5 / 68.3               | 8.5 / 63.8              | 8.5 / 59.0         |
| 1 + F                              | S      | 4.5 / 67.2               | 4.5 / 63.1              | 4.5 / 58.4         |
| 1                                  | S      | 7.5 / 65.9               | 7.5 / 61.7              | 7.5 / 57.2         |
| CLEAN                              |        |                          |                         |                    |
| FL                                 | Speed  | Pitch (°) Thrust (%N1)   |                         |                    |
| Below FL<br>200                    | 250kt  | 3.5 / 71.6               | 3.0 / 69.4              | 2.0 / 67.3         |
| FL 200 -<br>FL 320                 | 275 kt | 2.5 / 83.3               | 2.0 / 81.3              | 1.5 / 79.7         |
| Above FL<br>320                    | M 0.76 | 2.5 / 88.2               | 2.5 / 86.7              | 2.0 / 84.8         |



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## Abnormal Alpha Protection

**Condition:** Inaccurate Alpha Prot (or Max) PFD depiction or inappropriate Alpha Protection nose down pitching.

- If speed is above  $V_{LS}$ , and aircraft goes into a CONTINUOUS NOSE DOWN PITCH RATE, which cannot be stopped with sidestick inputs:

1. One ADR pb . . . . . Keep on
2. Remaining two ADR pb(s) . . . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M).**

**Caution! Stall warning VSW strip (black and red) may be erroneous.**

**Note:** In case of dispatch with one ADR inoperative, switch only one ADR to OFF.

3. AIR DATA SWTG . . . . . As required

**Note:** Use of Flight Path Vector (FPV) may aid pitch control. AP and FDs are inoperative.

**Caution! Do not reinstate ADRs, even if all PFD indications are normal.**

4. See appropriate NAV ADR 1+2, 1+3, or 2+3 fault procedure (QRH 11) for additional guidance and Approach Procedures.



▼ Abnormal Alpha Protection continued ▼

- ▶ If Alpha Max strip (red) completely obscures the Alpha Prot strip (black and amber) while in stabilized wings-level flight:
  - 1. One ADR pb . . . . . Keep on
  - 2. Remaining two ADR pb(s) . . Confirm . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

**Caution! Stall warning VSW strip (black and red) may be erroneous.**

**Note:** In case of dispatch with one ADR inoperative, switch only one ADR to OFF.

- 3. AIR DATA SWTG . . . . . As required

**Note:** Use of Flight Path Vector (FPV) may aid pitch control. AP and FD's are inoperative.

**Caution! Do not reinstate ADRs, even if all PFD indications are normal.**

- 4. See appropriate NAV ADR 1+2, 1+3, or 2+3 fault procedure (QRH 11) for additional guidance and Approach Procedures.



▼ Continued on next page ▼

▼ Abnormal Alpha Protection continued ▼

- ▶ If the Alpha Prot strip (black and amber) rapidly moves by more than 30 knots during normal flight maneuvers with AP ON and speedbrakes retracted:
  - 1. One ADR pb . . . . . Keep on
  - 2. Remaining two ADR pb(s) . . Confirm . . . OFF

---

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

---

---

**Caution! Stall warning VSW strip (black and red) may be erroneous.**

---

**Note:** : In case of dispatch with one ADR inoperative, switch only one ADR to OFF.

- 3. AIR DATA SWTG . . . . .As required

**Note:** Use of Flight Path Vector (FPV) may aid pitch control. AP and FD's are inoperative.

---

**Caution! Do not reinstate ADRs, even if all PFD indications are normal.**

---

- 4. See appropriate NAV ADR 1+2, 1+3, or 2+3 fault procedure (QRH 11) for additional guidance and Approach Procedures.



### **CHECK WEIGHT (MCDU Scratchpad message)**

**Condition:** A discrepancy of more than 15,000 lbs exists between FMGC and FAC weights. This discrepancy may result from:

- inaccurate FAC weight estimation,
- erroneous FMGC weight entry, or
- an FMGC-FAC interface issue.

**Note:** FMGC weight (displayed on the SD) is used for all FMS performance calculations, overweight landing recording, and VAPP calculation. FAC weight is used to calculate PFD displayed characteristic speeds, including the VLS “hook”.

1. Verify FUEL PRED “ZFW/ZFWCG” matches WDR value and “FOB” matches fuel onboard (ZFW/ZFWCG may be overwritten if incorrect). If FOB fuel is incorrect, see Vol. 1, SP.12, FMS Fuel Quantity Calculations.
  - ▶ If either of these items are corrected and clear message:



2. Verify WDR accuracy:
  - Ensure WDR matches current flight number/date.
  - Request verification of load data from OCC.
  - Consider having FAs perform passenger count.

▼ Continued on next page ▼

▼ CHECK WEIGHT (MCDU Scratch Pad Message) continued ▼

**Note:** A load error that is related to passenger count does not require a load audit on arrival.

- ▶ If a corrected WDR ZFW/ZFWCG can be obtained:
  - Enter into FUEL PRED page.

■ ■ ■ ■
  
- ▶ If no corrected ZFW/ZFWCG is available and indications support an inaccurate WDR (i.e. takeoff trim seemed inaccurate, fuel burn is off, aircraft climb performance does not match FMGC or flight plan, etc.):
  - Consider increasing VAPP by adding 10 kts to VLS **if** performance indicates actual weight is greater than expected. Enter the increased VAPP on the PERF APPR page and use managed speed for landing. Multiply landing distance by 1.1.
  - Request a load audit upon landing.

■ ■ ■ ■

3. Erroneous FAC weights most often result from inaccurate AOA information (tolerance 0.5° AOA or 11,000 lbs.). FAC weight are available through MCDU MENU/AIDS/CALL UP PARAMETERS/PARAM ALPHA CALL UP on most aircraft.

▼ Continued on next page ▼

**▼ CHECK WEIGHT (MCDU Scratch Pad Message) continued ▼**

- ▶ If FMGC weight appears accurate, yet FAC weights differ significantly (i.e. greater than 15,000 lbs.):
  - Use ODM “Approach and Landing Speeds” for flap configuration speeds (O, S, and F).
  - Use managed speed for landing. VAPP will not be less than the FAC generated VLS “hook”.
  - A logbook write-up should be made.



4. An FMGC-FAC interface problem may be due to improper INIT B entries (e.g. TAXI fuel greater than TRIP fuel) or other software issues.

- ▶ If message appears and with no apparent reason:
  - A logbook write-up should be made.



**FM Predictions Lost  
(MCDU Scratchpad message)**

**Condition:** Multiple FMGC automatic resets have occurred and a portion of the Flight Management system has stopped making predictions.

5. MCDU PERF page. . . . . Enter Cost Index
6. Ensure proper FMA indications.



**FMGC Failure or Reset (Dual)**

**Condition:** If any of the following indications are observed, it is possible that both FMGC units have experienced a failure.

- “MAP NOT AVAIL” on both NDs.
- “FM 1” & “FM 2” light illuminated on the associated MCDU.
- Flight directors may revert to HDG-V/S or TRK-FPA.
- Autopilot and/or Autothrust may disconnect.
- ECAM message CAB PR LDG ELEV FAULT displayed.
- THR LOCK may be displayed on FMA.

**Note:** When an FMGC detects an internal fault, it will automatically initiate a reset process, followed by a resynchronization attempt with the other FMGC.

- If one or both FMGC’s have “FMGC (OWN)” displayed on the MCDU menu page:  
The system has reset one or both FMGCs.

**Note:** “FMGC (OPP)” may display on the MCDU that did not reset.

- MCDU MENU page . . . .Select “FMGC (OWN)”
- Autopilot (operating FMGC) . . . . . Engage, if desired
- FCU . . . . .Select desired airspeed

▼ Continued on next page ▼

▼ FMGC Failure or Reset (Dual) continued ▼

- A/THR. . . . . Engage, if desired
- If necessary, restore FMGC information using the following:
  - DATA page. . . . .A/C STATUS (4L)
    - Verify / select correct NAV database cycle
  - FUEL PRED page. . . . . Enter ZFW/ZFWCG
  - PERF page. . . . . Enter Cost Index
  - PROG page. . . Enter desired cruise altitude
  - F-PLN page
    - LAT REV a discontinuity to insert a destination
    - Enter the desired route
- Verify proper FMA indications
- > If **1 FD 2** is displayed on the FMA:
  - Both FMGC's are operating.
  - Temporarily select a different ND mode.
  - Make an "INFO ONLY" logbook write-up.



- > If **1 FD 1** or **2 FD 2** is displayed on the FMA:
  - Verify which system requires a manual reset.
  - Pull only the appropriate c/b and reset after 5 secs:
    - FMGC 1 (**B2**) or
    - FMGC 2 (**M17**)
  - Wait another minute for indications to return to normal.

▼ Continued on next page ▼

**▼ FMGC Failure or Reset (Dual) continued ▼**

- >> If **1 FD 2** is displayed on the FMA:
- See “If **1 FD 2** is displayed on the FMA” on the previous page.
- >> If **1 FD 1** or **2 FD 2** is still displayed on the FMA:
- Consider the associated FMGC failed.
  - Select “FMGC (OPP)” on the MCDU menu.
  - Match both ND range and mode selectors.
  - Use the autopilot with the operating FMGC, if desired.
  - Reference ECAM STS page for the INOP SYS list.



- If neither FMGC has “FMGC (OWN)” displayed on the MCDU menu page:
- **Wait at least 2 minutes from the time indications were first observed. Then:**
    - Attempt a reset of FMGC 1:
      - Pull FMGC 1 (**B2**) c/b and reset after 5 sec.
      - Wait another minute for indications to return to normal.

**▼ Continued on next page ▼**

▼ **FMGC Failure or Reset (Dual) continued** ▼

>> If successful:

- “FMGC (OWN)” is displayed on the captain’s MCDU:

Refer to “If one or both FMGC’s have “FMGC (OWN)” displayed on the MCDU menu page:

>> If unsuccessful:

- Attempt a reset of FMGC 2.
  - Pull FMGC 2 (**M17**) c/b, and reset after 5 sec.
  - Wait another minute for indications to return to normal.

>> If successful:

- “FMGC (OWN)” is displayed on the first officer’s MCDU:

Refer to “If one or both FMGC’s have “FMGC (OWN)” displayed on the MCDU menu page” on previous page.

► If attempts at an FMGC reset are unsuccessful, both FMGC’s are inoperative:

- Reference ECAM STS page for the INOP SYS list.
- Select the guarded NAV pb on each RMP.
- Select the ILS/LS, VOR pb as required to manually tune desired navigation facilities.
- ROSE ILS/VOR is available to display raw data.
- Manually select the landing elevation using the LDG ELEV knob on the overhead CABIN PRESS panel while noting the selected elevation on the ECAM PRESS page.

▼ **Continued on next page** ▼

**Approach Procedures:**

- Approach & landing must be hand flown using manual thrust and raw data.

**Note:** Flight Path Angle is available, if desired.  
(**TRK-FPA** p/b on the FCU.)

- Minimum visibility for the approach 4000 RVR or 3/4nm.
- Refer to Approach/ Landing section, APPROACH AND LANDING SPEEDS in ODM. Select  $V_{LS} + 10$  for the approach.
- LDG DIST PROC . . . . . Apply (refer to ODM).



## FMGC Failure or Reset (Single)

**Condition:** If any of the following indications are observed, it is possible that the associated FMGC unit has experienced a failure. These indications may be observed during and / or after an FMGC failure:

- 1 FD 1 or 2 FD 2 on the FMA.
- “MAP NOT AVAIL” on the associated ND.
- “SET OFFSIDE RNG/MODE” on the associated ND.
- FM 1 (2) FAIL light on the associated MCDU.
- “OPP FMGC IN PROCESS” message in the MCDU scratchpad.
- “FMGC (OPP)” on the MCDU menu page.

**Note:** When an FMGC detects an internal fault, it will automatically initiate a reset process, followed by a resynchronization attempt with the other FMGC.

► If **1 FD 2** is displayed on the FMA:

The system has successfully auto reset and resynchronized the associated FMGC.

- Select “FMGC (OWN)” on the MCDU menu.
- Temporarily select a different mode of the ND.
- Re-engage autopilot, if necessary and desired.
- Re-engage A/THR, if necessary and desired.

▼ Continued on next page ▼

▼ FMGC Failure or Reset (Single) continued ▼

> If “FM PREDICTIONS LOST” MCDU scratchpad message:

- PERF page . . . . . Enter Cost Index
- Verify proper FMA indications.
- Make an “INFO ONLY” logbook write up.



► If **1 FD 1** or **2 FD 2** is displayed on the FMA:

The automatic reset process failed to restore the FMGC, and a manual FMGC reset is required.

- Verify which system requires the manual reset.
- Use the autopilot with the operating FMGC, if desired.
- Re-engage A/THR, if necessary and desired.
- **Wait at least 2 minutes from the time indications were first observed before performing the following actions:**
  - Pull only the appropriate C/B and reset after 5 sec:
    - FMGC 1 (**B2**), OR
    - FMGC 2 (**M17**)
  - Wait another minute for indications to return to normal.
- > If **1 FD 2** is displayed on the FMA:
  - Refer to “If **1 FD 2** is displayed on the FMA”, previous page.

▼ Continued on next page ▼

▼ **FMGC Failure or Reset (Single) continued** ▼

- > If 1 FD 1 OR 2 FD 2 is still displayed on the FMA:
  - Consider the affected FMGC failed.
  - Select “FMGC (OPP)” on the MCDU menu.
  - Match both ND range and mode selectors.
  - Use the autopilot with the operating FMGC, if desired.
  - Reference ECAM STS page for the INOP SYS list.



---

**FMGC Independent Operations  
(MCDU Scratchpad message)**

---

**Condition:** An abnormal condition exists that prevents the FMGCs from communicating and synchronizing with each other. Each FMGC is operating independently (no crosstalk). The "IND" light is illuminated on top of each MCDU.

- ▶ If on ground:
  - Contact maintenance.
- ▶ If in flight:
  - Do not switch NAV databases.
  - Make identical entries on both MCDUs.
  - If significant differences exist between the FMGCs, identify the most accurate (Position Monitor) and use the associated autopilot.

---

**Caution! Pulling a c/b to disable one FMGC, putting the system into SINGLE FMGC operation, is not recommended**

---



## IR Alignment in ATT Mode

**Condition:** One or more IRs have lost alignment and in-flight alignment is desired.

**Note:** If IR alignment is lost in flight, position functions for that IR, such as present position and groundspeed are lost. Only attitude and heading information can be regained.

1. IR Mode selector. . . . . ATT  
The ALIGN light will be on for 30 seconds and “ATT MODE” is displayed on the CDU.

**Note:** Hold a level attitude and constant airspeed for 30 secs.

2. MCDU DATA key . . . . . Select
3. IRS MONITOR (2L key) . . . . . Select
4. A/C Heading . . . . . Enter  
The heading must be entered in the SET HDG field (5R key).



**Loss of FMS Data in Descent or Approach**

**Condition:** FMS data has been lost while near the destination airport. Loss of FMS data may be indicated by any or all of the following:

- “MAP NOT AVAIL” on both NDs.
- ECAM message “CAB PR LDG ELEV FAULT”.
- AP and/or A/THR disconnect.
- “THR LOCK” displayed on FMA.
- FDs may be lost or revert to HDG-V/S or TRK-FPA.

**Note:** FMS data may be lost due to a severe reset of both FMGCs, or due to the aircraft entering the “done” phase (possibly due to a faulty landing gear position sensor).

- If AP, FDs, and A/THR have been lost:
- AP and FDs. . . . . Engage, when desired.

**Note:** If one autopilot will not engage, try the other.

- Use selected modes until FMS data can be re-entered.
  - Select a desired airspeed and re-engage A/THR.
- If the FMGC prompt is displayed on either MCDU menu page and an immediate ILS approach is desired:
- RAD NAV page . . . . . Select
  - ILS IDENT . . . . . Enter at 3L (e.g. IHIZ)
  - ILS CRS . . . . . Enter at 2L (e.g. 095)

▼ Continued on next page ▼

▼ **Loss of FMS Data in Descent or Approach continued** ▼

- Selected speed . . . . . Use

**Note:**  $V_{LS}$  is displayed on the PFD. Select a speed approximating  $V_{LS} + 10$  for the approach.

- LDG DIST PROC . . . . Apply, refer to ODM.
- Accomplished Descent and Approach checklists.

**Note:** The missed approach is unavailable and must be flown in selected modes.



- ▶ If the FMGC prompt is displayed on either MCDU menu page and time permits:
  - FUEL PRED page . . . . . Enter ZFW/ZFWCG.
  - F-PLN page:
    - LAT REV a discontinuity to insert a NEW DEST.
    - Enter the desired route.
  - PROG page. . . . . Activate APPROACH phase, when desired.
  - Accomplish Descent and Approach checklists.
  - Managed modes . . . . . Use, when desired.



- ▶ If the FMGC prompt is not displayed on either MCDU menu page:
  - See FMGC Failure or Reset (Dual) QRH 11.8.



**MCDU Locking or Blanking**

**Condition:** The affected MCDU is frozen (will not accept pilot inputs), or is blank.

1. Pull the affected MCDU (**B1** or **N20**) c/b, and reset after 10 seconds.
  - ▶ If the MCDU remains locked/blank, or if both MCDUs are affected:
    - Pull FMGC 1 (**B2**) c/b, and reset after 10 seconds.
  - ▶ If the problem remains:
    - Pull FMGC 2 (**M17**) c/b, and reset after 10 seconds.
  - ▶ If the problem remains:
    - Use the other MCDU and associated FMGC.

Document all successful computer resets with an "INFO ONLY" logbook write-up.



**Condition:** One ADR is faulty and there is a speed or angle of attack (AOA) disagreement between the two remaining ADRs.

- If no airspeed disagreements:

- There is an AOA disagreement between the ADRs.
- False stall warnings may occur.
- See Approach Procedures.



- If airspeed disagreement:

- ADR CHECK PROCEDURE (below) . . . . . Apply

## ADR CHECK PROCEDURE

Cross check airspeed/altitude indications (ADRs 1, 3, 2, and standby instruments). Attempt to identify faulty ADR(s) through comparison of primary and secondary instruments for erratic operation.

**Note:** ADR 1 and 2 provide data to the CA's and FO's PFD respectively; ADR 3 provides data after selecting AIR DATA SWITCH to CAPT 3 or F/O 3.

▼ Continued on next page ▼

▼ NAV ADR DISAGREE continued ▼

- ▶ If at least one ADR is reliable:
  - Keep one ADR on to maintain STALL WARNING protection
  - Faulty ADR(s) . . . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

- Confirm remaining air data is correct using GPS altitude and GPS or IRS ground speeds (taking into account altitude and wind effect)
  - See Approach Procedures
- ■ ■ ■

- ▶ If affected ADR(s) cannot be identified or all ADRs are affected:
  - Keep one ADR on to maintain STALL WARNING protection
  - Remaining two ADR(s) . . . . . OFF  
(to prevent flight control laws from using unreliable data.)

**Caution! ALTERNATE LAW is active. Do not exceed 320 Knots (or 0.77M).**

- EFIS DMC switching . . . . . As required
  - See Approach Procedures.
- ■ ■ ■

▼ Continued on next page ▼

## STATUS

| Approach Procedures                                                                                                                                                                                                                                                                                                                                                                                          | <i>INOP SYS</i>                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| <p>The control law will degrade to DIRECT LAW when the landing gear is lowered.</p> <ol style="list-style-type: none"> <li>1. Use FLAPS 3 for landing.</li> <li>2. GPWS LDG FLAP 3 . . . . ON</li> <li>3. Use a VAPP of VLS (FULL) plus 10 knots. Enter the increased VAPP on the PERF APPR page.</li> <li>4. LDG DIST PROC . . . APPLY (refer to the ODM)<br/>(due to the higher approach speed)</li> </ol> | <p>ADR 1, 2, and/or 3 (if turned OFF)</p> |



**ADR Fault (Triple)**

**Condition:** All ADRs are faulty, as indicated by ‘FAULT’ indications in all three ADR pbs.

**Note:** The ECAM only displays a double failure; therefore a triple fault can only be determined by all three ADR pbs indicating “FAULT”.

- 1. ADR 1 pb. . . . . Confirm . . . . . OFF
- 2. ADR 2 pb. . . . . Confirm . . . . . OFF
- 3. ADR 3 pb. . . . . Confirm . . . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M). Stall warnings are lost.**

- 4. Use standby altimeter and airspeed indicator.
- 5. Use rudder with care above 160 knots.
- 6. GPWS TERR pb . . . . . OFF
- 7. CAB PRESS MODE SEL pb. . . . . MAN
- 8. CAB PRESS MAN V/S CTL . . . . . As RQRD

**Note:** It may take up to 10 seconds before outflow valve movement is observed on the ECAM PRESS page. Use the cabin V/S indication to confirm the outflow valve operation.

- 9. Landing gear cannot be retracted and must be gravity extended.
- 10. See Approach Procedures.

▼ Continued on next page ▼

▼ **ADR Fault (Triple) continued** ▼

**STATUS**

*CAT II and III approach and RVSM flight not authorized.*

| <b>APPROACH PROCEDURES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>INOP SYS</b>                                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• The control law will degrade to DIRECT LAW when the landing gear is lowered.</li> <li>• Use FLAPS 3 for landing.</li> <li>• GPWS LDG FLAP 3 . . . . ON</li> <li>• Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. (set on standby airspeed indicator).</li> <li>• LDG DIST PROC . . . . APPLY (refer to the ODM)</li> </ul> <p><b>When landing gear extension is desired:</b></p> <ul style="list-style-type: none"> <li>• Raise and turn the GRAVITY GEAR EXTN handcrank three turns clockwise.</li> <li>• LDG GEAR lever . . . DOWN</li> <li>• Check for proper gear down indications.</li> <li>• Fully open the outflow valve by holding the MAN V/S CTL to UP.</li> </ul> | ADR 1+2+3<br>ALPHA LIMIT<br>AP 1+2<br>ATC ALTI MODE<br>A/THR<br>ATT LIMIT<br>FD 1+2<br>L/G RETRACT<br>OVSPD LIMIT<br>RUD TRV LIM 1+2<br>TCAS<br>GPWS<br>GPWS TERR<br>N.W.STEER<br>CAP PR 1+2<br>WINDSHEAR DET |
| <p><b>Caution! Nose wheel steering is lost.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                               |
| <p><b>Caution! Verify outflow valve is fully open and cabin altitude is at field elevation before opening doors.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                               |

**NAV ADR 1+2 FAULT**

**Condition:** ADRs 1 and 2 are faulted or have been selected OFF.

**Note:** If all three ADRs display faults, go to ADR Fault (Triple), (QRH 11.24).

- 1. AIR DATA SWTG . . . . . CAPT3
- 2. ADR 1 pb. . . . . Confirm . . . . . OFF
- 3. ADR 2 pb. . . . . Confirm . . . . . OFF

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M).**

- 4. GPWS TERR pb . . . . . OFF
- 5. See Approach Procedures.

| STATUS                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| CAT II and III approach and RVSM flight not authorized.                                                                                                                                                                                                                                                                                                                                                                                   |                                                          |
| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                       | INOP SYS                                                 |
| <ul style="list-style-type: none"><li>• The control law will degrade to DIRECT LAW when the landing gear is lowered.</li><li>• Use FLAPS 3 for landing.</li><li>• GPWS LDG FLAP 3 . . . . ON<ul style="list-style-type: none"><li>• Use a V<sub>APP</sub> of V<sub>LS</sub> (FULL) plus 10 knots. Enter the increased V<sub>APP</sub> on the PERF APPR page.</li></ul></li><li>• LDG DIST PROC . . . . APPLY (refer to the ODM)</li></ul> | ADR 1+2<br>AP 1+2<br>A/THR<br>CAT 2<br>GPWS<br>GPWS TERR |

**NAV ADR 1+3 FAULT**

**Condition:** ADRs 1 and 3 are faulted or have been selected OFF.

**Note:** If all three ADRs display faults, go to ADR Fault (Triple), (QRH 11.24).

- |                                         |       |
|-----------------------------------------|-------|
| 1. AIR DATA SWTG . . . . .              | NORM  |
| 2. ATC/XPDR . . . . .                   | SYS 2 |
| 3. ADR 1 pb . . . . . Confirm . . . . . | OFF   |
| 4. ADR 3 pb . . . . . Confirm . . . . . | OFF   |

---

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M).**

---

- 5. GPWS TERR pb . . . . . OFF
- 6. Landing gear cannot be retracted and must be gravity extended.
- 7. See Approach Procedures.

▼ Continued on next page ▼

▼ NAV ADR 1+3 FAULT continued ▼

| STATUS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| CAT II and III approach and RVSM flight not authorized.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                        |
| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INOP SYS                                                                                               |
| <ul style="list-style-type: none"><li>• The control law will degrade to DIRECT LAW when the landing gear is lowered.</li><li>• Use FLAPS 3 for landing.</li><li>• GPWS LDG FLAP 3 . . . .ON<ul style="list-style-type: none"><li>• Use a V<sub>APP</sub> of V<sub>LS</sub> (FULL) plus 10 knots. Enter the increased V<sub>APP</sub> on the PERF APPR page.</li></ul></li><li>• LDG DIST PROC . . . .APPLY (refer to the ODM)</li></ul> <p><b>When landing gear extension is desired:</b></p> <ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN handcrank three turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . . DOWN</li><li>• Check for proper gear down indications.</li></ul> | ADR 1+3<br>AP 1+2<br>A/THR<br>CAT 2<br>GPWS<br>GPWS TERR<br>L/G RETRACT<br>N.W. STEER<br>RUD TRV LIM 1 |
| <div>Caution! Nose wheel steering is lost.</div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                        |

## NAV ADR 2+3 FAULT

**Condition:** ADRs 2 and 3 are faulted or have been selected OFF.

**Note:** If all three ADRs display faults, go to ADR Fault (Triple), (QRH 11.24).

- |                                         |       |
|-----------------------------------------|-------|
| 1. AIR DATA SWTG . . . . .              | NORM  |
| 2. ATC/XPDR . . . . .                   | SYS 1 |
| 3. ADR 2 pb . . . . . Confirm . . . . . | OFF   |
| 4. ADR 3 pb . . . . . Confirm . . . . . | OFF   |

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M).**

5. See Approach Procedures.

| STATUS                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| <i>CAT II and III approach and RVSM flight not authorized.</i>                                                                                                                                                                                                                                                                                                                                               |                                                                                 |
| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                          | INOP SYS                                                                        |
| <ul style="list-style-type: none"> <li>The control law will degrade to DIRECT LAW when the landing gear is lowered.</li> <li>Use FLAPS 3 for landing.</li> <li>GPWS LDG FLAP 3 . . . . ON</li> <li>Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li> <li>LDG DIST PROC. . . . APPLY (refer to the ODM)</li> </ul> | ADR 2+3<br>AP 1+2<br>A/THR<br>CAT 2<br>FD 1+ 2<br>RUD TRV LIM 2<br>YAW DAMPER 1 |

**NAV ADR 1(2)(3) FAULT**

**Condition:** A single ADR is faulty or has been selected OFF.

**Note:** In the event of simultaneous ADR and IR FAULT of the same ADIRU, apply the ADR procedure first.

**Note:** ‘SPD’ and ‘ALT’ flags can be displayed on the captain’s PFD without triggering an ADR FAULT warning. In this case, apply the ADR 1 FAULT procedure

- ▶ If ADR 1 has faulted, or if ‘SPD’ and ‘ALT’ flags appear on the CAPT’s PFD:
  - AIR DATA SWTG . . . . . CAPT3
  - ADR 1 pb . . . . . Confirm . . . . . OFF
  - GPWS TERR pb . . . . . OFF
  - See Approach Procedures.



- ▶ If ADR 2 has faulted:
  - AIR DATA SWTG . . . . . F/O
  - ADR 2 pb . . . . . Confirm . . . . . OFF
  - BARO REF . . . . . CHECK

**Note:** When ADR 2 fails, both BARO reference channels are driven by the same FCU channel, therefore both FCU altimeter settings must be verified.

- See Approach Procedures.



▼ Continued on next page ▼

▼ NAV ADR 1(2)(3) FAULT continued ▼

- If ADR 3 has faulted:
- AIR DATA SWTG . . . . . NORM
  - ADR 3 pb . . . . Confirm . . . . . OFF
  - See Approach Procedures.

**STATUS**

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i> | <i>INOP SYS</i>                                                                  |
|----------------------------|----------------------------------------------------------------------------------|
|                            | ADR 1(2)(3)<br>CAT 3 DUAL<br>GPWS (if ADR 1 Fault)<br>GPWS TERR (if ADR 1 Fault) |

---

**NAV ALTI DISCREPANCY**

---

**Condition:** The difference between the altitudes displayed on the captain's PFD and first officer's PFD exceeds a preset limit.

1. Crosscheck/set appropriate altimeter settings (QNH).

► If the discrepancy remains:

- Determine the erroneous indication by crosschecking the PFD altitude indications against the standby altimeter.
- Disregard the erroneous altitude indications.



---

**NAV ATT DISCREPANCY**

---

**Condition:** The difference between roll or pitch angles displayed on the captain's PFD and first officer's PFD exceeds a preset limit.

1. Determine the faulty system by comparing the attitude displayed on both PFDs against the standby horizon.

2. SWITCHING ATT HDG . . . . . Select faulty side.



**NAV BARO REF DISCREPANCY**

**Condition:** The difference between the two BARO QNH references has exceeded a preset limit, or one BARO reference is set to STD while the other set to QNH.

1. BARO REF. . . . . Crosscheck



**NAV CAPT (F/O) (STBY) AOA FAULT**

**Condition:** Failure of one of the angle of attack vanes.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.



# NAV FM / GPS POS DISAGREE

**Condition:** The difference between the positions calculated by the FMS and GPS have exceeded the preset limit.

1. A/C POS . . . . .CHECK

**Note:** This message is generated, when either one of the FM positions differ from either of the GPS positions by more than 0.5 minutes of latitude or longitude.

- ▶ If the message occurs during climb, cruise, or descent:
  - Check the navigation accuracy using raw data.
    - > If the FM position being used for navigation is correct:
      - Continue to use of the ND ARC/ROSE NAV mode.
    - > If the FM position being used for navigation is not correct:
      - Use HDG/TRK and raw data for navigation.
      - Consider switching off the GPWS TERR pb.

▼ Continued on next page ▼

▼ NAV FM / GPS POS DISAGREE continued ▼

- **When** possible, compare the FM position versus the GPIRS position, on the POSITION MONITOR page.
  - > If one FM position agrees with the GPIRS position on the POSITION MONITOR page:
    - Use the associated FD/AP.
  - > If neither FM positions agree with the GPSIRS:
    - On the SELECTED NAVAIDS page, deselect GPS, and revert to basic information.
- ▶ If the message appears on final of an ILS or LOC approach:
  - Continue the approach if LOC is green on FMA.
- ▶ If the message appears during an APPR NAV non-ILS approach:
  - VOR, NDB, RNAV (GPS) and RNAV (RNP): A go-around is required unless the landing runway is in sight.



NAV GPS 1 (2) FAULT

**Condition:** One Global Positioning System is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

STATUS

|  |          |
|--|----------|
|  | INOP SYS |
|  | GPS 1(2) |



NAV GPWS FAULT

**Condition:** GPWS fault.

1. GPWS SYS . . . . . OFF

**Note:** The terrain features of EGPWS are still functional.

STATUS

|  |          |
|--|----------|
|  | INOP SYS |
|  | GPWS     |



## NAV GPWS TERR DET FAULT

**Condition:** The terrain detection function of the GPWS is inoperative.

1. GPWS TERR pb . . . . . OFF

**Note:** The basic GPWS modes are still functional.

### STATUS

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | GPWS TERR       |



## NAV HDG DISCREPANCY

**Condition:** The difference between the heading on captain's and first officer's display exceeds a preset limit.

1. Determine the faulty system by comparing the three ADIRS CDU headings with the headings displayed on the PFDs and the standby compass.
2. SWITCHING ATT HDG . . . select faulty side on 3



## NAV IAS DISCREPANCY

**Condition:** The difference between the indicated airspeed sensed by the number 1 system and the number 2 system has exceeded the preset limit.

1. AIRSPEED..... Crosscheck

**Note:** Cross check the IAS information on both PFDs and the standby airspeed indicator to determine the faulty system.

2. AIR DATA SWTG . . . . . As required

*CAT III approach not authorized.*



## NAV ILS 1+2 FAULT

**Condition:** Both ILS 1+2 are faulty.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for guidance.
- ▶ If in flight:
  - ILS approach capability is lost.

## STATUS

*CAT II or III approach not authorized.*

|  |          |
|--|----------|
|  | INOP SYS |
|  | ILS 1 +2 |
|  | GPWS     |



**NAV ILS 1 (2) FAULT**

**Condition:** ILS 1 or 2 is faulty.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

*CAT II or III approach not authorized.*

|  |                          |
|--|--------------------------|
|  | INOP SYS                 |
|  | ILS 1 (2)                |
|  | GPWS (if ILS 1 affected) |



NAV IR DISAGREE

Condition: With one IR failed, a disagreement occurs between the other two IRs.

**Caution! The flight control law has degraded to DIRECT LAW.**

1. Cross-check the attitude on both PFDs against the standby horizon to determine the faulty IR.
- ▶ If a disagreement is confirmed:
    - Faulty IR SEL knob . . . Confirm . . . . OFF
    - ELAC 2 . . . . . OFF for 5 seconds, then ON
    - ELAC 1. . . . . OFF for 5 seconds, then ON

**Caution! After corrective action (faulty IR switched off and ELACs reset), control laws should revert to ALTERNATE LAW. Do Not exceed 320 knots.**

- ▶ If a disagreement is not confirmed:
    - Leave the two IRs ON.
- The flight control system will remain in DIRECT LAW.

| STATUS                                     |          |
|--------------------------------------------|----------|
| APPROACH PROCEDURES                        | INOP SYS |
| 1. Refer to “F/CTL DIRECT LAW” on page 9.5 |          |



---

**NAV IR 1+2 FAULT**

---

**Condition:** IRs 1+2 are faulted.

**Note:** If an IR FAULT message is displayed simultaneously with an ADR FAULT message for same ADIRU, apply the ADR procedure first.

---

**Caution!** **ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M). All protections, except maneuver protection, are lost.**

---

- ATT HDG SWTG . . . . . CAPT 3

---

**Caution!** **The attitude information on the FO's PFD is lost.**

---

- ▶ If the FAULT indication in the IR(s) is flashing, the IR(s) may still have ATT capability:
  - Refer to 'IR Alignment in ATT Mode' procedure QRH 11.17 or Vol 1 SP.11.
- ▶ If the FAULT indication in the IR(s) is steady, ATT mode is unavailable.
  - See Approach Procedures.



*CAT II or III approach not authorized.*

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▼ Continued on next page ▼

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▼ NAV IR 1+2 FAULT continued ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                  | <i>INOP SYS</i>                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• The control law will degrade to DIRECT LAW when landing gear is lowered.</li><li>• Use FLAPS 3 for landing.</li><li>• GPWS LDG FLAP 3 . . . . ON</li><li>• Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li><li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li></ul> | AP 1+2<br>A/THR<br>CAT 2<br>F/CTL PROT<br>GPWS TERR<br>IR 1+2 |

---

**NAV IR 1+3 FAULT**

---

**Condition:** IRs 1+3 are faulted.

**Note:** If an IR FAULT message is displayed simultaneously with an ADR FAULT message for same ADIRU, apply the ADR procedure first.

---

**Caution! ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M). All protections, except maneuver protection, are lost.**

---

- ATT HDG SWTG . . . . . NORM

---

**Caution! The attitude information is lost on either the CAPT's OR FO's PFD.**

---

- ▶ If the FAULT indication in the IR(s) is flashing, the IR(s) may still have ATT capability:
  - Refer to 'IR Alignment in ATT Mode' procedure QRH 11.17 or Vol 1 SP.11.
- ▶ If the FAULT indication in the IR(s) is steady, ATT mode is unavailable.
  - See Approach Procedures.



*CAT II or III approach not authorized.*

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▼ Continued on next page ▼

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▼ NAV IR 1+3 FAULT continued ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                | <i>INOP SYS</i>                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• The control law will degrade to DIRECT LAW when landing gear is lowered.</li><li>• Use FLAPS 3 for landing.</li><li>• GPWS LDG FLAP 3 . . . ON</li><li>• Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li><li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li></ul> | AP 1+2<br>A/THR<br>CAT 2<br>F/CTL PROT<br>GPWS TERR<br>IR 1+3<br>YAW DAMPER 1 |

**NAV IR 2+3 FAULT**

**Condition:** IRs 2+3 are faulted.

**Note:** If an IR FAULT message is displayed simultaneously with an ADR FAULT message for same ADIRU, apply the ADR procedure first.

**Caution!** **ALTERNATE LAW is active. Do not exceed 320 knots (or 0.77M). All protections, except maneuver protection, are lost.**

- ATT HDG SWTG . . . . . NORM

**Caution!** **The attitude information is lost on either the CAPT's or FO's PFD.**

- ▶ If the FAULT indication in the IR(s) is flashing, the IR(s) may still have ATT capability:
  - Refer to 'IR Alignment in ATT Mode' procedure QRH 11.17 or Vol 1 SP.11.
- ▶ If the FAULT indication in the IR(s) is steady, ATT mode is unavailable.
  - See Approach Procedures.



CAT II or III approach not authorized.

▼ Continued on next page ▼

▼ NAV IR 2+3 FAULT continued ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                  | <i>INOP SYS</i>                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>• The control law will degrade to DIRECT LAW when landing gear is lowered.</li><li>• Use FLAPS 3 for landing.</li><li>• GPWS LDG FLAP 3 . . . . ON</li><li>• Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li><li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li></ul> | AP 1+2<br>A/THR<br>CAT 2<br>F/CTL PROT<br>GPWS TERR<br>IR 2+3<br>YAW DAMPER 2 |

**NAV IR 1(2)(3) FAULT**

**Condition:** A single IR is faulty.

**Note:** If an IR FAULT message is displayed simultaneously with an ADR FAULT message for same ADIRU, apply the ADR procedure first.

- ▶ If IR 1 is faulty:
  - ATT HDG SWTG . . . . . CAPT 3
  - > If the FAULT indication in the IR is flashing, the IR may still have ATT capability:
    - Refer to 'IR Alignment in ATT Mode' procedure QRH 11.17 or Vol 1 SP.11.
  - > If the FAULT indication in the IR is steady, ATT mode is unavailable.
  - See Approach Procedures.



- ▶ If IR 2 is faulty:
  - ATT HDG SWTG . . . . . F/O
  - > If the FAULT indication in the IR is flashing, the IR may still have ATT capability:
    - Refer to 'IR Alignment in ATT Mode' procedure QRH 11.17 or Vol 1 SP.11.
  - > If the FAULT indication in the IR is steady, ATT mode is unavailable.
  - See Approach Procedures.



▼ Continued on next page ▼

▼ NAV IR 1 (2)(3) FAULT continued ▼

- ▶ If IR 3 is faulty:
  - ATT HDG SWTG . . . . . NORM
  - > If the FAULT indication in the IR is flashing, the IR may still have ATT capability:
    - Refer to ‘IR Alignment in ATT Mode’ procedure QRH 11 or Vol 1 SP.11.
  - > If the FAULT indication in the IR is steady, ATT mode is unavailable.
  - See Approach Procedures.

**STATUS**

*CAT III approach not authorized.*

| APPROACH PROCEDURES | INOP SYS                                                 |
|---------------------|----------------------------------------------------------|
|                     | IR 1(2)(3)<br>CAT 3 DUAL<br>GPWS TERR (if IR 1<br>Fault) |

**NAV RA DEGRADED**

**Condition:** A significant difference occurred between the two radio altimeters.

**Note:** This ECAM message will only be displayed after landing.

► Consult with Dispatch/Maintenance Control.



NAV RA 1(2) FAULT

**Condition:** One or both radio altimeters have failed.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight and a single RA has failed:

**STATUS**

*CAT II or III approach not authorized.*

|  |                         |
|--|-------------------------|
|  | INOP SYS                |
|  | CAT III                 |
|  | RA 1 (2)                |
|  | GPWS (if RA 1 affected) |



- ▶ If in flight and **both** RAs have failed:

**Caution! The following should be considered prior to approach.**

- ILS GS capture function (AP and FD) unavailable.
- Flight controls degrade to DIRECT LAW when gear extended.
- Plan on a flaps 3 landing.
- Autopilot unavailable after gear extension.
- Auto callouts unavailable (includes “RETARD” callout).

▼ Continued on next page ▼

▼ NAV RA 1 (2) FAULT continued ▼

Approach options:

- RNAV (GPS or GNSS), VOR or NDB utilizing APPR mode
- ILS utilizing LOC & FPA mode
- Visual approach

**STATUS**

*Autolands and CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                          | INOP SYS                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. Use a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 10 knots. Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li> <li>2. GPWS LDG FLAP 3 . . . . ON</li> <li>3. LDG DIST PROC . . . APPLY (refer to the ODM)</li> <li>4. Extend flaps to 1 then 2 and slow in managed speed.</li> </ol> | <p>AUTO CALL OUT<br/>AP 1+2 (when landing gear down)<br/>RA 1+2<br/>GPWS</p> |
| <p><b>Caution!</b> AP will disconnect and controls will degrade to DIRECT LAW when gear extended.</p>                                                                                                                                                                                                                                                        |                                                                              |
| <ol style="list-style-type: none"> <li>5. When slowed, extend gear.</li> <li>6. Select FLAPS 3 for landing.</li> </ol> <p><b>Note:</b> If FLAPS 3 selected before gear is down, the gear warning will occur.</p>                                                                                                                                             |                                                                              |



**NAV STBY AOA FAULT**

**Condition:** The standby angle of attack probe heat has failed.

- 1. If the standby instruments are used, monitor the air data information.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | STBY AOA        |



**NAV TCAS FAULT**

**Condition:** TCAS has failed.

- ▶ If on the ground:
  - Reset the system as shown on page NNOI.1.10, TCAS, Computer Resets.
- ▶ If in flight:
  - Crew awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | TCAS            |



**NAV TCAS STBY**

**Condition:** TCAS is set to standby in flight.

1. Transponder . . . . . RA/TA

**Note:** If transponder fail light illuminated, select opposite transponder 1 or 2.



**Weather Radar Fault**

**Condition:** There is a malfunction with the weather radar.

A malfunction of the weather radar system will normally cause one of the following Fault Messages to be displayed on the ND:

- TR (Red) indicates a radar transceiver failure.
- ANT (Red) indicates a radar antenna failure.
- CTL (Red) indicates a radar control unit failure.
- RNG (Red) indicates an error in the range.
- WEAK (Amber) indicates a calibration failure
- ATT (Amber) indicates an attitude control failure.
- STAB (Amber) indicates an antenna stabilization failure.

1. Radar system switch . . . . . OFF for 10 or more seconds, then ON.

► If the radar system returns to normal:



> If the fault remains:

- Avoid convective activity. Ensure flight safety and passenger comfort.
- Consult with Dispatch regarding the en route weather. Use all available resources (meteorology, ATC, FSS, HIWAS etc.) to determine the best plan of action.
- If the flight cannot be continued safely, coordinate a diversion or hold until the conditions improve.



## Non-Normal Checklists

## Chapter NNC

### Fuel

### Section 12

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## Fuel System ECAM Advisories

**Condition:** A system parameter exceeds its normal range, the associated E/WD page is displayed, and the affected parameter pulses in green.

| <b>FUEL Advisory Displayed</b>                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Condition                                                                                    | Recommended Action                                                                                                                                                                                                                                                                                                                                                                                                   |
| Difference between wing fuel tank quantities $\geq 3,307$ lbs                                | <ul style="list-style-type: none"> <li>• Total fuel quantity Check against flight plan</li> <li>&gt; If fuel leak suspected:                             <ul style="list-style-type: none"> <li>• See “Fuel Leak” on page 12.10</li> </ul> </li> <li>&gt; If NO fuel leak suspected:                             <ul style="list-style-type: none"> <li>• See “Fuel Balancing,” Vol. 1, SP.12</li> </ul> </li> </ul> |
| Inner tank fuel temp $> 45^{\circ}\text{C}$ , or outer tank fuel temp $> 55^{\circ}\text{C}$ | <ul style="list-style-type: none"> <li>• Galley pb . . . . . OFF</li> </ul>                                                                                                                                                                                                                                                                                                                                          |
| Inner or outer fuel temp $< - 40^{\circ}\text{C}$                                            | <ul style="list-style-type: none"> <li>• Descend to lower altitude and/or increase Mach to increase TAT</li> </ul>                                                                                                                                                                                                                                                                                                   |



**FUEL APU LP VALVE FAULT**

**Condition:** The APU low pressure fuel valve disagrees with the commanded position.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** This message may be triggered after an APU emergency or auto shutdown. Recycling the APU MASTER SW (ON then OFF) may clear the warning.



## FUEL AUTO FEED FAULT

**Condition:** The center tank has more than 550 lbs and the left or right wing tank has less than 11,000 lbs; or the center tank pumps did not shut off after slat extension or after the center tank is emptied.

**Note:** Disregard this message if it appears only during the refueling process.

If it remains after refueling is complete due to an abnormal fuel load, see Vol. 1, SP.12, Non-Standard Fuel Distributions.

**Note:** Although rare, fuel migration into the center tank from the inner wing tanks could occur, resulting in an AUTO FEED FAULT ECAM message. Apply the AUTO FEED FAULT procedure and make a logbook write-up.

1. FUEL MODE SEL . . . . . MAN

**Note:** The message CTR TK FEED MAN ONLY will appear on the STATUS page.

► If the center tank pumps continue to operate after the slats are extended or after the center tank is emptied:

- CTR TK PUMP 1 . . . . . OFF
- CTR TK PUMP 2 . . . . . OFF



▼ Continued on next page ▼

▼ **FUEL AUTO FEED FAULT continued** ▼

- ▶ If the fuel in either wing is less than 11,000 lbs and there is more than 550 lbs in the center tank:
  - CTR TK PUMP 1 . . . . . Verify ON
  - CTR TK PUMP 2 . . . . . Verify ON

**Note:** The center tank pumps will operate and feed the engines.

**Note:** The CTR TK PUMP LO PR warning will annunciate when the center tank is empty.

- > If CTR TK PUMP LO PR warning annunciates:
  - Both CTR TK PUMPS . . . . . OFF

On approach:

- CTR TK PUMPS . . . . . OFF
- 

FUEL CTR TK PUMP 1 (2) LO PR

**Condition:** One center tank fuel pump is inoperative.

1. FUEL X FEED. . . . . ON  
2. CTR TK PUMP (affected side) . . . . . OFF

**Note:** FUEL X FEED pb should be selected to OFF when the center tank is empty to avoid a possible fuel imbalance.

**Note:** ECAM message CTR TK PUMP 1(2) LO PR may be displayed when center tank quantity is low (<550 pounds) and the center tank pumps are in AUTO mode. Select pump(s) OFF and disregard warnings.

STATUS

|  |                   |
|--|-------------------|
|  | INOP SYS          |
|  | CTR TK PUMP 1 (2) |



**FUEL CTR TK PUMPS LO PR**

**Condition:** Both center tank fuel pumps are inoperative.

- 1. CTR TK PUMP 1 . . . . . OFF
- 2. CTR TK PUMP 2 . . . . . OFF

**Caution!** The fuel remaining in the center tank is unusable since gravity feed from the center fuel tank is not possible.

**Note:** Selecting the FUEL MODE SEL to MAN will prevent repetitive warnings.

**Note:** ECAM message CTR TANK PUMPS LO PR may be displayed when center tank quantity is low (<550 pounds) and the center tank pumps are in AUTO mode. Select pumps OFF and disregard warnings.

**Note:** FUEL X FEED pb should be selected to OFF to prevent a fuel imbalance.

**STATUS**

|  |              |
|--|--------------|
|  | INOP SYS     |
|  | CTR TK PUMPS |



**FUEL CTR TK PUMPS OFF**

**Condition:** The center tank pump pbs are selected off with slats retracted and no fault exists.

1. CTR TK PUMP 1 . . . . . ON
2. CTR TK PUMP 2 . . . . . ON



**FUEL ENG 1 (2) LP VALVE OPEN**

**Condition:** The engine low pressure fuel valve disagrees with the selected position and is in the open position.

- ▶ If on the ground:
  - Maintenance action is required.
- ▶ If in flight:
  - Crew awareness.

**Note:** The LP valve may be closed by activation of the FIRE pb or the ENG MASTER switch.



**FUEL FQI CH 1 (2) FAULT**

**Condition:** A fault has been detected in one channel of the FQI.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** For additional guidance, see Volume 1, Supplementary Procedures, Fuel section.

**FUEL IDG 1 (2) COOL FAULT**

**Condition:** Failure of the fuel return valve.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.



**FUEL INERTING SYS FAULT**

**Condition:** The fuel tank inerting system is inoperative.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness

**STATUS**

*APPROACH PROCEDURES*

*INOP SYS*

FUEL INERT



**Fuel Leak**

**Condition:** Fuel spray is observed from either the engine or the wing tip, the total fuel quantity or a single tank quantity is decreasing at an abnormal rate, excessive fuel flow indications are noted, fuel fumes are smelled in the aircraft, an unusual fuel imbalance has developed, the FOB + F.USED is much less than the departure FOB, or “DEST EFOB BELOW MIN” appears on the MCDU scratchpad.

---

---

**Warning! Land As Soon As Possible. [AFM]**

---

---

1. Attempt to determine the source of the fuel leak.  
[AFM]
  - Inspect the engine/wing areas.
  - Monitor engine instruments for signs of a leak (excessive fuel flow, total fuel quantity decreases at an abnormal rate, fuel imbalance develops, check for a fuel odor in the cabin, etc.)
2. Write down the fuel quantity in each of the tanks and monitor fuel consumption/balance to determine the location of the leak and usable fuel.  
[AFM]

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

- ▶ If a fuel leak in the engine/pylon area is confirmed (excessive fuel flow indication, or observed spray), shut that engine down:
  - THRUST LEVER  
(affected engine). . . . Confirm. . . . . IDLE
  - ENG MASTER switch  
(affected engine). . . Confirm. . . . . OFF

**Note:** If the fuel leak stops after shutting down the engine, the FUEL X FEED may be used as required to balance and use fuel from both wings.

**After engine shut down:**

- APU (if available) . . . . . Start
- APU BLEED . . . . . off
- > If wing anti-ice is required:
  - PACK pb (affected side) . . . . . OFF
  - WING Anti Ice . . . . . ON
- ENG HYD PUMP pb  
(affected engine) . . . . Confirm . . . . . OFF  
(to prevent spurious ECAM messages)
- X BLEED selector . . . . . OPEN
- ENG MODE SEL . . . . . IGN
- Do not restart the engine.
- See Approach Procedures.

**Note:** Even with maximum fuel imbalance (one wing full, one empty), there is no special procedure required for landing.

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

| STATUS                                                                                                                                |                                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| APPROACH PROCEDURES                                                                                                                   | INOP SYS                                                          |
| 1. LDG DIST PROC . . .APPLY (refer to ODM)                                                                                            | CAT 3 DUAL<br>GEN 1(2)                                            |
| 2. For performance, delay landing configuration (gear down and flaps 3 or FULL) until <u>established on final descent</u> to landing. | REVERSER 1(2)<br>ENG 1(2) BLEED<br>G ENG 1 PUMP (or Y ENG 2 PUMP) |
| 3. One pack only if wing anti-ice ON.                                                                                                 | ALPHA FLOOR<br>(Flap lever position 1 or greater)*                |
| <b>Note:</b> Alpha Floor protection is not available with an engine out and flaps/slats extended.                                     | * Item not listed on the ECAM STATUS page.                        |

- If the location of the fuel leak is in the wing area or cannot be identified:
- **FUEL X FEED valve . . . . .Confirm CLOSED**  
**Note:** This prevents leak from affecting both sides.
  - CTR TK PUMPS . . . . . OFF
  - **Monitor the depletion rate of the inner tanks.**
    - > If one inner tank depletes faster than the opposite inner tank by at least 660 lbs in less than 30 minutes, an engine fuel leak may still be suspected. Accomplish the following:

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

- THRUST LEVER  
(affected engine). . Confirm. . . . . IDLE
  - ENG MASTER switch  
(affected engine). . Confirm. . . . . OFF
  - Both CTR TK PUMPS . . . . . ON
  - Monitor the fuel leak.
    - >> If the leak stops:
      - Use the FUEL X FEED as required to balance and use fuel from both wings.
      - Proceed to the “**After engine shut down**” step at the top of the previous page.
    - >> If the leak continues after shutting down the engine (inner tank on affected side continues to decrease), a leak from the wing is suspected.
      - Do not open the FUEL X FEED valve, even if called for by another ECAM procedure.
      - Do not attempt to balance fuel. [AFM]
- Note:** Even with maximum fuel imbalance (one wing full, one empty), there is no special procedure required for landing.

▼ Continued on next page ▼

▼ Fuel Leak continued ▼

- Consider engine relight.
  - >> If performing an engine relight see “Engine Relight” on page 7.74.
  - >> If NOT performing an engine relight
    - See **“After engine shut down:” on page 12.11**
- > If both inner tanks deplete at a similar rate, a leak from the APU feed line or center tank is suspected.
  - >> If there is a fuel smell in the cabin:
    - APU MASTER SW . . . . . OFF  
■ ■ ■ ■
  - >> If there is NO fuel smell in the cabin:
 

**When** the fuel quantity in one inner tank is less than 6,600 lbs:

    - Both CTR TK PUMPS . . . . . ON  
■ ■ ■ ■
- If a fuel leak cannot be confirmed but the total fuel quantity continues to decrease at an abnormally high rate, a fuel indication problem is suspected.
  - Ensure that the X FEED VALVE remains closed.
  - Pull then push the following C/Bs:
 

FUEL FQI CHAN 1 (A13)

FUEL FQI CHAN 2 (M27)
  - Monitor the fuel quantity/distribution and continue to search for a possible fuel leak.  
■ ■ ■ ■

## **FUEL LO LVL DET FAULT**

Condition: Failure of low level sensor in inner tank.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew awareness.



**FUEL L (R) INNER TK HI TEMP**

**Condition:** The inner cell fuel temperature has exceeded the ground limit or the in flight limit.

- ▶ If the aircraft is on the ground:
  - GALLEY pb. . . . . OFF

**Note:** Reducing electrical loads will reduce the heat produced in the IDG. Minimizing taxi time will also assist fuel temperature control. Delay takeoff until the fuel temperature is within limits.

- > If the temperature reaches 54°C in the inner cell:
  - Shut down the engine on the affected side.



- ▶ If the aircraft is in flight:
  - GALLEY pb. . . . . OFF

**Note:** Reducing electrical loads will reduce the heat produced in the IDG.

**Note:** Prior to disconnecting A/THR, first match the THR LVR with the actual N1 to avoid a rapid thrust increase.

- Autothrust. . . . . Disconnect

▼ Continued on next page ▼

▼ FUEL L (R) INNER TK HI TEMP continued ▼

- Thrust lever (affected side) . . . . . Advance  
**Note:** This action will increase fuel flow through the heat exchanger and decrease the temperature of the fuel returning to the outer cell.
- > If the temperature exceeds 57°C in the inner cell:
  - Start the APU (if available).
    - >> If the opposite generator and the APU generator are available:

Press the IDG pb until the GEN FAULT light comes on but not for more than 3 seconds.



- IDG (affected). . . Confirm. . . . . OFF



**FUEL L (R) INNER TK LO TEMP**

**Condition:** The temperature of the fuel in the inner tank is lower than the preset limit.

- ▶ If the aircraft is in flight:
  - Consider descending/re-routing into warmer air and/or increasing cruise Mach to increase TAT.



- ▶ If the aircraft is on the ground:
  - Do not takeoff until the fuel temperature is within limits.



**FUEL L (R) OUTER TK HI TEMP**

**Condition:** The outer cell fuel temperature has exceeded the ground limit or the in flight limit.

► If the aircraft is on the ground:

- GALLEY pb. . . . . OFF

**Note:** Reducing electrical loads will reduce the heat produced in the IDG. Minimizing taxi time will also assist fuel temperature control. Delay takeoff until the fuel temperature is within limits.

- > If the fuel temperature in the outer cell reaches 60°C:

- Shut down the engine on the affected side.



► If the aircraft is in flight:

- GALLEY pb. . . . . OFF

**Note:** Reducing the electrical loads will reduce the heat produced in the IDG and thereby lower fuel temperature.

**Note:** Prior to disconnecting A/THR, first match the THR LVR with the actual N1 to avoid a rapid thrust increase.

- Autothrust. . . . . Disconnect

▼ Continued on next page ▼

▼ **FUEL L (R) OUTER TK HI TEMP continued** ▼

- Thrust lever (affected side) . . . . . Advance

**Note:** This action will increase fuel flow through the heat exchanger and decrease the temperature of the fuel returning to the outer cell.

- > If the fuel temperature in the outer cell exceeds 65°C:
  - Start the APU (if available).
  - >> If the opposite generator and the APU generator are available:

Press the IDG pb until the GEN FAULT light comes on but not for more than 3 seconds.



- IDG (affected). . . Confirm . . . . . OFF



**FUEL L (R) OUTER TK LO TEMP**

**Condition:** The temperature of the fuel in the outer tank is lower than the preset limit.

- ▶ If the aircraft is in flight:
  - Consider descending/re-routing into warmer air and/or increasing cruise Mach to increase TAT.



- ▶ If the aircraft is on the ground:
  - Do not takeoff until the fuel temperature is within limits.



**FUEL L (R) OUTER VALVE CLOSED**

**Condition:** One or both transfer valves have failed to open after the inner cell has reached low level.

- ▶ If FUEL L (R) OUTER VALVE CLOSED is annunciated:
  - Reset the system as shown on page NNOI.1.9, FQI, Computer Resets.

**Note:** When the fuel quantity in the affected wing reaches a low level, corresponding WING TK LO LVL warning will be triggered.

**Caution! Outer cell fuel is unusable on the affected side(s).**

- ▶ If the fuel is trapped on one side only:
  - Ensure that the fuel quantity in the wing without trapped fuel (outer + inner) remains approximately equal to the quantity of the fuel in the wing with trapped fuel (outer + inner).

**STATUS**

|  |                            |
|--|----------------------------|
|  | INOP SYS                   |
|  | L (R) OUTER TK<br>UNUSABLE |



FUEL L (R) OUTER VALVE OPEN

**Condition:** One transfer valve has opened prior to the inner cell low level being reached.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** Disregard amber transfer valve indications that occur in a steep descent unless the FUEL L (R) OUTER VALVE OPEN message is displayed.

**STATUS**

|  |                  |
|--|------------------|
|  | INOP SYS         |
|  | L (R) CELL VALVE |



FUEL L (R) TK PUMP 1 (2) LO PR

**Condition:** One wing fuel tank pump has low pressure.

1. TK PUMP pb (affected pump) . . . . . OFF

**STATUS**

|  |                    |
|--|--------------------|
|  | INOP SYS           |
|  | TK PUMP (affected) |



**FUEL L (R) TK PUMP 1 + 2 LO PR**

**Condition:** Both boost pumps in one wing tank are inoperative.

**Caution!** This ECAM message may be the result of a fuel leak. If a fuel leak is suspected, ensure FUEL X FEED is closed and see “Fuel Leak” on page 12.10.

- ▶ If the center fuel tank is not empty:
  - FUEL MODE SEL pb. . . . . MAN  
(to ensure the center tank pumps run.)
  - TK PUMPS 1 and 2 (affected side) . . . . . OFF
  - Monitor the fuel quantity in the center tank.
- ▶ If (**When**) the center fuel tank is empty (CTR TK pumps OFF):
  - > If above 15,000 feet:
    - FUEL X FEED . . . . . ON
    - ENG MODE SEL . . . . . IGN
    - TK PUMPS 1 and 2 (affected side) . . . . . OFF
    - Monitor lateral fuel imbalance and comply with fuel limitations. (Vol 1 - Limitations)

**Note:** If the FUEL X FEED valve is not open, use the gravity feed procedures listed below.

**Note:** Consider terrain clearance and fuel imbalance in the flight continuation decision.

▼ Continued on next page ▼

▼ FUEL L (R) TK PUMP 1 + 2 LO PR continued ▼

- If (**When**) the affected wing tank's fuel is required for flight, use the following gravity feed procedures:
- > If above 15,000 feet
    - FUEL X FEED pb . . . . . ON
    - ENG MODE SEL . . . . . IGN
    - Determine the gravity feed ceiling from the following chart and descend if necessary.

| Flight Conditions at time of Gravity Feeding       | Gravity Feed Ceiling |
|----------------------------------------------------|----------------------|
| Flight time above FL300 is more than 30 minutes    | Current FL*          |
| Flight time above FL300 is less than 30 minutes    | FL300*               |
| Flight level never exceeded FL300                  | FL150 MSL*           |
| * JET B fuel: gravity feed ceiling is 10,000 feet. |                      |

When at the gravity feed ceiling:

- FUEL X FEED pb . . . . . OFF
- FUEL MODE SEL  
(if previously selected to MAN). . . . . AUTO
- Avoid any negative G load factors.

**STATUS**

|  |          |
|--|----------|
|  | INOP SYS |
|  | TK PUMPS |



**FUEL L (R) WING TK LO LVL**

**Condition:** The respective fuel tank has less than 1,650 pounds of fuel remaining.

1. FUEL MODE SEL ..... MAN

► IF FUEL UNBALANCE:

- FUEL X FEED . . . . . ON
- TK PUMP 1 (affected side) . . . . . OFF
- TK PUMP 2 (affected side) . . . . . OFF

**Caution! This ECAM message may be the result of a fuel leak. If a fuel leak is suspected:**

**Ensure FUEL X FEED is closed.**

**See “Fuel Leak” procedure on page 12.10.**

- ▶ If the center fuel tank is not empty:
  - FUEL MODE SEL pb. . . . . MAN
  - CTR TK PUMP pbs. . . . . Verify ON



- If the center fuel tank is empty and a fuel imbalance condition exists:

**Caution! Ensure the FUEL X FEED is closed if a leak is suspected in the engine feed system.**

▼ Continued on next page ▼

▼ FUEL L (R) WING TK LO LVL continued ▼

STATUS

|                                                                                                     |                |
|-----------------------------------------------------------------------------------------------------|----------------|
|                                                                                                     | INOP SYS       |
| L (R) TK GRVTY FEED ONLY                                                                            | L (R) TK PUMPS |
| <div> <div>► If center tank not empty:</div> <div> <div>• CTR TK FEED: MAN ONLY</div> </div> </div> |                |



**FUEL L (R) XFR VALVE CLOSED**

**Condition:** One or both transfer valves have failed to open after the inner cell has reached low level.

- ▶ If FUEL L (R) XFR VALVE CLOSED is annunciated:
  - Reset the system as shown on page NNOI.1.9, FQI, Computer Resets.

**Note:** When the fuel quantity in the affected wing reaches a low level, corresponding WING TK LO LVL warning will be triggered.

**Caution! Outer cell fuel is unusable on the affected side(s).**

- ▶ If the fuel is trapped on one side only:
  - Ensure that the fuel quantity in the wing without trapped fuel (outer + inner) remains approximately equal to the quantity of the fuel in the wing with trapped fuel (outer + inner).

**STATUS**

|  |                            |
|--|----------------------------|
|  | INOP SYS                   |
|  | L (R) OUTER TK<br>UNUSABLE |



## FUEL L (R) XFR VALVE OPEN

**Condition:** One transfer valve has opened prior to the inner cell low level being reached.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**Note:** Disregard amber transfer valve indications that occur in a steep descent unless the FUEL L (R) XFR VALVE OPEN message is displayed.

### STATUS

|  |                  |
|--|------------------|
|  | INOP SYS         |
|  | L (R) CELL VALVE |



## FUEL L + R WING TK LO LVL

**Condition:** A low level is detected in both wing inner cells (remaining flight time is about 30 minutes).

**Warning! Land As Soon As Possible.**

1. FUEL MODE SEL pb . . . . . MAN
2. All FUEL TK PUMPs. . . . . Verify ON
3. FUEL X FEED pb . . . . . OFF



**Fuel Quantity Indicating System  
Degraded**

**Condition:** FOB indication on the E/WD is shown with two amber dashes across the last two digits. Fuel quantity indicating system accuracy is reduced.

- If on ground:
- Consult with Dispatch/Maintenance Control for possible MEL relief.



- If in flight:
1. Determine the tank(s) affected by referencing the FUEL systems display page.
  2. Consider the maximum possible fuel inaccuracy:
    - For each wing outer cell affected: . . . 440
    - For each wing inner cell affected: . . . 240
    - Center tank affected: . . . . . 290
    - For all tanks affected: . . . . . 1660
  3. Plan/operate the flight based upon the lowest possible fuel (FOB less possible tank inaccuracy).
  4. Plan landing distance based on the highest possible total fuel (FOB plus possible tank inaccuracy).



**FUEL X FEED VALVE FAULT**

**Condition:** The fuel cross feed valve disagrees with the commanded position.

- ▶ If the valve has failed OPEN:
  - Maintain fuel balance with the selective use of tank pumps.



- ▶ If the valve has failed CLOSED:
  - > If unable to maintain an acceptable fuel balance:
    - Land as soon as practical.

**STATUS**

|  |             |
|--|-------------|
|  | INOP SYS    |
|  | FUEL X FEED |



**Gravity Feed Procedure**

**Condition:** Gravity fuel feeding is required due to another non-normal procedure.

1. ENG MODE SEL . . . . . IGN

**Note:** Avoid negative G factors.

2. Determine Gravity Feed Ceiling from the following chart and descend if necessary.

| Flight Conditions at time of Gravity Feeding       | Gravity Feed Ceiling |
|----------------------------------------------------|----------------------|
| Flight time above FL300 is more than 30 minutes    | Current FL *         |
| Flight time above FL300 is less than 30 minutes    | FL300 *              |
| Flight level never exceeded FL300                  | 15,000 *             |
| * JET B fuel: gravity feed ceiling is 10,000 feet. |                      |

3. When at the gravity feed ceiling:
- FUEL X FEED pb . . . . . Verify OFF (lights out)
  - FUEL MODE SEL . . . . . Verify AUTO (lights out)

**Caution!** Any fuel remaining in the center tank is unusable since gravity feeding from the center tank is not possible.



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**Condition:** The blue electric pump pressure is low.

- [illegible]

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                      | <i>INOP SYS</i>    |
|-----------------------------------------------------------------|--------------------|
| 1. LDG DIST PROC. . . APPLY<br>(refer to the ODM)<br>SLATS SLOW | BLUE HYD<br>SPLR 3 |



**HYD B ELEC PUMP OVHT**

**Condition:** The blue electric pump has overheated.

- 1. BLUE ELEC PUMP . . . . . OFF
- 2. See Approach Procedures:  
For Approach:
  - If BLUE OVHT is not annunciated:
    - BLUE ELEC PUMP . . . . . AUTO

**STATUS**

*CAT III approach not authorized.*

| APPROACH PROCEDURES                                             | INOP SYS           |
|-----------------------------------------------------------------|--------------------|
| 1. LDG DIST PROC . . . . .APPLY<br>(refer to ODM)<br>SLATS SLOW | BLUE HYD<br>SPLR 3 |



## HYD B RSVR LO AIR PR

**Condition:** The blue hydraulic reservoir air pressure is low.

- ▶ If the blue hydraulic pressure is fluctuating:
  - BLUE ELEC PUMP . . . . . OFF

**Note:** Since the probability of cavitation increases with altitude, it may be possible to restore the system after descending to a lower altitude.

- See Approach Procedures.

### STATUS

*CAT III approach not authorized (if the system is not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                      | INOP SYS           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 1. BLUE ELEC PUMP . . . AUTO<br>▶ If the hydraulic system is recovered: <ul style="list-style-type: none"> <li>• End.</li> </ul> ▶ If the hydraulic system is not recovered: <ul style="list-style-type: none"> <li>• BLUE ELEC PUMP . . . OFF</li> </ul> SLATS SLOW<br>• LDG DIST PROC . . APPLY<br>(refer to the ODM) | BLUE HYD<br>SPLR 3 |



## HYD B RSVR LO LVL

**Condition:** The blue hydraulic reservoir fluid quantity is low.

1. BLUE ELEC PUMP.....OFF

► If hydraulic quantity normal:

- BLUE ELEC PUMP . . . . . ON

Continue normal operation while monitoring hydraulic level.



- If hydraulic quantity low or decreasing:

- BLUE ELEC PUMP ..... OFF

2. See Approach Procedures.

## STATUS

*CAT III approach not authorized.*

| APPROACH PROCEDURES                                | INOP SYS           |
|----------------------------------------------------|--------------------|
| SLATS SLOW                                         | BLUE HYD           |
| 1. LDG DIST PROC . . . APPLY<br>(refer to the ODM) | SPLR 3<br>EMER GEN |



## HYD B RSVR OVHT

**Condition:** The blue hydraulic reservoir has overheated.

1. BLUE ELEC PUMP . . . . . OFF
2. See Approach Procedures.

### STATUS

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | INOP SYS                   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| <ul style="list-style-type: none"> <li>▶ If the blue hydraulic system overheat is out (no FAULT light):                             <ul style="list-style-type: none"> <li>• BLUE ELEC PUMP . . . AUTO</li> </ul> </li> <li>&gt; If the hydraulic system is recovered:                             <ul style="list-style-type: none"> <li>• End.</li> </ul> </li> <li>▶ If the blue hydraulic system overheat is still present:                             <p>SLATS SLOW</p> <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . APPLY<br/>(refer to the ODM)</li> </ul> </li> </ul> | <p>BLUE HYD<br/>SPLR 3</p> |



**HYD B + Y SYS LO PR**

**Condition:** The blue and yellow hydraulic system pressures are low.

- ▶ If the yellow system was lost by yellow reservoir low air pressure, reservoir low level, or reservoir overheat:
  - PTU . . . . . OFF
- ▶ If the yellow system was lost by engine 2 pump low pressure and the PTU is not operating:
  - YELLOW ELEC PUMP . . . . . ON
  - YELLOW ENG 2 PUMP . . . . . OFF
- ▶ If the blue system was lost by blue electric pump low pressure:
  - Maintain a minimum of 140 knots to keep the RAT powered.
  - HYD RAT MAN ON pb . . . . . Push
  - BLUE ELEC PUMP . . . . . OFF
  - Avoid icing conditions.
- ▶ If the blue or yellow hydraulic system is recovered:
  - See the abnormal procedure for the remaining failure.
- ▶ If neither system is recovered:
  - BLUE ELEC PUMP . . . . . Verify OFF
  - YELLOW ENG 2 PUMP . . . . . Verify OFF
  - YELLOW ELEC PUMP . . . . . Verify OFF
  - Maneuver with care. Do not exceed 320 knots (or 0.77M).

▼ Continued on next page ▼

▼ **HYD B + Y SYS LO PR continued** ▼

**Note:** The flight controls remain in NORMAL LAW.

- Land As Soon As Possible.
- See Approach Procedures.

**STATUS**

*CAT II or III approach not authorized (if the hydraulic systems are not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | INOP SYS |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>▶ If a hydraulic system was lost due to reservoir low air pressure:                             <ul style="list-style-type: none"> <li>• Hydraulic pump (affected system) . . . .ON</li> </ul> </li> <li>&gt; If yellow system affected                             <ul style="list-style-type: none"> <li>• PTU . . . . .AUTO</li> </ul> </li> <li>▶ If the blue hydraulic reservoir was overheated and the FAULT light is out:                             <ul style="list-style-type: none"> <li>• BLUE ELEC PUMP . . . .AUTO</li> </ul> </li> <li>▶ If the yellow hydraulic reservoir was overheated and the FAULT light is out:                             <ul style="list-style-type: none"> <li>• YELLOW ENG 2 PUMP . .ON</li> <li>• PTU . . . . .AUTO</li> </ul> </li> <li>▶ If a single hydraulic system is recovered:                             <ul style="list-style-type: none"> <li>• See the abnormal procedure for the remaining failure.</li> </ul> </li> </ul> |          |

▼ **Continued on next page** ▼

▼ **HYD B + Y SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <i>INOP SYS</i>                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>► If neither hydraulic system is recovered:<br/>SLATS SLOW</p> <ul style="list-style-type: none"><li>• LDG DIST PROC . . . . .APPLY (refer to the ODM)</li><li>• Gravity extend landing gear to preserve green system integrity.</li></ul> <p>When landing gear extension is desired:</p> <ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . . DOWN</li><li>• Check for proper gear down indications.</li></ul> | <p>B+Y HYD<br/>AP 1+2<br/>R ELEV<br/>SPLR 2+3+4<br/>SPD BRK<br/>REVERSER 2<br/>YAW DAMPER 2<br/>CARGO DOOR (if Y reservoir low level)<br/>EMER GEN (if B reservoir low level)<br/>B ELEC PUMP</p> |
| <hr/> <p><b>Caution!    Nose wheel steering is lost.</b></p> <hr/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                   |
| <p><b>Note:</b> Do not retract the gear in the event of a go-around.</p> <p><b>Note:</b> Following a yellow system failure, the parking brake may be inoperative due to low accumulator pressure.</p>                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                   |



**HYD G ENG 1 PUMP LO PR**

**Condition:** The green engine pump outlet pressure is low.

1. GREEN ENG 1 PUMP. . . . . OFF
  - ▶ If the PTU is available and pressurizing the green system:
    - Notify the flight attendants that the PTU may cause vibration in the floor.
- 
- ▶ If PTU is not available or not operating:
  - See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD G ENG 1 PUMP LO PR continued** ▼

**STATUS**

*Operations on 100' wide runways is not authorized.  
CAT III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | INOP SYS                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>► If the green hydraulic system is lost:<br/>SLATS/FLAPS SLOW</div> <div><ul style="list-style-type: none"><li>• LDG DIST PROC . . . . APPLY (refer to the ODM)</li><li>• The landing gear will have to be gravity extended.<br/>When landing gear extension is desired:<ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . . DOWN</li><li>• Check for proper gear down indications.</li></ul></li></ul></div> | <div>GREEN HYD</div> <div>SPLR 1+5</div> <div>L/G RETRACT</div> <div>NW STEER</div> <div>AUTO BRK</div> <div>NORM BRK</div> <div>REVERSER 1</div> <div>YAW DAMPER 1</div> |
| <div><b>Caution!    Nose wheel steering is lost.</b></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                           |



HYD G RSVR LO AIR PR

**Condition:** The green hydraulic reservoir air pressure is low.

- ▶ If the green hydraulic pressure is fluctuating:
  - PTU . . . . . OFF
  - GREEN ENG 1 PUMP . . . . . OFF

**Note:** Since the probability of cavitation increases with altitude, it may be possible to restore the system after descending to a lower altitude.

- See Approach Procedures.

**STATUS**

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                       | INOP SYS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1. GREEN ENG 1 PUMP . . .ON<br>2. PTU . . . . . AUTO<br>▶ If the hydraulic system is recovered: <ul style="list-style-type: none"> <li>• End.</li> </ul> |          |

▼ Continued on next page ▼

▼ **HYD G RSVR LO AIR PR continued** ▼

**STATUS (Continued)**

*Operations on 100' wide runways is not authorized.  
CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | INOP SYS                                                                                               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <div>► If the hydraulic system is not recovered:<ul style="list-style-type: none"><li>• GREEN ENG 1 PUMP . . . OFF</li><li>• PTU . . . . . OFF</li><li>SLATS/FLAPS SLOW</li><li>• LDG DIST PROC . . . . APPLY (refer to the ODM)</li><li>• The landing gear will have to be gravity extended.</li></ul>When landing gear extension is desired:<ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . DOWN</li><li>• Check for proper gear down indications.</li></ul></div> | GREEN HYD<br>SPLR 1+5<br>L/G RETRACT<br>NW STEER<br>AUTO BRK<br>NORM BRK<br>REVERSER 1<br>YAW DAMPER 1 |
| <div><b>Caution!    Nose wheel steering is lost.</b></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                        |



**Condition:** Green hydraulic reservoir fluid quantity is low.

- 

- PTU . . . . . ON
- GREEN ENG 1 PUMP . . . . . ON

■■■■

- PTU . . . . . OFF
- GREEN ENG 1 PUMP . . . . . OFF
- See Approach Procedures.

▼ Continued on next page ▼

**STATUS**

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                               | <i>INOP SYS</i>                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <p>SLATS/FLAPS SLOW</p> <ul style="list-style-type: none"><li>• LDG DIST PROC . . . . APPLY (refer to the ODM)</li><li>• If the landing gear will have to be gravity extended:<br/>When landing gear extension is desired:<ul style="list-style-type: none"><li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li><li>• LDG GEAR lever . . . DOWN</li><li>• Check for proper gear down indications.</li></ul></li></ul> | <p>GREEN HYD</p> <p>SPLR 1+5</p> <p>L/G RETRACT</p> <p>NW STEER</p> <p>AUTO BRK</p> <p>NORM BRK</p> <p>REVERSER 1</p> <p>YAW DAMPER 1</p> |
| <p><b>Caution!    Nose wheel steering is lost.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                           |



**HYD G RSVR OVHT**

**Condition:** The green hydraulic reservoir has overheated.

- If fault occurs in conjunction with HYD Y ENG 2 PUMP LO PR fault, disregard the HYD G RSVR OVHT ECAM procedure and perform the following:
- PTU . . . . . OFF
  - GREEN ENG 1 PUMP . . . . . Keep ON

**Caution! Selecting the GREEN ENG 1 PUMP OFF in this situation results in a dual hydraulic system loss.**

**Note:** In this situation, the reservoir overheat results from PTU over-speeding. Overheat will cool once PTU is selected to OFF.



- If fault has not occurred in conjunction with HYD Y ENG 2 PUMP LO PR fault:
- PTU . . . . . OFF
  - GREEN ENG 1 PUMP . . . . . OFF
  - See Approach Procedures.



▼ Continued on next page ▼

▼ **HYD G RSVR OVHT continued** ▼

**STATUS**

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| <i>APPROACH PROCEDURES</i><br>(10 minutes before landing)                                                                                                                                                                                                                            | <i>INOP SYS</i> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <div>► If the green hydraulic system overheat is out (no FAULT light):<ul style="list-style-type: none"><li>• GREEN ENG 1 PUMP . . . ON</li><li>• PTU . . . . . AUTO</li></ul>&gt; If the hydraulic system is recovered:<ul style="list-style-type: none"><li>• End.</li></ul></div> |                 |

▼ **Continued on next page** ▼

▼ **HYD G RSVR OVHT continued** ▼

**STATUS (Continued)**

*Operations on 100' wide runways is not authorized.*

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | INOP SYS                                                                                                                                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <p>► If the green hydraulic system overheat is still present:</p> <p>SLATS/FLAPS SLOW</p> <ul style="list-style-type: none"> <li>• LDG DIST PROC. . . APPLY (refer to the ODM)</li> <li>• The landing gear will have to be gravity extended.</li> </ul> <p>When landing gear extension is desired:</p> <ul style="list-style-type: none"> <li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li> <li>• LDG GEAR Lever . DOWN</li> <li>• Check for proper gear down indications.</li> </ul> | <p>GREEN HYD</p> <p>SPLR 1+5</p> <p>L/G RETRACT</p> <p>NW STEER</p> <p>AUTO BRK</p> <p>NORM BRK</p> <p>REVERSER 1</p> <p>YAW DAMPER 1</p> |
| <hr style="border: 1px solid orange;"/> <p><b>Caution!    Nose wheel steering is lost.</b></p> <hr style="border: 1px solid orange;"/>                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                           |



**HYD G + B SYS LO PR**

**Condition:** The green and blue hydraulic system pressures are low.

- ▶ If the green system was lost by green reservoir low air pressure, reservoir low level, or reservoir overheat:
  - PTU . . . . . OFF
- ▶ If the blue system was lost by blue electric pump low pressure:
  - Maintain a minimum speed of 140 knots to keep the RAT powered.
  - HYD RAT MAN ON. . . . . Push
  - Avoid icing conditions.
  - BLUE ELEC PUMP . . . . . OFF
- ▶ If the blue hydraulic system is recovered:
  - See “HYD G ENG 1 PUMP LO PR” on page 13.9.
- ▶ If the blue hydraulic system is not recovered:
  - GREEN ENG 1 PUMP . . . . . OFF
  - BLUE ELEC PUMP . . . . . Verify OFF

**Caution! The flight control laws have degraded to ALTERNATE LAW.**

- Maneuver with care.
- Do not use speed brakes.  
PFD characteristics speed (F, S) indications are incorrect.
- Do not exceed 320 knots (or 0.77M).
- Land As Soon As Possible.
- See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD G + B SYS LO PR continued** ▼

### STATUS

*CAT II or III approach not authorized (if hydraulic system is not recovered).*

*Operations on 100' wide runways is not authorized.*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | INOP SYS |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <ul style="list-style-type: none"> <li>▶ If a hydraulic system was lost due to reservoir low air pressure:                             <ul style="list-style-type: none"> <li>• Hydraulic pump (associated Sys. . . . ON</li> </ul> </li> <li>&gt; If green system affected:                             <ul style="list-style-type: none"> <li>• PTU . . . . . AUTO</li> </ul> </li> <li>▶ If the blue hydraulic reservoir was overheated and the FAULT light is out:                             <ul style="list-style-type: none"> <li>• BLUE ELEC PUMP . . . AUTO</li> </ul> </li> <li>▶ If the green hydraulic reservoir was overheated and the FAULT light is out:                             <ul style="list-style-type: none"> <li>• GREEN ENG 1 PUMP . . . ON</li> <li>• PTU . . . . . AUTO</li> </ul> </li> <li>▶ If a single hydraulic system is recovered:                             <ul style="list-style-type: none"> <li>• See the abnormal procedure for the remaining failure.</li> </ul> </li> </ul> |          |

▼ **Continued on next page** ▼

▼ **HYD G + B SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>INOP SYS</i>                                                                                                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>► If neither hydraulic system is recovered:</p> <ul style="list-style-type: none"> <li>• Use manual thrust (A/THR may not maintain speed satisfactorily due to lost flight control surfaces). Slats are inoperative. Only flaps will be available.</li> <li>• Plan on a longer than normal final approach.</li> <li>• Maintain green dot airspeed until established on final.</li> <li>• <b>Do Not</b> use speed brakes.</li> <li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li> <li>• The landing gear must be gravity extended. <b>DIRECT LAW</b> will become active after the gear is lowered.</li> <li>• FOR LDG . . . USE FLAPS 3<br/>FLAPS SLOW</li> <li>• GPWS LDG FLAP 3 . . . . ON</li> <li>• Calculate a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 25 knots. Ensure <b>FULL</b> (5R) selected on the MCDU PERF APPR page.</li> <li>• Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li> </ul> <p><b>Note:</b> With 0 slats, expect a pitch attitude of <math>0^\circ</math> during final.</p> | <p>G+B HYD<br/>AP 1+2<br/>SLATS<br/>L+R AIL<br/>L ELEV<br/>SPLR 1+3+5<br/>L/G RETRACT<br/>NW STEER<br/>AUTOBRK<br/>NORM BRK<br/>REVERSER 1<br/>ATT LIMIT<br/>OVSPD LIMIT<br/>ALPHA LIMIT<br/>EMER GEN (if B reservoir low level)</p> |

▼ **Continued on next page** ▼

▼ **HYD G + B SYS LO PR continued** ▼

**Deferred Items**

**Descent Checklist**

|                              |            |     |
|------------------------------|------------|-----|
| Altimeters. . . . .          | ____, xckd | C&F |
| ▪Minimums . . . . .          | ____, ____ | C&F |
| Landing Data . . . . .       | ____, ____ | C&F |
| ▪Approach briefing . . . . . | complete   | PM  |
| ▪Autobrakes . . . . .        | as reqd    | PM  |
| Seat belt signs . . . . .    | ON         | PM  |

**Approach Checklist**

|                                     |            |     |
|-------------------------------------|------------|-----|
| ▪Flight & nav instruments . . . . . | verified   | C&F |
| Cabin notification. . . . .         | complete   | C   |
| ▪FMS flight phase. . . . .          | APPR/DES   | PM  |
| Altimeters. . . . .                 | ____, xckd | C&F |

▼ **Continued on next page** ▼

| ▼ HYD G + B SYS LO PR continued ▼                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | INOP SYS                                                                                                                                                                                                         |
| Refer to the following procedure <b><u>while</u></b> configuring the aircraft:<br><b>When the flap handle is at 0:</b> <ul style="list-style-type: none"><li>• Maintain green dot speed.</li><li>• For flaps 1: select flap handle position 1.</li></ul> <b>When the flap handle is at 1:</b> <ul style="list-style-type: none"><li>• Maintain green dot airspeed.</li><li>• For flaps 2:<ul style="list-style-type: none"><li>• <u>Select</u> 190 Kts.</li><li>• When below 200 kts, select flap handle position 2.</li></ul></li></ul> <b>When the flap handle is at 2:</b> <ul style="list-style-type: none"><li>• Maintain 190 knots.</li><li>• For flaps 3:<ul style="list-style-type: none"><li>• Activate managed speed.</li><li>• As the speed slows below 185 knots, select flap handle position 3.</li></ul></li></ul> | G+B HYD<br>AP 1+2<br>SLATS<br>L+R AIL<br>L ELEV<br>SPLR 1+3+5<br>L/G RETRACT<br>NW STEER<br>AUTO BRK<br>NORM BRK<br>REVERSER 1<br>ATT LIMIT<br>OVSPD LIMIT<br>ALPHA LIMIT<br>EMER GEN (if B reservoir low level) |

▼ Continued on next page ▼

▼ **HYD G + B SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                           | <i>INOP SYS</i>                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| When landing gear extension is desired:                                                                                                                                                                                              | G+B HYD                             |
| <b>Note:</b> If slats retracted, extend gear at 200 KIAS to provide better pitch control.                                                                                                                                            | AP 1+2                              |
| <ul style="list-style-type: none"> <li>• Raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li> <li>• LDG GEAR lever . DOWN</li> <li>• Check for proper gear down indications.</li> </ul> | SLATS                               |
| Accomplish Deferred Landing checklist.                                                                                                                                                                                               | L+R AIL                             |
|                                                                                                                                                                                                                                      | L ELEV                              |
|                                                                                                                                                                                                                                      | SPLR 1+3+5                          |
|                                                                                                                                                                                                                                      | L/G RETRACT                         |
|                                                                                                                                                                                                                                      | NW STEER                            |
|                                                                                                                                                                                                                                      | AUTO BRK                            |
|                                                                                                                                                                                                                                      | NORM BRK                            |
|                                                                                                                                                                                                                                      | REVERSER 1                          |
|                                                                                                                                                                                                                                      | ATT LIMIT                           |
|                                                                                                                                                                                                                                      | OVSPD LIMIT                         |
|                                                                                                                                                                                                                                      | ALPHA LIMIT                         |
|                                                                                                                                                                                                                                      | EMER GEN (if B reservoir low level) |

## Landing Checklist

|                        |                                 |     |
|------------------------|---------------------------------|-----|
| Landing gear . . . . . | down                            | C&F |
| Flaps . . . . .        | <b>as directed, as directed</b> | C&F |
| Spoilers . . . . .     | ARMED                           | PM  |

**Caution!    Nose wheel steering is lost.**



**HYD G + Y SYS LO PR**

**Condition:** The green and yellow hydraulic system pressures are low.

- ▶ If the yellow system was lost by engine 2 pump low pressure:
  - YELLOW ELEC PUMP . . . . . ON
    - > If the yellow system is recovered:
      - YELLOW ENG 2 PUMP . . . . . OFF
      - See the appropriate green system failure procedure.
- ▶ If neither system is recovered:
  - GREEN ENG 1 PUMP . . . . . Verify OFF
  - YELLOW ENG 2 PUMP . . . . . Verify OFF
  - YELLOW ELEC PUMP . . . . . Verify OFF
  - PTU . . . . . OFF

**Caution! The flight control laws have degraded to ALTERNATE LAW.**

- Maneuver with care.
- PFD characteristics speed (F, S) indications are incorrect.
- Do not exceed 320 knots (0.77M).
  - Land as soon as possible.
  - See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD G + Y SYS LO PR continued** ▼

**STATUS**

*Operations on 100' wide runways is not authorized.  
 CAT II or III approach not authorized (if hydraulic system  
 is not recovered).*

**APPROACH PROCEDURES**  
 (10 minutes before landing)

**INOP SYS**

- ▶ If a hydraulic system was lost due to reservoir low air pressure:
  - Hydraulic pump pb  
 (associated sys) . . . . . ON
  - PTU . . . . . AUTO
- ▶ If a hydraulic reservoir was overheated and the FAULT light is out:
  - HYD ENG PUMP  
 (associated sys) . . . . . ON
- > If no overheat exists:
  - PTU . . . . . AUTO
- ▶ If a single hydraulic system is recovered:
  - See the abnormal procedure for the remaining failure.

▼ **Continued on next page** ▼

▼ **HYD G + Y SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <i>INOP SYS</i>                                                                                                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>► If neither hydraulic system is recovered:<br/>Flaps are inoperative. Only slats will be available.<br/>SLATS SLOW.<br/>Reversers 1 and 2 are inoperative.<br/>Pitch trim is inoperative.</p> <ul style="list-style-type: none"><li>• Plan on a longer than normal final.</li><li>• LDG DIST PROC . . . APPLY (refer to the ODM)</li><li>• Maintain green dot airspeed until established on final.</li><li>• For LDG . . . . USE FLAPS 3</li><li>• GPWS FLAP MODE . . . OFF</li><li>• GPWS LDG FLAP 3 . . . . ON</li></ul> | <p>G+Y HYD<br/>AP 1+2</p> <p>FLAPS<br/>SPLR 1+2+4+5<br/>STABILIZER<br/>YAW DAMPER<br/>L/G RETRACT<br/>NW STEER<br/>ANTI SKID<br/>REVERSER 1+2<br/>ATT LIMIT<br/>OVSPD LIMIT<br/>ALPHA LIMIT<br/>CARGO DOOR (if Y reservoir low level)<br/>AUTO BRK<br/>NORM BRK</p> |
| <p><b>Caution!</b> If flaps are at or near zero, approximately 8° of pitch on final, there is an increased chance of tail strike.</p>                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                     |

▼ **Continued on next page** ▼

▼ **HYD G + Y SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>INOP SYS</i>                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Calculate a <math>V_{APP}</math> of <math>V_{LS}</math> (FULL) plus 25 knots. Ensure <b>FULL</b> (5R) is selected on the MCDU PERF APPR page.</li> <li>• Enter the increased <math>V_{APP}</math> on the PERF APPR page.</li> <li>• The landing gear must be gravity extended.<br/> <b>DIRECT LAW</b> will become active when the gear is lowered.</li> <li>• Do not extend the landing gear until configured at FLAPS 3 <b>and</b> stabilized at <math>V_{APP}</math>.</li> <li>• Limit the maximum brake pressure to 1,000 PSI as the only source of hydraulic pressure is the yellow brake accumulator. Only seven full brake applications are available.</li> </ul> <p><b>Note:</b> Following a yellow system failure, the parking brake may be inoperative due to low accumulator pressure.</p> | <p>G + Y HYD<br/>AP 1+2</p> <p>FLAPS<br/>SPLR 1+2+4+5<br/>STABILIZER<br/>YAW DAMPER<br/>L/G RETRACT<br/>NW STEER<br/>ANTI SKID<br/>REVERSER 1+2<br/>ATT LIMIT<br/>OVSPD LIMIT<br/>ALPHA LIMIT<br/>CARGO DOOR (if Y reservoir low level)<br/>AUTO BRK<br/>NORM BRK</p> |

▼ **Continued on next page** ▼

▼ HYD G + Y SYS LO PR continued ▼

**Deferred Items**

**Descent Checklist**

- Altimeters . . . . . \_\_\_\_, xckd C&F
- Minimums . . . . . \_\_\_\_, \_\_ C&F
- Landing Data . . . . . \_\_\_\_, \_\_ C&F
- Approach briefing . . . . . complete PM
- Autobrakes . . . . . Off PM
- Seat belt signs . . . . . ON PM

**Approach Checklist**

- Flight & nav instruments . . . . . verified C&F
- Cabin notification . . . . . complete C
- FMS flight phase . . . . . APPR/DES PM
- Altimeters . . . . . \_\_\_\_, xckd C&F

▼ Continued on next page ▼

▼ **HYD G + Y SYS LO PR continued** ▼

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>INOP SYS</i>                                                                                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Refer to the following procedure <b><u>while</u></b> configuring the aircraft:</p> <p><b>When the flap handle is at 0:</b></p> <ul style="list-style-type: none"> <li>• Maintain green dot speed.</li> </ul> <p>To move flap handle to 1:</p> <ul style="list-style-type: none"> <li>• Select “S” speed (PERF APPR page) or 190 knots whichever is higher.</li> <li>• <u>Select</u> flap handle position 1.</li> </ul> <p><b>When the flap handle is at 1:</b></p> <ul style="list-style-type: none"> <li>• Maintain “S” speed or 190 knots whichever is higher.</li> </ul> <p>To move flap handle to 2:</p> <ul style="list-style-type: none"> <li>• <u>Select</u> 190 knots.</li> <li>• When below 200 kts: select flap handle position 2.</li> </ul> <p><b>When the flap handle is at 2:</b></p> <ul style="list-style-type: none"> <li>• Maintain 190 knots.</li> </ul> <p>To move flap handle to 3:</p> <ul style="list-style-type: none"> <li>• Activate managed speed.</li> <li>• When below 185 kts: select flap handle position 3.</li> </ul> <p><b>For landing gear extension:</b></p> <ul style="list-style-type: none"> <li>• At VAPP, raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</li> <li>• LDG GEAR lever . . . DOWN</li> </ul> <p>Accomplish Deferred Landing checklist</p> | <p>G + Y HYD<br/>AP 1+2</p> <p>FLAPS<br/>SPLR 1+2+4+5<br/>STABILIZER<br/>YAW DAMPER<br/>L/G RETRACT<br/>NW STEER<br/>ANTI SKID<br/>REVERSER 1+2<br/>ATT LIMIT<br/>OVSPD LIMIT<br/>ALPHA LIMIT<br/>CARGO DOOR (if Y reservoir low level)<br/>AUTO BRK<br/>NORM BRK</p> |

▼ **Continued on next page** ▼

|                        |                    |     |
|------------------------|--------------------|-----|
| Landing gear . . . . . | down               | C&F |
| Flaps . . . . .        | ____, ____         | C&F |
|                        | <b>as directed</b> |     |
| Spoilers . . . . .     | ARMED              | PM  |

**Caution! Nose wheel steering is lost.**



HYD PTU FAULT

**Condition:** A PTU FAULT was detected during the second engine start, the second engine was started while cargo door operation was inhibiting the PTU, or a Green or Yellow reservoir problem was detected with the PTU in AUTO.

- ▶ If on the ground, just after the second engine was started:
  - Attempt to reset warning by switching yellow electric pump ON then OFF.
  - > If the message clears:
 


  - > If the message remains:
    - Contact Maintenance.
- ▶ If the green or yellow hydraulic reservoir has low level and low pressure:
  - PTU . . . . . OFF

**Note:** Inflight this message is not an indication that the PTU has failed. Instead, this message indicates that the PTU pb is still in the AUTO position following a G or Y reservoir malfunction, and should be selected OFF.

**STATUS**

|  |          |
|--|----------|
|  | INOP SYS |
|  | PTU      |



**HYD RAT FAULT**

**Condition:** The RAT is not fully stowed or there is pressure present in RAT stowing actuator or RAT pump is not available.

- ▶ If on the ground:
  - Consult with Dispatch/Maintenance Control for possible MEL relief.
- ▶ If in flight:
  - Crew Awareness.

**STATUS**

|  |                 |
|--|-----------------|
|  | <i>INOP SYS</i> |
|  | RAT             |



**HYD Y ELEC PUMP LO PR**

**Condition:** The yellow electric pump pressure is low.

- ▶ If the yellow electric pump fails while the yellow engine pump and PTU are inoperative:
  - YELLOW ELEC PUMP . . . . . OFF
  - See Approach Procedures.

**STATUS**

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                       | <i>INOP SYS</i>                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| FLAPS SLOW<br><br>1. LDG DIST PROC . . . APPLY<br>(refer to the ODM)<br>2. Brake accumulator<br>pressure . . . . . Monitor<br>If brake accumulator<br>pressure is low: <ul style="list-style-type: none"> <li>• Do not set the parking brake.</li> <li>• Do not shut down the engines until the aircraft chocks are in place.</li> <li>• Instruct ground crew to not use the yellow electric pump to open cargo door.</li> </ul> | YELLOW HYD<br>SPLR 2+4<br>REVERSER 2<br>YAW DAMPER 2 |



**HYD Y ELEC PUMP OVHT**

**Condition:** The yellow electric pump has overheated.

**Note:** If at the gate following cargo door operation, the cargo door selector handle, located underneath the fuselage, may be stuck engaged causing the HYD Y ELEC PUMP to overheat. Cycle (or request Maintenance personnel to cycle) the cargo door selector handle in an attempt to de-energize the HYD Y ELEC PUMP.

- ▶ If the yellow electric pump overheats when the yellow engine pump and PTU are inoperative:
  - YELLOW ELEC PUMP . . . . . OFF
  - See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD Y ELEC PUMP OVHT continued** ▼

**STATUS**

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                | <i>INOP SYS</i> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| FLAPS SLOW                                                                                                                                                                                                                                                | YELLOW HYD      |
| 1. LDG DIST PROC . . . . . APPLY<br>(refer to the ODM)                                                                                                                                                                                                    | SPLR 2+4        |
| 2. Brake accumulator<br>pressure . . . . . Monitor<br>If brake accumulator pressure<br>is low:                                                                                                                                                            | REVERSER 2      |
| <ul style="list-style-type: none"> <li>• Do not set the parking brake.</li> <li>• Do not shut down the engines until the aircraft chocks are in place.</li> <li>• Instruct ground crew to not use the yellow electric pump to open cargo door.</li> </ul> | YAW DAMPER 2    |



**HYD Y ENG 2 PUMP LO PR**

**Condition:** The yellow engine pump outlet pressure is low.

1. YELLOW ENG 2 PUMP . . . . . OFF
- ▶ If the PTU is operative:
    - The PTU will pressurize the yellow system.
    - Notify the flight attendants that the PTU may cause vibration in the floor.

■ ■ ■ ■
  
  - ▶ If the PTU is inoperative:
    - YELLOW ELEC PUMP . . . . . ON
    - > If Y hydraulic system pressure recovered.
      - Brake accumulator pressure . . . . . Monitor
      - >> If brake accumulator pressure is low:
        - Do not set the parking brake.
        - Do not shut down the engines until the aircraft chocks are in place.
        - Instruct ground crew to not use the yellow electric pump to open cargo door.

■ ■ ■ ■

▼ Continued on next page ▼

▼ **HYD Y ENG 2 PUMP LO PR continued** ▼

- > If Y hydraulic system pressure not recovered.

**STATUS**

*Operations on 100' wide runways is not authorized.  
 CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>INOP SYS</i>                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <b>FLAPS SLOW</b><br><br>1. LDG DIST PROC . . . . . APPLY<br>(refer to the ODM)<br><br>2. Brake accumulator<br>pressure . . . . . Monitor<br>If brake accumulator pressure<br>is low: <ul style="list-style-type: none"> <li>• Do not set the parking brake.</li> <li>• Do not shut down the engines until the aircraft chocks are in place.</li> <li>• Instruct ground crew to not use the yellow electric pump to open cargo door.</li> </ul> | <b>YELLOW HYD</b><br><br><b>SPLR 2+4</b><br><b>REVERSER 2</b><br><b>YAW DAMPER 2</b> |



**HYD Y RSVR LO AIR PR**

**Condition:** The yellow hydraulic reservoir air pressure is low.

- ▶ If the yellow hydraulic pressure is fluctuating:
  - PTU . . . . . OFF
  - YELLOW ENG 2 PUMP . . . . . OFF
  - YELLOW ELEC PUMP . . . . . OFF

**Note:** Since the probability of cavitation increases with altitude, it may be possible to restore the system by descending to a lower altitude.

- See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD Y RSVR LO AIR PR continued** ▼

**STATUS**

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | INOP SYS                                                       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>1. YELLOW ENG 2 PUMP . . ON</li> <li>2. PTU . . . . . AUTO</li> </ol> <ul style="list-style-type: none"> <li>▶ If the hydraulic system is recovered: <ul style="list-style-type: none"> <li>• End.</li> </ul> </li> <li>▶ If the hydraulic system is not recovered: <ul style="list-style-type: none"> <li>• YELLOW ENG 2 PUMP . OFF</li> <li>• PTU . . . . . OFF</li> <li>FLAPS SLOW</li> <li>• LDG DIST PROC . . . APPLY<br/>(refer to the ODM)</li> <li>• Brake accumulator pressure . . . . . Monitor<br/>If brake accumulator pressure is low: <ul style="list-style-type: none"> <li>• Do not set the parking brake.</li> <li>• Do not shut down the engines until the aircraft chocks are in place.</li> <li>• Instruct ground crew to not use the yellow electric pump to open cargo door.</li> </ul> </li> </ul> </li> </ul> | <p>YELLOW HYD<br/>SPLR 2+4<br/>REVERSER 2<br/>YAW DAMPER 2</p> |



## HYD Y RSVR LO LVL

**Condition:** The yellow hydraulic reservoir fluid quantity is low.

- [illegible]

- If hydraulic quantity normal:
- PTU . . . . . ON
  - YELLOW ENG 2 PUMP . . . . . ON
- Continue normal operation while monitoring hydraulic level.



- If hydraulic quantity low or decreasing:
- PTU . . . . . OFF
  - YELLOW ENG 2 PUMP . . . . . OFF
  - YELLOW ELEC PUMP . . . . . OFF
  - See Approach Procedures.

▼ Continued on next page ▼

▼ **HYD Y RSVR LO LVL continued** ▼

**STATUS**

*CAT III approach not authorized.*

| <i>APPROACH PROCEDURES</i>                                                                                                                                                                                                                                                                                                                                                                                                                    | <i>INOP SYS</i>                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <p>FLAPS SLOW</p> <p>1. LDG DIST PROC . . . . . APPLY<br/>(refer to the ODM)</p> <hr style="border: 1px solid orange;"/> <p><b>Caution! If the brake accumulator pressure is low, do not set the parking brake.</b></p> <hr style="border: 1px solid orange;"/> <p>2. Do not shut down the engines until the aircraft chocks are in place.</p> <p>3. Instruct the ground crew not to use the yellow electric pump to open the cargo door.</p> | <p>YELLOW HYD</p> <p>SPLR 2+4</p> <p>REVERSER 2</p> <p>YAW DAMPER 2</p> |



**HYD Y RSVR OVHT**

**Condition:** The yellow hydraulic reservoir has overheated.

- Note:** If at the gate following cargo door operation, the cargo door selector handle, located underneath the fuselage, may be stuck engaged causing the HYD Y RSVR OVHT. Cycle (or request Maintenance personnel to cycle) the cargo door selector handle in an attempt to de-energize the HYD Y ELEC PUMP.
- If fault occurs in conjunction with HYD G ENG 1 PUMP LO PR fault, disregard the HYD Y RSVR OVHT ECAM and perform the following:
- PTU . . . . . OFF
  - YELLOW ENG 2 PUMP . . . . . Keep ON

**Caution!** Selecting the **YELLOW ENG 2 PUMP OFF** in this situation results in a dual hydraulic system loss.

**Note:** In this situation, the reservoir overheat results from PTU over-speeding. Overheat will cool once PTU is selected to OFF.



▼ Continued on next page ▼

▼ **HYD Y RSVR OVHT continued** ▼

- ▶ If fault has not occurred in conjunction with HYD G ENG 1 PUMP LO PR fault:
  - PTU . . . . . OFF
  - YELLOW ENG 2 PUMP . . . . . OFF
  - YELLOW ELEC PUMP . . . . . OFF
  - See Approach Procedures.

**STATUS**

*CAT III approach not authorized (if the hydraulic system is not recovered).*

| APPROACH PROCEDURES<br>(10 minutes before landing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | INOP SYS                                             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▶ If the yellow hydraulic system was overheated and the FAULT light is out:                             <ul style="list-style-type: none"> <li>• YELLOW ENG 2 PUMP . ON</li> <li>• PTU . . . . . AUTO</li> </ul> </li> <li>&gt; If the hydraulic system is recovered:                             <ul style="list-style-type: none"> <li>• End.</li> </ul> </li> <li>▶ If the yellow hydraulic system overheat is still present:                             FLAPS SLOW                             <ul style="list-style-type: none"> <li>• LDG DIST PROC . . . APPLY<br/>(refer to the ODM)</li> <li>• Brake accumulator pressure . . . . . Monitor<br/>If brake accumulator pressure is low:                                     <ul style="list-style-type: none"> <li>• Do not set the parking brake.</li> <li>• Do not shut down the engines until the aircraft chocks are in place.</li> <li>• Instruct ground crew to not use the yellow electric pump to open cargo door.</li> </ul> </li> </ul> </li> </ul> | YELLOW HYD<br>SPLR 2+4<br>REVERSER 2<br>YAW DAMPER 2 |



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**Non-Normal Checklists**

**Chapter NNC**

**Landing Gear**

**Section 14**

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## BRAKES ANTI SKID NWS FAULT

**Condition:** Both channels of the BSCU have failed.

**Note:** The brake system automatically reverts to alternate braking (yellow system) without anti-skid.

1. See Approach Procedures.

### STATUS

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                   | INOP SYS                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 1. Monitor brake pressure on the BRAKE pressure indicator and limit the maximum brake pressure to 1,000 PSI.<br>2. LDG DIST PROC . . . APPLY (refer to the ODM)<br>3. Avoid landing on an icy runway. | ANTI SKID<br>NW STEER<br>AUTO BRK<br>BRAKES CH 1<br>BRAKES CH 2 |



**BRAKES ANTI SKID / NWS OFF**

**Condition:** The A/SKID & N/W STRG switch is OFF.

**Note:** The brake system automatically reverts to alternate braking (yellow system) without anti-skid.

- ▶ If on the ground:
  - Stop the aircraft using alternate braking (brake pedals).
  - A/SKID & N/W STRG. . . . . ON
- ▶ If in flight with the landing gear retracted:
  - A/SKID & N/W STRG. . . . . ON
- > If system is recovered:


- > If system is not recovered:
  - See Approach Procedures.

**STATUS**

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                          | INOP SYS  |
|--------------------------------------------------------------------------------------------------------------|-----------|
| 1. Monitor brake pressure on the BRAKE pressure indicator and limit the maximum brake pressure to 1,000 PSI. | ANTI SKID |
| 2. LDG DIST PROC . . . APPLY (refer to the ODM)                                                              | NW STEER  |
| 3. Avoid landing on an icy runway.                                                                           | AUTO BRK  |



## BRAKES AUTO BRK FAULT

**Condition:** There is a failure of the auto brake mode or one wheel speed tachometer.

**Note:** In the case of tachometer failure, one brake may be permanently released. This condition may cause a slight lateral drift on landing which can be easily controlled with rudder.

- ▶ If on the **ground** and the aircraft is **stopped**:
  - ANTI SKID & N/W STRG . . . . .OFF, then ON

**When** taxi is resumed:

  - Recheck brakes.
- ▶ If in flight:
  - See Approach Procedures.

### STATUS

*CAT III approach not authorized.*

| APPROACH PROCEDURES                                | INOP SYS |
|----------------------------------------------------|----------|
| 1. LDG DIST PROC . . . APPLY<br>(refer to the ODM) | AUTO BRK |



**BRAKES HOT**

**Condition:** At least one brake temp is over 300°C.

- ▶ If the aircraft is on the ground:
  - Delay takeoff until the temperature is below 275° C.
  - > If the temperature difference between two brakes on the same gear is greater than 150° *and* the temperature of one brake is above 600°C.
    - **Do Not** taxi. This may be indicative of a brake binding.

**Note:** Under these conditions, avoid taxi until the **BRAKES HOT** message disappears. Maintenance action is due.

- > If the **BRAKES HOT** message is displayed when parking:
  - **Do Not** set the PARK BRK.



▼ Continued on next page ▼

▼ **BRAKES HOT continued** ▼

► If the aircraft is in flight:

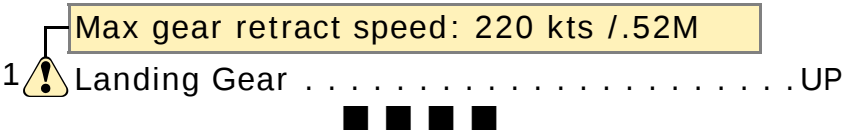
---

**Caution! Do not extend the gear above FL250.**

---

- **Do Not** exceed 240 knots (or 0.58M).
- Extend the LDG GEAR to cool the brakes.
- **Reduce to 210 knots if possible to prevent overspeed during retraction (Max 220 knots or 0.52M).**

**When** the brake temperature returns to the normal range and below 220 knots / .52M (210 knots recommended):



**BRAKES RELEASE FAULT**

**Condition:** One release signal is not present when in flight with the landing gear downlocked.

1. See Approach Procedures.

**STATUS**

*CAT III approach not authorized.*

| APPROACH PROCEDURES                                | INOP SYS |
|----------------------------------------------------|----------|
| 1. LDG DIST PROC . . . APPLY<br>(refer to the ODM) | AUTO BRK |



## BRAKES BSCU CH 1 (2) FAULT or BRAKES SYS 1 (2) FAULT

**Condition:** One channel of the BSCU has failed.

**Note:** If the BRAKES BSCU CH 1 (2) FAULT or BRAKES SYS 1 (2) FAULT is annunciated without a BRAKES AUTO BRK FAULT, reset the BSCU as shown on page NNOI.1.6, BSCU, Computer Resets.

1. Depress the brake pedals and observe the yellow brake pressure indicator.
  - ▶ If yellow brake pressure is NOT indicated, the brake system has properly transferred to the secondary BSCU channel.
    - See Approach Procedures.
  - ▶ If yellow brake pressure is indicated with the pedals depressed, the brake system has transferred to alternate braking.
    - Select the ECAM WHEEL page.
    - > If “A/SKID” does NOT appear in amber on the WHEEL page, the brake system will provide alternate brakes with anti-skid protection.
      - See Approach Procedures.
    - > If “A/SKID” appears in amber, anti-skid is inoperative. Accomplish the following:
      - With the landing gear in the **up** position:  
A/SKID & N/W STRG . . . . OFF then ON

---

**Caution! Do not cycle the A/SKID & N/S STRG switch in flight with the gear extended.**

---

▼ Continued on next page ▼

▼ **BRAKES BSCU CH 1 (2) FAULT or SYS 1 (2) FAULT continued** ▼

>> If the brake system returns to normal:



>> If the brake system remains on alternate brakes without anti-skid:

- Refer to the “BRAKES ANTI SKID NWS FAULT” on page 14.1.

**STATUS**

| APPROACH PROCEDURES                                                                                                                                                                               | INOP SYS        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <div>1. Monitor the ECAM WHEEL page. Messages on this page may indicate a partial loss of braking/steering capability.</div> <div>2. After touchdown, monitor the brake pressure indicator.</div> | BRAKES CH 1 (2) |



**CONFIG PARK BRK ON**

**Condition:** Parking brake is ON when thrust levers are set at the TOGA or FLX power position.

1. PARK BRK. . . . . Verify OFF
- ▶ If warning remains on:
- Check that the pressure is zero on the BRAKES pressure indicator.



## L / G DOORS NOT CLOSED

**Condition:** A gear door does not agree with gear lever position.

- ▶ If the L/G lever is in the DOWN position:
  - **Do Not** recycle gear if the gear is extended (normal green gear indication). Leave gear extended for landing.
  - If nose gear door open, nosewheel steering may be unavailable.
  - Gear doors will not contact ground on landing.
- ▶ If the L/G lever is in the UP position:
  - Reduce speed to less than 220 knots.
  - Recycle the landing gear by selecting the L/G lever Down.
  - Wait for gear to downlock and gear doors to close (as depicted on the wheel page).
  - Landing gear lever . . . . . Up

**Note:** Recycling switches the active LGCIU.

- > If recycling the landing gear is unsuccessful:
  - **Do Not** exceed 250 knots (or 0.60M).

**Caution!** Flight with landing gear down will significantly increase the fuel consumption and decrease the climb gradient.

### STATUS

|  |          |
|--|----------|
|  | INOP SYS |
|  | L/G DOOR |



**L / G GEAR NOT DOWN**

**Condition:** Warning appears at 750 feet AGL if the landing gear lever is not set to DOWN, and the system has not failed.

**Note:** This warning may occur in case of landing gear position sensor disagreement between LGCIU 1 and 2. In this case, verify gear lever DOWN and at least 1 green triangle displayed for each landing gear on the WHEEL page. This confirms the landing gear is downlocked. If so, use the EMER CANC pb to cancel the warning.

► If landing gear is not down:

- Go-around.

**Note:** Lowering the gear at less than 1,000 feet AGL and continuing the approach violates stable approach criteria.



**L / G GEAR NOT DOWNLOCKED**

**Condition:** One gear is not downlocked and the landing gear is selected down *OR* the landing gear sequence is not complete within 30 seconds.

**Note:** Perform this QRH checklist in lieu of the ECAM.

1. Slow below 220 knots.
2. Recycle the landing gear lever as follows.
  - Landing gear lever . . . . . Up
  - Wait for landing gear to uplock and doors to close.
  - Landing gear lever . . . . . Down
  - Wait 60 seconds after selecting gear down.
  - Check for proper gear down indications.

**Note:** The landing gear is considered down and locked when the gear lever is DOWN and at least 1 green triangle is displayed for each gear on the WHEEL page.

- ▶ If successful:
- Accomplish Landing Checklist.



- ▶ If unsuccessful:

**Note:** Fuel consumption may be considerably higher, possibly as much as doubled. Establish time parameters for beginning approach.

▼ Continued on next page ▼

**▼ L/G GEAR NOT DOWNLOCKED continued ▼**

- Recycle the landing gear in the same manner up to 5 times, if necessary, as follows;
  - Place the landing gear lever UP.
  - Wait for landing gear to uplock and doors to close.
  - Place gear lever DOWN.
- Wait 60 seconds between each recycling.
  - >> If proper gear down indications are obtained at any point:
    - Accomplish Landing Checklist.  

  - >> If unsuccessful after 5 recycling attempts:
    - See “Landing Gear Gravity Extension” on page 14.15  


## L / G GEAR NOT UNLOCKED

**Condition:** The landing gear retraction sequence is not complete within 30 seconds.

- ▶ If the landing gear doors are closed (normal indication on the ECAM WHEEL page) and the landing gear is not unlocked:
  - Avoid excess G factors. With the landing gear resting on the doors, excessive load factors may damage the doors.



- ▶ If the landing gear doors are not closed (amber on the WHEEL page):
  - **Do Not** exceed 220 knots (or 0.54M).
  - Recycle the landing gear by selecting the L/G lever Down.
  - Wait for gear to downlock and gear doors to close (as depicted on the wheel page).
  - Landing gear lever . . . . . Up

**Note:** Recycling switches the active LGCIU.

- > If the landing gear doors still do not unlock properly (after 30 seconds):
  - Landing gear lever . . . . . DOWN
  - **Do Not** exceed 280 knots (or 0.67M).

**Caution! Flight with the landing gear down increases fuel consumption and decreases the climb gradient.**

### STATUS

|  |             |
|--|-------------|
|  | INOP SYS    |
|  | L/G RETRACT |



**L / G GEAR UPLOCK FAULT**

**Condition:** One gear’s uplock device is engaged with the corresponding gear downlocked.

1. **Do Not** raise the landing gear.

**Warning!** The landing gear must be left down to avoid structural damages as the uplock device will stay in the locked position.

2. **Do Not** exceed 280 knots (or 0.67M).

**Caution!** Flight with landing gear down will significantly increase the fuel consumption and decrease the climb gradient.

| STATUS |             |
|--------|-------------|
|        | INOP SYS    |
|        | L/G RETRACT |



### Landing Gear Gravity Extension

**Condition:** The landing gear must be lowered by gravity extension.

1. Raise and turn the GRAVITY GEAR EXTN handcrank.

**Note:** The handle must be rotated clockwise 3 turns until the mechanical stop is reached.

2. Landing gear lever. . . . . DOWN
3. Check for proper gear down indications.

**Note:** Depending on aircraft speed, the L/G doors may be displayed in the amber transit position.

**Note:** Disregard/clear spurious BRAKES SYS 1(2) FAULT, LGCIU 2 FAULT, and REVERSER 2 INOP messages that may be triggered by the gravity extension.

**Note:** The landing gear is considered down and locked when the gear lever is DOWN and at least 1 green triangle is displayed for each gear on the WHEEL page.

- ▶ If gravity extension is successful:

---

**Caution! Nose wheel steering is lost and the gear doors will remain down.**

---

---

**Caution! Do Not reset the GRAVITY GEAR EXTN handcrank (to avoid further damage).**

---

- ▶ If gravity extension is unsuccessful:
  - Refer to “Landing With Abnormal Landing Gear” on page 14.24



**L / G LGCIU 1 (2) FAULT**

**Condition:** There is a fault in either the number 1 or number 2 landing gear control interface unit.

**Note:** If L/G LGCIU 1 (2) FAULT is annunciated on the ground, reset the system as shown on page NNOI.1.9, LGCIU, Computer Resets.

**Note:** When the aircraft is on the ground with the slats extended and the thrust levers at idle, the associated engine will only reduce to approach idle.

- ▶ If LGCIU 1 is inoperative:
    - GPWS SYS . . . . . OFF
- Note:** GPWS receives “L/G in up position” information even if the landing gear is down. Setting the GPWS SYS pushbutton to OFF will prevent untimely warnings during the approach.

**Note:** The forward instrument panel gear indicating lights receive information from LGCIU 1 only. Use the ECAM WHEEL page for gear down indications.

**Caution! Reverser 1 is inoperative.**

- ▶ If LGCIU 2 is inoperative:
  - Crew Awareness

**Caution! Reverser 2 is inoperative.**

 **Continued on next page** 

▼ **L/G LGCIU 1 (2) FAULT continued** ▼

- If the L/G LGCIU 1 FAULT and L/G LGCIU 2 FAULT messages appear together on the ECAM:
- Refer to “L/G LGCIU 1 + 2 FAULT” on page 14.18

**STATUS**

*CAT III approach not authorized.*

|                          |                                                     |
|--------------------------|-----------------------------------------------------|
|                          | INOP SYS                                            |
| ENG 1 (2) APPR IDLE ONLY | LGCIU 1 (2)<br>REV 1 (2)<br>GPWS (if LGCIU 1 Fault) |



**L/G LGCIU 1 + 2 FAULT**

**Condition:** Both LGCIUs are faulty.

Normal landing gear control is lost and gravity extension required. Landing gear position indications may be unavailable.

**Note:** Idle on both engines is limited to approach idle only.

**Note:** CAT II or III approach and/or autoland not authorized.

▼ Continued on next page ▼

▼ L/G LGCIU 1 + 2 FAULT continued ▼

**STATUS**

*CAT II or III approach not authorized.*

| APPROACH PROCEDURES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | INOP SYS                                                                                                  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| <p>1. GPWS SYS . . . . . OFF</p> <p><b>Note:</b> This prevents undue gear warnings.</p> <p>2. When ready for approach, raise and turn the GRAVITY GEAR EXTN handcrank 3 turns until the mechanical stop is reached.</p> <p>3. Landing gear lever. DOWN</p> <p><b>Note:</b> Depending on failure mode of LGCIU 1, LDG GEAR lights <b>may</b> be available.</p> <p><b>Note:</b> Fly-bys are considered to be of minimal value in confirming locked/unlocked condition of landing gear.</p> <p>► If the gear is known to be unsafe:</p> <ul style="list-style-type: none"> <li>Refer to “Landing With Abnormal Landing Gear” on page 14.24</li> </ul> | <p>LGCIU 1 and 2</p> <p>NW STEER</p> <p>REV 1 + 2</p> <p>AP 1 + 2</p> <p>A/THR</p> <p>FDs</p> <p>GPWS</p> |

▼ Continued on next page ▼

▼ L/G LGCIU 1 +2 FAULT continued ▼

| APPROACH PROCEDURES                                                                                      | INOP SYS                                                                   |
|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Caution! BOTH REVERSERS ARE INOPERATIVE.</b>                                                          | LGCIU 1 and 2<br>NW STEER<br>REV 1 + 2<br>AP 1 + 2<br>A/THR<br>FDs<br>GPWS |
| <b>Caution! Nose wheel steering is lost. Do not reset the GRAVITY GEAR EXTN handcrank after landing.</b> |                                                                            |



**Condition:** One landing gear shock absorber did not extend after liftoff or did not compress after landing, causing aircraft systems to be in wrong mode. Nosewheel may be deflected 90° from center if triggered in conjunction with the WHEEL N/W STRG FAULT. [AFM]

- Note:** During operations on contaminated taxiways, the radio altimeter may compute invalid data, activating false warnings/faults, including L/G SHOCK ABSORBER FAULT. Disregard these warnings.

- 444 —

- 

**Caution! Flight with the gear down will increase fuel consumption and decrease climb gradient.**

▼ Continued on next page ▼

---

**Caution! If WHEEL N/W STRG FAULT is also displayed, the nose wheels may be at maximum deflection. (turned 90° from center). [AFM]**

---

- ▶ If WHEEL N/W STRG FAULT is also displayed with the landing gear down:
    - Check all gear doors closed on ECAM WHEEL page.
    - A/SKID & N/W STRG switch. . . . OFF then ON
      - >> If WHEEL N/W STRG FAULT no longer displayed, the nose wheel is recentered. Rearm auto brakes as necessary.
      - >> If WHEEL N/W STRG FAULT remains on ECAM. The nose wheel may not be centered. During landing, delay nose wheel touchdown for as long as possible.
- [AFM]**



## L / G SYS DISAGREE

**Condition:** There is a disagreement between the landing gear positions detected by LGCIU 1 and by LGCIU 2.

**Note:** Fly-bys are considered to be of minimal value in confirming locked/unlocked condition of landing gear.

1. Ensure that at least one LGCIU indicates that the landing gear are all down before landing.

**Note:** Reference the ECAM WHEEL page for proper gear indications since the indicators on the center instrument panel may be inoperative. If at least one LGCIU indicates that the gear are down (3 green), consider the gear are down and locked. Use the EMER CANC pb to silence the landing gear warnings at 750 feet AGL on approach and in the flare.

### STATUS

|                                                                                                                                                                               | INOP SYS                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <p>► If LGCIU 1 is indicating the landing gear is not down (no green lights on forward panel):</p> <ul style="list-style-type: none"> <li>• GPWS pb . . . . . OFF.</li> </ul> | <p>A/THR *</p> <p>AP 1 + 2 *</p> <p>* May or may not be inoperative depending on the failure mode.</p> |



**Landing With Abnormal Landing Gear**

**Condition:** This procedure is intended for use when one or more landing gear fail to extend and/or lock down following the application of the “Landing Gear Gravity Extension” procedure in this section.

**Note:** If, on the WHEEL page, at least one LGCIU indicates that the gear are down (3 green), consider the gear are down and locked.

It is preferable to use any available landing gear, rather than carry out a belly landing.  
It is recommended to use a hard surfaced runway for landing.

- 1. Notify the flight attendants of the situation.

**Caution!** Be aware that forward passenger door evacuation rates (if abnormal NOSE L/G) or aft passenger door evacuation rates (if abnormal MAIN L/G) are considerably reduced due to abnormal slide inclination. Aft passenger doors should not be used for evacuation with the NOSE L/G collapsed.

- 2. Notify ATC.
- 3. GPWS SYS . . . . . OFF
- 4. OXYGEN CREW SUPPLY pb . . . . . OFF
- 5. SEAT BELTS, NO-SMOKING SIGNS,  
and EMER EXIT LT . . . . . ON
- 6. GALLEY pb . . . . . OFF

▼ Continued on next page ▼

▼ Landing With Abnormal Landing Gear continued ▼

7. Prepare the flight deck by securing all loose equipment.
8. Secure and lock seat belts and shoulder harnesses.

**Note:** Fly-bys are considered to be of minimal value in confirming the condition of landing gear.

9. Reduce fuel to a safe minimum.
10. Determine which landing gear is abnormal:
  - ▶ If the NOSE gear is abnormal:
    - Move the CG location AFT, if possible.
  - ▶ If the MAIN gear is abnormal:
    - Consider reducing the fuel on the side of the failed landing gear.
    - **Do Not** arm the ground spoilers.
    - **Do Not** use reverse thrust.
    - A/SKID & N/W STRG . . . . . OFF
11. LDG GEAR LEVER . . . . . Verify DOWN
12. GRAVITY GEAR EXTN handcrank . . . . . Normal  
(3 counterclockwise rotations and stow handle).

**Note:** Rotating the handcrank back to normal may pressurize the landing gear down actuators. Returning the handcrank to normal may also close the gear doors.

13. Obtain the status of the cabin from the flight attendants.
14. Review Emergency Landing Considerations on 0.6.

**Before Landing:**

15. Start the APU, if available.

▼ Continued on next page ▼

▼ Landing With Abnormal Landing Gear continued ▼

16. RAM AIR pb . . . . . ON

17. On approach

- EMER CANC the L/G GEAR NOT DOWN warning (if reqd)

**At 1,000 feet:**

- Announce “BRACE FOR LANDING” via the PA.

**Short Final and Touchdown:**

- ▶ If the NOSE landing gear is abnormal:
  - At main gear touchdown, have the PM place both ENG MASTERS to OFF.
  - Keep the nose off the runway by using the elevator.
  - Apply the brakes manually (compatible with elevator efficiency).
- ▶ If one MAIN landing gear is abnormal:
  - At touchdown, have the PM place both ENG MASTER switches OFF. (Use the EMER CANC pb to silence the ECAM warnings.)
  - Keep the failure side wing off the runway as long as possible.
  - Maintain directional control with rudder and brakes.
  - Modulate brake pressure to 1,000 PSI.

▼ Continued on next page ▼

▼ Landing With Abnormal Landing Gear continued ▼

- ▶ If BOTH MAIN landing gear are abnormal:
  - Just prior to touchdown, have the PM place both ENG MASTERS to OFF.
  - Maintain a touchdown pitch angle of at least 6°.

**Note:** A pitch angle of 6° or greater will ensure that the tail section will impact first.

- ▶ If evacuation is desired, after aircraft has come to a stop, see “Evacuation” on the back cover of this QRH.



**Loss of Braking**

Condition: Loss of pedal braking on the ground.

- 1. Thrust Levers . . . . .Maximum Reverse (as reqd)
  - 2. Brake pedals . . . . . Release
  - 3. A/SKID & NWS switch . . . . . OFF
  - 4. Brake pedals . . . . . APPLY (max 1000 psi)
  - 
  - 5. If required, apply parking brake with short, successive applications.
- 

**WHEEL HYD SEL FAULT**

Condition: The normal brake selector valve is failed open.

**Caution! Full green hydraulic pressure is supplied to the open servo valves. Do not tow the aircraft with the green system pressurized.**

- 1. A/SKID & N/W STRG switch . . . . . Keep ON  
(Selecting A/SKID & N/W STRG OFF or resetting the BSCU will cause maximum deflection of the nosewheel.)

**Note:** As long as anti-skid is operative, brake pressure is regulated by the normal servo valves.

Nosewheel steering remains available.



## WHEEL N / W STRG FAULT

**Condition:** The BSCU has detected a nose wheel steering fault.

- If on the ground:
- Attempt a reset of the system as shown on page NNOI.1.6, BSCU, Computer Resets.
  - Contact maintenance to determine if maintenance is required. Maintenance must be contacted regardless of outcome of reset.

---

**Caution! If taxiing, use care and a max speed of 10 knots.**

---



▼ Continued on next page ▼

▼ WHEEL N / W STRG FAULT continued ▼

**Caution!** If both N / W STRG FAULT and L / G SHOCK ABSORBER FAULT messages are displayed, the nose wheel may be turned 90° from center. [AFM]

- ▶ If in flight and both N/W STRG FAULT and L/G SHOCK ABSORBER FAULT messages are displayed, proceed to L/G SHOCK ABSORBER FAULT procedure, this section.
- ▶ If in flight and N/W STRG FAULT (only) displayed:
  - Nosewheel steering is lost.
  - Use differential braking to steer the aircraft.
  - CAT II, CAT III approaches are not authorized.
  - See ECAM STATUS.

**STATUS**

*CAT II or III approach not authorized.*

|                   |                          |
|-------------------|--------------------------|
|                   | INOP SYS                 |
| CAT 3 SINGLE ONLY | CAT 3 DUAL<br>N.W. STEER |



**Table of Contents**

**None**

## **Table of Contents**

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## Non-Normal Ops Info

### Ops Info

## Chapter NNOI

### Section 1

### ILS Approach Equipment Requirements (Not for Dispatch)

If operable, both the autopilot and flight director will be utilized for all ILS approaches when the reported weather is below 4,000 RVR or 3/4 mile.

| <b>Equipment Required<br/>in addition to FAR<br/>121.305</b> | <b>CAT I<br/>&gt; 1800 RVR or<br/>1/2 Mile</b> | <b>CAT II<br/>Autoland<br/>1000 RVR</b> | <b>CAT III<br/>Autoland<br/>300 RVR</b> |
|--------------------------------------------------------------|------------------------------------------------|-----------------------------------------|-----------------------------------------|
| Anti-Skid                                                    | 0                                              | Required                                | Required                                |
| Autobrakes                                                   | 0                                              | 0                                       | Required                                |
| Autopilot / Flight Director                                  | 1 or 1 (a)                                     | 1 AP Engaged                            | 2 AP Engaged                            |
| Autothrust                                                   | 0                                              | Required                                | Required                                |
| Engine(s) Operating                                          | 1 (e)                                          | 1 (d)                                   | 2                                       |
| FWC                                                          | 0                                              | 1                                       | 2                                       |
| ILS Receiver                                                 | 1                                              | 2                                       | 2                                       |
| Marker beacon system                                         | 0                                              | 0 (c)                                   | 0                                       |
| Nosewheel Steering                                           | 0                                              | Required                                | Required                                |
| PFD/ND                                                       | 0                                              | 2                                       | 2                                       |
| Radio Altimeter                                              | 0                                              | 2                                       | 2                                       |
| Standby Attitude Indicator                                   | 0                                              | Required                                | Required                                |
| Windshield Wipers / Heat                                     | 0                                              | 1 (b)                                   | 1 (b)                                   |

- (a) Exception: For approaches with "autopilot coupled approaches not authorized" restrictions, hand-flown CAT I are authorized to applicable minimums with an operable flight director.
- (b) Windshield Wiper and Window Heat are required for the PF.
- (c) Inner Marker is required for CAT II RA/NA.
- (d) A320 flaps FULL configuration only.
- (e) Automatic landings can be made using flaps 3 or flaps FULL (dual or single engine) if CAT 3 SINGLE or CAT 3 DUAL is displayed on FMA.

## RNAV Approach Equipment Requirements (Not for Dispatch)

| RNAV Equipment Requirements     |                 |            |
|---------------------------------|-----------------|------------|
| Equipment Required              | RNAV Approach   |            |
|                                 | RNAV (GPS)      | RNAV (RNP) |
|                                 | Number Required |            |
| ADR                             | 2(B)            | 3          |
| Autopilot                       | 1               | 1(A)       |
| Autothrust Function             | 0               | 1          |
| ELAC                            | 0               | 2          |
| FAC                             | 0               | 2          |
| FCU                             | 1               | 2          |
| Flight Director Systems         | 1               | 2          |
| FMGC                            | 1               | 2          |
| Global Positioning System (GPS) | 1               | 2          |
| GPWS                            | 0               | 1          |
| GPWS TERR                       | 1               | 1          |
| IR                              | 2(B)            | 3(B)       |
| MCDU                            | 1               | 2          |
| Navigational Displays           | 0               | 2          |
| PFD with VDEV indications       | 0               | 2          |
| Radio Altimeters                | 0               | 2          |
| SEC                             | 0               | 1          |
| SFCC                            | 0               | 2          |

(A) Two Autopilots required if RNP<0.3 for approach, or RNP<1.0 in go around or departure.

(B) IRU 1 and ADR 1 required for GPWS TERR functionality.

(B) All IRs operating in NAV Mode. RNAV (RNP) only

## RNAV Enroute Equipment Requirements (Not for Dispatch)

| Equipment Required              | RNAV Enroute |
|---------------------------------|--------------|
| ADR                             | 2            |
| Autopilot                       | 1            |
| Autothrust Function             | 0            |
| ECAM                            | 1            |
| EFIS Flight Displays            | 3(D)         |
| FCU                             | 1            |
| Flight Director Systems         | 1            |
| FMA                             | 0            |
| FMGC                            | 1            |
| Global Positioning System (GPS) | 1            |
| GPWS                            | 0            |
| GPWS TERR                       | 0            |
| IRU                             | 2            |
| MCDU                            | 1            |

(D) For PF both ND and PFD are required. For PM at least one display is required with associated switching to allow ND to be viewed when desired

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## Computer Resets

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### General

In most cases, computers may be recovered following abnormal behavior or a detected fault either by a computer reset or by interrupting the power supply for a short period of time. The flight deck crew may reset the computers/systems listed in the following table (without consulting Maintenance) in an attempt to regain a faulty system.

The crew must perform the reset procedure as published. The flight crew can reset most of the aircraft's computers with a normal flight deck control (selector or pushbutton). However, for some systems, the only way to cut off electrical power is to pull the associated Circuit Breaker (C/B).

When resetting a system using a flight deck control, wait 3 seconds to reselect. When using a Circuit Breaker to reset a system, wait 5 seconds to reset (unless otherwise specified).

### On the ground:

Almost all computers can be reset per MCC guidance and are not limited to the ones indicated in the table. The following restrictions apply:

- ECU (Engine Control Unit) or EIU (Engine Interface Unit): cannot be reset while the engine is running.
- BSCU (Brake Steering Control Unit): aircraft must be stopped with parking brake set.

### In flight:

As a general rule, the Flight Crew must restrict computer resets to those listed in the table, QRH, or Vol. 1 procedure. Before taking any action on another computer, the flight crew must consider and fully understand the consequences and crosscheck to ensure that the C/B label corresponds to the affected system. Resets other than those listed as “in flight” in the table may be performed with the following restrictions:

- Pilots should never pull an ECU, EIU, or SFCC circuit breaker,
- The C/B label should be crosschecked to ensure it corresponds to the affected system,
- The affected system must not be designated “on the ground only”, and
- The reset must be performed with the concurrence of both MCC and the captain.

### Caution:

- Comply with all restrictions for each procedure before pulling and resetting a circuit breaker.

- 
- Only one computer may be reset at a time, unless specified by the following procedures.
  - If one attempt at a computer reset is unsuccessful, maintenance must be contacted.

If the system returns to normal after resetting a circuit breaker or a switch using the following procedures, make an “INFO ONLY” logbook write-up to document the reset (e.g.; “INFO ONLY: C/B FCDC 2 (Q20) reset as per QRH Supplemental Procedure, FCDC system normal.”).

## Reset Procedures

| System     | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ATSU       | <p>(3101-3177 and 3271-3278)<br/> <b>On the ground or in flight:</b><br/>           Pull the following C/Bs in sequence:</p> <ul style="list-style-type: none"> <li>• <b>L16, L15</b></li> <li>• After 5 secs, push <b>L16, L15</b></li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| AVNCS VENT | <p>Any associated ECAM message<br/> <b>On the ground ONLY:</b><br/>           Pull all three C/Bs and then reset</p> <ul style="list-style-type: none"> <li>• AIR COND/AVNCS VENT/CTL (<b>D6 &amp; 7</b> 3209-3211) or (<b>D5 &amp; 6</b> 3212-3278, 3101-3177)</li> <li>• AIR COND/AVNCS VENT/MONG (<b>Y17</b>)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BSCU       | <p>WHEEL N.W. STEER FAULT (ground only) or<br/>           BRAKES BSCU CH 1 (2) FAULT or<br/>           BRAKES SYS 1(2) FAULT<br/> <b>On the ground</b> with aircraft stopped, tow bar disconnected, and parking brake applied:</p> <ul style="list-style-type: none"> <li>• Cycle A/SKID &amp; N/W STRG switch OFF, then ON<br/>             - If fault remains, attempt reset of BSCU C/Bs (<b>M33, M34, M35, M36</b>)</li> <li>• Check normal braking efficiency</li> <li>• Rearm autobrakes, if required</li> </ul> <p><b>In flight</b> with landing gear retracted:</p> <ul style="list-style-type: none"> <li>• Cycle A/SKID &amp; N/W STRG switch OFF, then ON</li> <li>• Rearm autobrakes, if required</li> </ul> <p><b>CAUTION: Reset not authorized in flight with gear extended.</b></p> |
| CAB PRESS  | <p>SYS 1 (2) FAULT<br/> <b>On the ground ONLY:</b><br/>           Pull then reset the appropriate C/B</p> <ul style="list-style-type: none"> <li>• AIR COND/CAB/CTL 1 (<b>D09</b>)</li> <li>• AIR COND/CAB/CTL 2 (<b>Y22</b>)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| System             | Actions                                                                                                                                                                                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CARGO              | AFT CRG VENT FAULT or<br>AFT CRG HEAT FAULT or<br>AFT CRG ISOL VALVE<br><b>On the ground ONLY:</b><br>Pull then reset the appropriate C/B <ul style="list-style-type: none"> <li>AFT CARGO VENT &amp; HTG (<b>S20</b> 3209-3211) or (<b>C7</b> 3212-3278, 3101-3177)</li> </ul>                                                               |
| CARGO SMOKE (SDCU) | SMOKE AFT (FWD) CRG DET FAULT<br><b>On the ground ONLY:</b> <ul style="list-style-type: none"> <li>Pull (simultaneously) AIR COND/SDCU/CHAN 1 C/B (<b>T17</b> 3209-3211) or (<b>C6</b> 3212-3278, 3101-3177) and AIR COND/SDCU/CHAN 2 C/B (<b>T18</b>) for 5 seconds, then reset</li> </ul>                                                   |
| CVR                | NO MESSAGE<br>COCKPIT VOICE RECORDER <ul style="list-style-type: none"> <li>Pull E13 &amp; E14 and reset after 10 secs</li> </ul>                                                                                                                                                                                                             |
| CIDS               | CIDS 1 + 2 FAULT<br>Pull in the following order (if installed): <ul style="list-style-type: none"> <li><b>G1, M5, G2, &amp; M6</b></li> </ul> Note: C/B not installed in position G1 on all aircraft.<br>After 10 seconds, reset in the following order: <ul style="list-style-type: none"> <li><b>M5, M6, G1, &amp; G2</b></li> </ul>        |
| CIDS               | Forward Attendant Panel (FAP) Freeze<br>3209 - 3270: <ul style="list-style-type: none"> <li>Pull <b>M14</b> and reset after 10 secs</li> </ul> 3271-3278 and 3101 - 3177: <ul style="list-style-type: none"> <li>Pull <b>Q14</b> and reset after 10 secs</li> </ul>                                                                           |
| ELAC               | ELAC 1 (2) FAULT or<br>ELAC 1 (2) PITCH FAULT<br>Cycling of the associated ELAC pb OFF/ON (one at a time) is authorized.<br>If an ELAC reset is performed on the ground, the crew must perform a Flight Control check and check the pitch trim position.<br><b>CAUTION: Do not reset an ELAC if uncommanded maneuvers occurred in flight.</b> |

| System | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FAC    | <p>WINDSHEAR DETECTION FAULT or<br/>AUTO FLT YAW DAMPER 1 (2)<br/><b>On the ground ONLY:</b></p> <ul style="list-style-type: none"> <li>• Cycle both FAC pbs to OFF, then ON <ul style="list-style-type: none"> <li>▶ If message remains: With engines off &amp; green/yellow hydraulics pressurized, pull the affected FAC C/Bs &amp; reset after 10 seconds: <ul style="list-style-type: none"> <li>- FAC1 (<b>B3</b>) and (<b>B4</b>) or</li> <li>- FAC2 (<b>M18</b>) and (<b>M19</b>)</li> </ul> </li> </ul> </li> </ul> <p>AUTO FLT RUD TRIM 1 (2) FAULT or<br/>AUTO FLT RUD TRV LIM 1 (2)<br/><b>On the ground ONLY:</b></p> <ul style="list-style-type: none"> <li>• Cycle both FAC pbs to OFF, then ON</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| FCDC   | <p>FCDC FAULT<br/><b>On the ground ONLY:</b><br/>Pull then reset the appropriate C/B</p> <ul style="list-style-type: none"> <li>• FCDC 1 (<b>B10</b>)</li> <li>• FCDC 2 (<b>Q20</b>)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FCU    | <p>FCU 1 (2) FAULT<br/><b>On the ground or in flight:</b></p> <ul style="list-style-type: none"> <li>• For FCU 1, pull <b>B5</b>, reset after 5 secs</li> <li>• For FCU 2, pull <b>M21</b>, reset after 5 secs <ul style="list-style-type: none"> <li>▶ IF UNSUCCESSFUL, <b>on the ground ONLY:</b> <ul style="list-style-type: none"> <li>- Pull both <b>B5</b> and <b>M21</b>, reset after 7 min</li> <li>- Wait 30 secs. before using FCU</li> </ul> </li> </ul> </li> </ul> <p>Verify all FCU selections including FCU altitude and QNH barometric setting, correct as necessary. Verify proper FMA indications, including V-Speeds if prior to takeoff.</p> <p>FCU 1 + 2 FAULT<br/><b>On the ground or in flight:</b></p> <ul style="list-style-type: none"> <li>• Pull <b>B5</b> (FCU 1), reset after 5 secs, then</li> <li>• Pull <b>M21</b> (FCU 2), reset after 5 secs <ul style="list-style-type: none"> <li>▶ IF UNSUCCESSFUL, <b>on the ground ONLY:</b> <ul style="list-style-type: none"> <li>- Pull both <b>B5</b> and <b>M21</b>, reset after 7 min</li> <li>- Wait 30 secs. before using FCU</li> </ul> </li> </ul> </li> </ul> <p>Verify all FCU selections including FCU altitude and QNH barometric setting, correct as necessary. Verify proper FMA indications, including V-Speeds if prior to takeoff.</p> |

| System                | Actions                                                                                                                                                                                                                                                                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FMGC                  | Single / Dual FMGC Failure<br>For FMGC 1 - pull <b>B2</b> , reset after 5 secs<br>For FMGC 2 - pull <b>M17</b> , reset after 5 secs                                                                                                                                                                                                                                                                         |
| FQI                   | L (R) XFR VALVE CLOSED or<br>L (R) OUTER VALVE CLOSED or<br>Abnormal fuel indication<br>Pull then push all three C/Bs: <ul style="list-style-type: none"> <li>FUEL/FQI/CHAN 1 (<b>A13</b>)</li> <li>FUEL/FQI/CHAN 2 (<b>M27</b>)</li> <li>FUEL/FQI/CHANNEL 1 and 2 (<b>L26</b>)</li> </ul>                                                                                                                  |
| FWC                   | FWS FWC 1(2) FAULT<br>Pull then push the affected FWC C/B: <ul style="list-style-type: none"> <li>FWC 1 (<b>E02</b> 3209-3211) or (<b>F01</b> 3212-3278, 3101-3177)</li> <li>FWC 2 (<b>Q07</b>)</li> </ul>                                                                                                                                                                                                  |
| LAVATORY SMOKE (SDCU) | SMOKE LAV + CRG DET FAULT or LAVATORY DET FAULT (may have associated CIDS caution light on F/A panel)<br><b>On the ground ONLY:</b><br>Pull then reset the appropriate C/B <ul style="list-style-type: none"> <li>Pull (simultaneously) AIR COND/SDCU/CHAN 1 C/B (<b>T17</b> 3209-3211) or (<b>C6</b> 3212-3278, 3101-3177) and AIR COND/SDCU/CHAN 2 C/B (<b>T18</b>) for 5 seconds, then reset.</li> </ul> |
| LGCIU                 | LGCIU 1 (2) FAULT<br><b>On the ground ONLY:</b><br>Pull then reset the appropriate C/B <ul style="list-style-type: none"> <li>LGCIU/SYS 1: Pull <b>Q34</b>, then <b>C09</b>; reset <b>C09</b>, then <b>Q34</b>.</li> <li>LGCIU/SYS 2: Pull then reset <b>Q35</b>.</li> </ul>                                                                                                                                |
| MCDU                  | MCDU Locking or Blanking<br>For MCDU 1 - pull <b>B1</b> , reset after 10 secs<br>For MCDU 2 - pull <b>N20</b> , reset after 10 secs                                                                                                                                                                                                                                                                         |

| System          | Actions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SEC             | <p>SEC 1 (2) (3) FAULT</p> <p><b>CAUTION: Never recycle a SEC pb when in ALTN Law with an ADR DISAGREE or when ALTN Law is annunciated shortly after takeoff.</b></p> <p>Cycling a single SEC pb is authorized in flight.</p> <p>► If an SEC reset is performed on the ground, the crew must perform a Flight Control check.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| SFCC            | <p><b>In flight:</b> DO NOT pull any C/B as this could lead to slats/flaps locked.</p> <p><b>On the ground ONLY:</b> Pull (simultaneously, if more than one) then push the affected C/Bs.</p> <p><b>CAUTION: Ground reset NOT AUTHORIZED for SLAT SYS 1 (2) FAULT or SLATS FAULT.</b></p> <ul style="list-style-type: none"> <li>• <b>FLAPS FAULT</b> <ul style="list-style-type: none"> <li>- FLP/CTL AND MONG/SYS 1 (B07)</li> <li>- FLP/CTL AND MONG/SYS 2 (Q21)</li> </ul> </li> <li>• <b>FLAPS SYS 1 FAULT</b> <ul style="list-style-type: none"> <li>- FLP/CTL AND MONG/SYS 1 (B07)</li> </ul> </li> <li>• <b>FLAPS SYS 2 FAULT</b> <ul style="list-style-type: none"> <li>- FLP/CTL AND MONG/SYS 2 (Q21)</li> </ul> </li> </ul> <p><b>CAUTION: If WTB is engaged, maintenance action is due</b></p> |
| SMOKE DET FAULT | <p><b>On the ground ONLY:</b><br/>Pull and reset the following C/Bs:</p> <ul style="list-style-type: none"> <li>• Pull (simultaneously):<br/>AIR COND/SDCU/CHAN 1 C/B (T17 3209-3211)<br/>or (C6 3212-3278, 3101-3177)</li> </ul> <p><b>AND:</b></p> <p>AIR COND/SDCU/CHAN 2 C/B (T18)<br/>for 60 seconds, then reset.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| TCAS            | <p><b>On the ground ONLY:</b><br/>Pull <b>K10</b> and reset after 5 seconds.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

| <b>System</b> | <b>Actions</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VOR           | On the ground ONLY:<br>Bearing Fluctuations <ul style="list-style-type: none"><li>• VOR 1 (<b>G13</b>)</li><li>• VOR 2 (<b>K08</b>)</li></ul>                                                                                                                                                                                                                                                                                                                 |
| WHC           | ANTI ICE L (R) WINDSHIELD or WINDOW:<br>If on the ground, packs OFF and OAT > 40° C, or windshield/window directly heated by the sun: <ul style="list-style-type: none"><li>• Select packs on, cooling.</li><li>• After 5 minutes, pull the affected C/Bs and reset after 5 seconds:<ul style="list-style-type: none"><li>- WHC 1 (<b>X13</b>) &amp; WINDOWS L (<b>X14</b>), or</li><li>- WHC 2 (<b>W13</b>) &amp; WINDOWS R (<b>W14</b>)</li></ul></li></ul> |

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| <b>Non-Normal Checklists</b>              | <b>Section 1</b>    |

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## **Introduction**

The Non-Normal Checklists chapters contain checklists used by the flight crew to manage non-normal situations. Most checklists contained in the Non-Normal Checklists chapters correspond to an ECAM message. ECAM messages are generated by manufacturer-developed software. Because the ECAM is not customized for specific airlines, it does not always reflect the current operating philosophy of Delta Air Lines. Consequently, Delta provides QRH emergency/non-normal procedures to provide additional information/guidance for Delta standardization, to address situations that are not recognized by the ECAM, or for the remote case of an ECAM failure.

The Flight Warning Computers generate ECAM messages and checklists. At times, procedural changes from Airbus may outpace updates to the FWC, or other aircraft systems. In this case, the QRH procedure should be used, rather than the ECAM procedure. These exceptions to the normal “ECAM first, then QRH” philosophy are identified in the ECAM Exceptions tab of the QRH.

Checklists without an ECAM message are called unannunciated checklists. Most unannunciated checklists are in the associated system section. For example, Engine Fuel Leak is in section 12, Fuel. Unannunciated checklists with no associated system (such as Volcanic Ash) are in section 0, Miscellaneous. In addition, the Miscellaneous section contains checklists titled “Considerations.” These checklists are designed to assist crewmembers in the decision making process to accomplish a non-normal maneuver (such as a decision to perform an overweight landing), assist in the preparation and execution of a non-normal maneuver (such as preparation for a ditching), and/or provide considerations that should be taken into account after a non-normal maneuver has been executed (such as post RTO). These checklists should be referenced as time and conditions allow.

All checklists have condition statements. The condition statement briefly describes the situation that caused the ECAM alert message.

Checklists may include memory items. Memory items are critical steps that must be done from memory before reading the checklist. Condition and precaution statements, and notes associated with memory items (i.e., above the dashed line) support action steps and are not considered memory items. The last memory item is followed by a dashed horizontal line.

Checklists that need a quick response are listed in the Quick Action Index on the front cover of the QRH. Some checklist titles are shown in a larger font (such as Evacuation) to make them easier to read under conditions where crew members may be wearing an oxygen mask or under conditions of reduced visibility (e.g., smoke in the flight deck). In the table of contents of each system section, Quick Action Index checklists are listed first, followed by all other checklists. The titles of Quick Action Index checklists are printed in bold type.

Checklist titles in upper case (such as BRAKES HOT) are annunciated by an ECAM alert message. Checklist titles in title case (such as Windshield Cracked) are not annunciated.

---

## **Non-Normal Checklist Operation**

### **General**

Non-normal checklists start with steps to correct the situation. If needed, information for planning the rest of the flight is included. Flight patterns for some non-normal situations are located in the Flight Crew Training Manual (FCTM), and show the sequence of configuration changes.

If a checklist or a step in a checklist is not applicable to all airplanes, airplane effectivity information is included in the checklist. Airplane effectivity can be listed by ship number or airplane model. If a checklist is applicable to some, but not all airplanes, airplane effectivity is centered below the checklist title. If a step in a checklist is applicable to some, but not all airplanes, airplane effectivity is included above the step. If a checklist or a step in a checklist is applicable to all airplanes, airplane effectivity information is not included.

While every attempt is made to supply needed non-normal checklists, it is not possible to develop checklists for all conceivable situations. For example, in some smoke, fire or fumes situations, the flight crew may need to move between the Cabin Smoke/Fire/Fumes checklist and the Removal of Smoke/Toxic Fumes checklist. In some multiple failure situations, the flight crew may need to combine the elements of more than one checklist. In all situations, the captain must assess the situation and use good judgment to determine the safest course of action.

---

## **Landing at the Nearest Suitable Airport**

There are some situations where the crew must always land at the nearest suitable airport. These situations include, but are not limited to, conditions where:

- The ECAM displays “LAND ASAP” in red;

Note: If the ECAM displays “LAND ASAP” in amber, consideration should be given to landing at the nearest suitable airport.

- Fire or smoke continues;
- Normal aircraft pitch, roll, or yaw cannot be maintained using aircraft trim systems;
- There is only one AC power source (such as an engine or APU generator);
- One hydraulic system remains; or
- Any other situation determined by the crew to have a significant adverse effect on safety if the flight is continued.

## **Land as Soon as Possible**

It must be stressed that for persistent smoke or a fire that cannot be positively confirmed to be completely extinguished, the earliest possible descent, landing, and evacuation must be done.

If a smoke, fire or fumes condition becomes uncontrollable, “Land As Soon As Possible” implies immediate diversion to a runway. However, the smoke, fire or fumes situation may be severe enough that the Captain should consider an overweight landing, a tailwind landing, an off-airport landing, or a ditching.

## **Checklists Directing Engine Shutdown**

Checklists directing an engine shutdown must be evaluated by the captain to determine whether an actual shutdown or operation at reduced thrust is the safest course of action. Consideration must be given to the probable effects of running the engine at reduced thrust.

---

## Non-Normal Checklist Assumptions

Non-normal checklists assume:

- System controls are in the normal configuration for the phase of flight before the start of the non-normal checklist.
- Aural alerts are silenced and the master caution system is reset by the flight crew as soon as the cause of the alert is recognized.
- During engine start and before takeoff, the associated non-normal checklist is done if a non-normal situation is identified. After completion of the checklist, consult the Minimum Equipment List (MEL) to determine if dispatch relief is available.
- The EMERGENCY position of the oxygen regulator is used when needed to supply positive pressure in the masks to remove contaminants. The 100% position of the oxygen regulator is used when positive pressure is not needed but contamination of the flight deck air exists. The Normal position of the oxygen regulator is used if prolonged use is needed and the situation allows. If smoke/fire/fumes are detected in another part of the aircraft, flight crew judgment will determine if/when masks are donned.

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## Circuit Breaker Policy

**DO NOT** reset a tripped circuit breaker in flight unless the captain, using emergency authority, deems it necessary for a safe continuation of the flight. In this case, the tripped circuit breaker may be reset only once and only after observing a five minute cooling period.

Crew members may pull and reset a circuit breaker only when directed to do so by Maintenance, a specific QRH, MEL, or VOL 1 procedure, or when following the Computer Reset procedures in the NNOI section. If this action restores the failed system, make an “INFO ONLY” entry in the Aircraft Maintenance Log.

---

## **Non-Normal Checklist Use**

### **General**

Non-Normal checklist use starts when the airplane flight path and configuration are correctly established. Only a few situations need an immediate response (such as CAB PR EXCESS CAB ALT or Rapid Depressurization). Usually, time is available to assess the situation before corrective action is started. Flight path control must never be compromised.

Use the following guidelines when dealing with a non-normal situation:

- Fly the aircraft
- Do not hurry
- Cancel the warning
- Identify the emergency or Non-Normal
- Accomplish recall items from memory (if applicable)
- Read the ECAM/checklist (if item is an ECAM Exception, leave the ECAM as is and proceed directly to the appropriate QRH NNC).

This guidance recognizes the following:

- Non-Normal procedure completion and PF duties (flying, navigation, communication with ATC) each require the full attention of the pilot performing the task in order to ensure accuracy and maintain safety.
- One pilot cannot effectively perform or monitor all required tasks.
- During high workload periods where time is critical, the PF may not be able to monitor ECAM operation.
- Unnecessary distractions increase the likelihood of errors.
- Accidents have occurred in situations where all pilots were concentrating on the Non-Normal procedures and nobody was actively monitoring the airplane.
- Human Factors studies indicate that reading checklist procedures aloud decreases the likelihood of human error. It also provides the PF the opportunity to monitor and acknowledge the accomplishment of the ECAM/QRH procedure. In order to ensure proper checklist selection and completion it is important that the PF actively monitor the accomplishment of the non-normal procedure as his/her workload permits. However, the PF's primary responsibility must be to maintain control of the aircraft.

### **Calling for the Checklist**

At the onset of the ECAM annunciation or when a non-normal situation becomes apparent:

- The pilot recognizing the non-normal will state the ECAM annunciation (title). If un-annunciated, the pilot will state the condition.

- Both pilots will accomplish memory items associated with the non-normal.
- If an ECAM annunciated malfunction, both pilots will determine if the procedure is an ECAM Exception (Ref. QRH ECAM Exceptions Tab).
- The captain will assign PF and PM duties. PF duties will include control of the aircraft and communication with ATC. In determining PF and PM duties, the captain must consider the principles of CRM, TEM, the nature of the non-normal, and the need to coordinate operational decisions with external resources.
- The PF will conduct the flight as directed by the captain (e.g., maintain course, initiate a diversion), communicate with ATC, and configure the aircraft as necessary.
- The PM will complete the non-normal ECAM (if any), followed by the QRH procedure (time permitting).
- **ECAM Exceptions:** If the procedure is a current ECAM Exception (i.e. listed under the QRH ECAM Exceptions Tab), the PM will complete the QRH procedure. When the QRH procedure has been completed, the ECAM procedure for the ECAM Exception non-normal may be cleared. Care should be used to ensure that **only** the ECAM Exception procedure is cleared from the ECAM. Additional ECAM procedures, which are not exceptions, should be completed using the ECAM in the normal "ECAM first, then QRH" manner.

## Completing the Non-Normal Procedure

### ECAM Operation

**Note: For “no time” emergencies reference FOM chapter 10 regarding the captain's emergency authority.**

The ECAM abnormal procedure is divided into three specific areas of information. The first area (ECAM checklist on the E/WD) displays the affected system (underlined) in red or amber, followed by the title of the failure. Action steps (listed in blue) required to stabilize the aircraft are listed below the title; for example:

#### ENG 1 FAIL

ENG MODE SEL.....IGN

The second area of information (right side of the E/WD) displays special messages (such as LAND ASAP) and secondary affected systems impacted by the non-normal. The third area of information displayed is the STATUS page, which supplies information on inoperative components and non-normal configurations required for landing (if required).

After the PIC assigns duties and an overall plan of action, the PF should call “ECAM Actions”. The PM will confirm the failure by checking/inspecting the overhead panel and/or associated SD. The PM shall manage the ECAM checklist procedure. The PM will read aloud each message and step in order, and complete the ECAM checklist procedure to a lights out condition. Lights out refers to the CLR light being extinguished on the ECAM Control Panel. The ECAM checklist can include monitored and non-monitored items. When a monitored action step is completed it will disappear, and the remaining steps will replace it in order. A non-monitored action step, such as “NOTIFY ATC”, will remain displayed.

**Note: The CLR PB will never clear blue action items.**

When completing an ECAM action item (e.g. moving a control), the PM will read aloud the action to be taken (e.g., “ENG MODE SEL...IGN”). As the action item is completed, the crewmember taking the action will again state the checklist response (e.g., “Ignition” IGN), confirming that action was taken.

After all of the actions listed under the title are completed, the PM will verbally challenge the PF to clear the failed system message (e.g., “Clear Engine 1 Fail?”). The PF should visually confirm that the referenced ECAM actions have been completed, and then state “Clear Engine 1 Fail.” Before the PM presses the CLR key, the PM should visually confirm the ECAM failure title that will be cleared. The PM will then press the CLR key. This ensures that any additional Master Warnings or Cautions will be advanced to the top of the ECAM checklist section. Complete each subsequent ECAM checklists using the same procedure before proceeding to the system and status pages.

When the ECAM displays several failures at one time, the flight crew should repeat the same sequence for each failure (ECAM actions, request “CLEAR” and confirm “CLEAR” before clearing). When all necessary actions are completed, amber and red failure titles will no longer appear on the E/WD. The affected systems pages will be displayed on the lower ECAM (Systems Display) and provides an easy way to assess overall system status. Before the PM clears a system page, the PM will analyze it and verbally challenge the PF to clear the system page (e.g., “Clear BLEED?”). The PF should check the displayed system page and respond to the challenge (e.g., “Clear BLEED.”). If the ECAM displays several systems pages, the flight crew should repeat the same sequence for each SD (analyze, request “CLEAR” and confirm “CLEAR” before clearing).

**Note: If an extended interruption occurs (ATC call, Flight Attendant call, etc.) or a configuration change is necessary, the PF should have the PM stop the ECAM procedure. When ready, the PF should ask the PM to continue the ECAM.**

When reaching the STATUS page during the ECAM abnormal procedure, the crew should complete any outstanding normal checklists (e.g., After Takeoff Checklist) and consider any applicable computer resets. If there are no actions to complete or when the actions are complete, the crew should continue the ECAM.

The status page summarizes the status of the aircraft as well as provides minimum information for an approach. Status page approach procedures (i.e., blue action/informational steps) will be addressed at this time. When workload permits, the PM should brief the PF on the status of relevant inoperative aircraft systems as well as limitations displayed on the STATUS page. If the status page indicates limitations, the PM will read them out loud. In many cases, a significant number of items may be displayed on the STATUS page INOP SYS list. The most effective briefing identifies the significant items from the list so they are properly understood and considered.

**Note: When it is necessary to review a system page while completing STATUS page procedures, the PM should press the desired system page key to display requested page (e.g., Fuel page). After reviewing that page, the PM should press the STS key to return to the STATUS page and continue the procedure.**

After all STATUS page approach procedures are complete and system/limitations have been briefed, the PM will challenge the PF to clear the STATUS page (e.g., “Clear Status?”). The PF should confirm and state “Clear Status.” The PM will press the CLR key and confirm the light remains extinguished. At that time the PM should announce “ECAM procedure complete.”

**Note: The STATUS page will appear automatically when slats are extended to one, if there are items in the STATUS page. The PM should state “STATUS” and review the page for any changes. Once reviewed, the PM should ask “Clear STATUS?” The PF will review the STATUS page and state “Clear STATUS.”**

## ECAM Advisories

An advisory is generated when a system parameter exceeds the normal range but has not exceeded a preset limit. When an advisory is activated, the associated systems page is automatically displayed on the SD, and the affected parameter pulses in green.

When an advisory is displayed, refer to the associated Advisory Displayed page (e.g. FUEL ADVISORY DISPLAYED) in the advisory’s respective chapter (e.g. Section 12 for FUEL System ECAM advisories).

## **QRH Use**

Upon completion of the ECAM procedure to “lights out”, the corresponding QRH procedures can also be accomplished, time permitting. The QRH often provides amplifying information in the form of notes, cautions and clear language that is not provided in the ECAM procedure.

When reading the QRH procedure, the PM reads aloud:

- The checklist title
- As much of the condition statement as needed to verify that the correct checklist has been selected

The PF does not need to repeat this information but must acknowledge, time and workload permitting, that the information was heard and understood.

For checklists with memory items, the PM first verifies that each memory item has been completed. The checklist is normally read aloud during this verification. The PF does not need to respond except for items that are not in agreement with the checklist. The item numbers do not need to be read.

Some QRH procedures contain a line of inverted “T’s” in the checklist. All of the items above to the line of inverted “T’s” were contained within the ECAM procedure. The PM can silently verify that the steps above the inverted “T’s” have been accomplished during the ECAM procedure, and will verbalize any applicable notes, cautions, or warnings. The PM should then continue with the QRH checklist by reading out loud the remaining items of the checklist.

Upon completion of the QRH procedure, the PM will brief the PF on additional QRH items and approach procedures. Review the QRH Approach Procedures early enough to allow for sufficient time to plan an alternate course of action before beginning the approach. Use the normal Approach and Landing checklists, in conjunction with the ECAM/QRH Approach Procedures, to verify correct flight deck and aircraft configuration for landing.

The PF will update the PM on aircraft's position, navigation, communication, and other status items including tasks completed and those still needing to be accomplished, as appropriate.

The captain will coordinate with Flight Control and the flight leader, or designate as appropriate.

If not landing immediately, review relevant approach items from the non-normal procedure when the approach briefing is conducted.

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## Dual Verification of Critical Controls

The word “confirm” is added to checklist items when both crew members must verbally agree before action is taken. During an in-flight non-normal situation, verbal confirmation is required whenever “confirm” is included in a QRH step, and always prior to the movement of the following critical controls:

- An Engine Thrust Lever
- An Engine Master Switch
- An Engine or APU Fire pb
- An IDG Disconnect pb
- Any mode Selectors on the ADIRS panel

After determination that a critical control must be actuated in flight, the following steps must be taken:

- The pilot performing the action (PM) must visually and verbally identify the affected control.
- The pilot performing the action (PM) will place their hand on the affected control.
- The pilot monitoring the action (PF) will visually and verbally confirm the proper control has been selected.
- The pilot performing the action (PM) then actuates the affected control.

Note: This does not apply to the ALL ENGINE FLAME OUT procedure.

## Deferred Items

When there are deferred items, the non-normal checklist will include the item **“Checklist Complete Except Deferred Items.”** The PF is to be made aware when there are deferred items. In the printed non-normal checklists, these items are included in the Deferred Items section of the checklist and may be delayed until the usual point during descent, approach or landing.

The deferred items are read aloud by the PM. The crewmember taking the action states the response.

In the printed non-normal checklists, when there are deferred items, the Deferred Items section of the non-normal checklist will include the Descent, Approach and Landing normal checklists. These checklists should be used instead of the usual Descent, Approach and Landing normal checklists. If a normal checklist item is changed as a result of the non-normal situation, the changed response is printed in **bold type**. The PF or the PM responds to the deferred normal checklist items based on each crewmember’s area of responsibility.

When there are no deferred items, the Descent, Approach and Landing normal checklists are used to verify that the configuration is correct for each phase of flight.

A **■** indicates items that should be considered for re-accomplishment in the event of an approach change or go-around.

## Checklist Completion

Each checklist has a checklist complete symbol at the end. The following symbol indicates that the checklist is complete:



The checklist complete symbol can also be in the body of the checklist. This only occurs when a checklist divides into two or more paths. Each path can have a checklist complete symbol at the end. The flight crew does not need to continue reading the checklist after the checklist complete symbol.

After completion of each non-normal checklist, the PM states " \_\_\_\_\_  
CHECKLIST COMPLETE."

## Checklist Limitations

The flight crew must be aware that checklists cannot be created for all conceivable situations and are not intended to replace good judgment. In some situations, at the captain’s discretion, deviation from a checklist may be needed.

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## Non-Normal Checklist Legend

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The procedures are written according to a prescribed format whenever possible. An understanding of this format makes following the procedures easier and more efficient to complete.

Each emergency and non normal procedure includes the following elements, as appropriate to the situation:

- **TITLE** - If the title is all in capital (UPPER CASE) letters, it represents an ECAM message. If the title is not all in capital letters (lower case), an ECAM message is not available, and the title is a description of the emergency or non normal condition.
- **CONDITION** - Describes the condition causing the emergency or non normal situation.
- **ACTION STEPS** - Procedure to contain or correct the emergency or non normal situation. The initial steps of the procedure are normally identical to the ECAM procedure and may have already been accomplished. Subsequent steps in the QRH include company procedures, approach procedures, and additional information.

**Note:** The action steps in the procedure are preceded by a number or a bullet. “If” statements are preceded by a black triangle, a single caret or a double caret.

- A **NUMBERED ITEM** (1,2,3, etc.) indicates a step in the procedure that must always be accomplished as long as an end symbol has not been reached.
- A **BLACK TRIANGLE (V)** indicates an “if” statement or a variable condition exists and the steps may or may not apply. Further “if” statements that depend on previous “if” statements are preceded by a single (>) or double (>>) caret.
- A **BULLET (•)** identifies a sub-step that applies to the “if” statement or variable condition.
- Informational text that does not require a specific action is not preceded by a bullet or number.
- The following end symbol may appear in the middle of a procedure and indicates that the emergency or non-normal procedure is complete based on the existing conditions. Approach procedures may still be applicable and should be complied with.



As the procedure is performed, all numbered steps must be accomplished. When a triangle or caret is reached, the pilot must decide if the stated condition applies to that specific situation. If the condition does apply, the sub-step indicated by the indented black bullets must be performed or further conditions indicated by multiple carets should be examined.

If the condition following the triangle does not apply, the pilot should continue to the next caret or numbered step in the same vertical column without performing the intermediate steps. In all cases, all numbered steps must be completed and all triangles in the left most margin must be examined to see if they apply, unless the statement end symbol is encountered.

Some procedures contain the statement: “No action is required. This message is for your information only.” This statement is used when there is no procedure or action required to stabilize the non normal and the ECAM message provides information only.

## **Redirection Symbol**

Note: (Not currently used in this manual)



The redirection symbol is used in two ways:

- In the Table of Contents of a system section, to direct the flight crew to a different system section.
- In a non-normal checklist, with the word “Go to”, to direct the flight crew to a different checklist or to a different step in the current checklist.
- The words “see” or “refer to” are also used to direct the continuation of the procedure to another location.

## **Separator Symbol**



The separator symbol is used in two ways:

- In certain system section tables of contents, to separate the titles of QAI checklists from non-QAI checklists.
- In a non-normal checklist, to separate the memory items from the reference items.

## **Inverted “T” Symbol**



Indicates a division between the ECAM steps and the non-ECAM steps.

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## Task Divider Symbol

Note: (Not currently used in this manual)

The task divider symbol is used to indicate the end of one task and the beginning of another task.

## Decision Symbol

Note: (Not currently used in this manual)



The decision symbol is used to identify possible mutually exclusive choices.

## Precaution Symbol



The precaution symbol is used to identify information the flight crew must consider before taking the action.

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## **Emergency Evacuation Flow/Philosophy**

Evacuation flow items listed below are not included within the Evacuation checklist. They are meant to refresh the logical pattern of procedures that must occur for a successful evacuation. In the unlikely event that the checklist cannot be read due to smoke/fire, darkness, injury or incapacitation, this simple flow or philosophy should lead the pilot to completion of all critical tasks contributing to the safest possible evacuation. The checklist follows the flow pattern of:

STOP

CONFIGURE

SHUTDOWN

EVACUATE

Intentionally  
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**ECAM Exceptions Instructions**  
**ECAM Exceptions**

**Chapter EE**  
**Section 1**

**Introduction . . . . . EE.TOC.1**

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## **ECAM Exceptions Instructions**

### **ECAM Exceptions**

## **Chapter EE**

### **Section 1**

### **Introduction**

ECAM Exceptions deviate from the normal “ECAM first, then QRH” philosophy discussed in the QRH NNCI section and FCTM Chapter 8. When one of the non-normal procedures listed below occurs, the crew should identify it as an ECAM Exception as part of the non-normal recognition process. Subsequently, following PF and PM duty assignments, the PM should proceed directly to the QRH to work through the appropriate Non-Normal Checklist (NNC).

When the QRH procedure has been completed, the ECAM procedure for the ECAM Exception non-normal may be cleared. Care should be used to ensure that only the ECAM Exception procedure is cleared from the ECAM. Additional ECAM procedures, which are not exceptions, should be completed using the ECAM in the normal “ECAM first, then QRH” manner.

ECAM Exceptions occur due to changes in procedure outpacing technology (e.g. FWC updates). Thus, they are temporary in nature. Pilots must be aware of the current ECAM Exceptions.

The following ECAM Exceptions are currently active:

- L/G GEAR NOT DOWNLOCKED (QRH 14.11)
- HYD G RSVR OVHT (when in conjunction with HYD Y ENG 2 PUMP LO PR) (QRH 13.15)
- HYD Y RSVR OVHT (when in conjunction with HYD G ENG 1 PUMP LO PR) (QRH 13.41)

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**Revision Record**  
**Table of Contents**

**Chapter RR**  
**Section RR**

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**Revision Record**  
**Model Identification**

**Chapter RR**  
**Section ModID**

**General**

The airplanes listed in the table below are covered in the Quick Reference Handbook. The numbers are used to distinguish data peculiar to one or more, but not all of the airplanes. Where data applies to all airplanes listed, no reference is made to individual airplane numbers.

The table permits flight crew correlation of configuration differences by Registry Number in alpha/numeric order within an operator's fleet for airplanes covered in this manual. Configuration data reflects the airplane as delivered configuration and is updated for service bulletin incorporations in conformance with the policy stated in the introduction section of this chapter.

Registry number is supplied by the national regulatory agency. Serial and tabulation numbers are supplied by Airbus.

Custom number is supplied by the operator.

The procedures and information contained in this manual also apply to aircraft acquired by Delta Air Lines subsequent to the current revision; however, this document may not address all pertinent information for these airplanes. In such instances, specific operating procedures and systems information can be found in appropriate Differences Chapter(s) and/or Fleet Bulletin(s) prior their incorporation in the next scheduled revision.

**A320**

| Ship Number | Registry Number | Serial Number | Tabulation Number |
|-------------|-----------------|---------------|-------------------|
| 3209        | N209US          | 0118          | A-320-211         |
| 3210        | N310NW          | 0121          | A-320-211         |
| 3211        | N311US          | 0125          | A320-211          |
| 3212        | N312US          | 0152          | A-320-211         |
| 3213        | N313US          | 0153          | A-320-211         |
| 3214        | N314US          | 0160          | A-320-211         |
| 3215        | N315US          | 0171          | A-320-211         |
| 3216        | N316US          | 0192          | A-320-211         |
| 3217        | N317US          | 0197          | A-320-211         |
| 3218        | N318US          | 0206          | A-320-211         |

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| Ship Number | Registry Number | Serial Number | Tabulation Number |
|-------------|-----------------|---------------|-------------------|
| 3219        | N319US          | 0208          | A-320-211         |
| 3220        | N320US          | 0213          | A-320-211         |
| 3221        | N321US          | 0262          | A-320-211         |
| 3222        | N322US          | 0263          | A-320-211         |
| 3223        | N323US          | 0272          | A-320-211         |
| 3224        | N324US          | 0273          | A-320-211         |
| 3225        | N325US          | 0281          | A-320-211         |
| 3226        | N326US          | 0282          | A-320-211         |
| 3227        | N327NW          | 0297          | A-320-211         |
| 3228        | N328NW          | 0298          | A-320-211         |
| 3229        | N329NW          | 0306          | A-320-211         |
| 3230        | N330NW          | 0307          | A-320-211         |
| 3231        | N331NW          | 0318          | A-320-211         |
| 3232        | N332NW          | 0319          | A-320-211         |
| 3233        | N333NW          | 0329          | A-320-211         |
| 3234        | N334NW          | 0339          | A-320-212         |
| 3235        | N335NW          | 0340          | A-320-212         |
| 3236        | N336NW          | 0355          | A-320-212         |
| 3237        | N337NW          | 0358          | A-320-212         |
| 3238        | N338NW          | 0360          | A-320-212         |
| 3239        | N339NW          | 0367          | A-320-212         |
| 3240        | N340NW          | 0372          | A-320-212         |
| 3241        | N341NW          | 0380          | A-320-212         |
| 3242        | N342NW          | 0381          | A-320-212         |
| 3243        | N343NW          | 0387          | A-320-212         |
| 3244        | N344NW          | 0388          | A-320-212         |
| 3245        | N345NW          | 0399          | A-320-212         |

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Model Identification**

| Ship Number | Registry Number | Serial Number | Tabulation Number |
|-------------|-----------------|---------------|-------------------|
| 3247        | N347NW          | 0408          | A-320-212         |
| 3248        | N348NW          | 0410          | A-320-212         |
| 3249        | N349NW          | 0417          | A-320-212         |
| 3250        | N350NA          | 0418          | A-320-212         |
| 3251        | N351NW          | 0766          | A-320-212         |
| 3252        | N352NW          | 0778          | A-320-212         |
| 3253        | N353NW          | 0786          | A-320-212         |
| 3254        | N354NW          | 0801          | A-320-212         |
| 3255        | N355NW          | 0807          | A-320-212         |
| 3256        | N356NW          | 0818          | A-320-212         |
| 3257        | N357NW          | 0830          | A-320-212         |
| 3258        | N358NW          | 0832          | A-320-212         |
| 3259        | N359NW          | 0832          | A-320-212         |
| 3260        | N360NW          | 0903          | A-320-212         |
| 3261        | N361NW          | 0907          | A-320-212         |
| 3262        | N362NW          | 0911          | A-320-212         |
| 3263        | N363NW          | 0923          | A-320-212         |
| 3264        | N364NW          | 0962          | A-320-212         |
| 3265        | N365NW          | 0964          | A-320-212         |
| 3266        | N366NW          | 0981          | A-320-212         |
| 3267        | N367NW          | 0988          | A-320-212         |
| 3268        | N368NW          | 0996          | A-320-212         |
| 3269        | N369NW          | 1011          | A-320-212         |
| 3270        | N369NW          | 1037          | A-320-212         |
| 3271        | N371NW          | 1535          | A-320-212         |
| 3272        | N372NW          | 1633          | A-320-212         |
| 3273        | N373NW          | 1641          | A-320-212         |

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| Ship Number | Registry Number | Serial Number | Tabulation Number |
|-------------|-----------------|---------------|-------------------|
| 3274        | N374NW          | 1646          | A-320-212         |
| 3275        | N375NC          | 1789          | A-320-212         |
| 3276        | N376NW          | 1812          | A-320-212         |
| 3277        | N377NW          | 2082          | A-320-211         |
| 3278        | N378NW          | 2092          | A-320-211         |

**A319**

| Ship Number | Registry Number | Serial Number | Model    |
|-------------|-----------------|---------------|----------|
| 3101        | N301NB          | 1058          | A319-114 |
| 3102        | N302NB          | 1062          | A319-114 |
| 3114        | N314NB          | 1191          | A319-114 |
| 3115        | N315NB          | 1230          | A319-114 |
| 3116        | N316NB          | 1249          | A319-114 |
| 3117        | N317NB          | 1324          | A319-114 |
| 3118        | N318NB          | 1325          | A319-114 |
| 3119        | N319NB          | 1346          | A319-114 |
| 3120        | N320NB          | 1392          | A319-114 |
| 3121        | N321NB          | 1414          | A319-114 |
| 3122        | N322NB          | 1434          | A319-114 |
| 3123        | N323NB          | 1453          | A319-114 |
| 3124        | N324NB          | 1456          | A319-114 |
| 3125        | N325NB          | 1483          | A319-114 |
| 3126        | N326NB          | 1498          | A319-114 |
| 3127        | N327NB          | 1501          | A319-114 |
| 3128        | N328NB          | 1520          | A319-114 |
| 3129        | N329NB          | 1543          | A319-114 |
| 3130        | N330NB          | 1549          | A319-114 |

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| Ship Number | Registry Number | Serial Number | Model    |
|-------------|-----------------|---------------|----------|
| 3131        | N331NB          | 1567          | A319-114 |
| 3132        | N332NB          | 1570          | A319-114 |
| 3133        | N333NB          | 1582          | A319-114 |
| 3134        | N334NB          | 1659          | A319-114 |
| 3135        | N335NB          | 1662          | A319-114 |
| 3136        | N336NB          | 1683          | A319-114 |
| 3137        | N337NB          | 1685          | A319-114 |
| 3138        | N338NB          | 1693          | A319-114 |
| 3139        | N339NB          | 1709          | A319-114 |
| 3140        | N340NB          | 1714          | A319-114 |
| 3141        | N341NB          | 1738          | A319-114 |
| 3142        | N442NB          | 1746          | A319-114 |
| 3143        | N343NB          | 1752          | A319-114 |
| 3144        | N344NB          | 1766          | A319-114 |
| 3145        | N345NB          | 1774          | A319-114 |
| 3146        | N346NB          | 1796          | A319-114 |
| 3147        | N347NB          | 1800          | A319-114 |
| 3148        | N348NB          | 1810          | A319-114 |
| 3149        | N348NB          | 1815          | A319-114 |
| 3151        | N351NB          | 1820          | A319-114 |
| 3152        | N352NB          | 1824          | A319-114 |
| 3153        | N353NB          | 1828          | A319-114 |
| 3154        | N354NB          | 1833          | A319-114 |
| 3155        | N355NB          | 1839          | A319-114 |
| 3157        | N357NB          | 1875          | A319-114 |
| 3158        | N358NB          | 1897          | A319-114 |
| 3159        | N359NB          | 1923          | A319-114 |

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| Ship Number | Registry Number | Serial Number | Model    |
|-------------|-----------------|---------------|----------|
| 3160        | N360NB          | 1959          | A319-114 |
| 3161        | N361NB          | 1976          | A319-114 |
| 3162        | N362NB          | 1982          | A319-114 |
| 3163        | N363NB          | 1990          | A319-114 |
| 3164        | N364NB          | 2002          | A319-114 |
| 3165        | N365NB          | 2013          | A319-114 |
| 3166        | N366NB          | 2026          | A319-114 |
| 3167        | N367NB          | 2028          | A319-114 |
| 3168        | N368NB          | 2039          | A319-114 |
| 3169        | N369NB          | 2047          | A319-114 |
| 3170        | N370NB          | 2087          | A319-114 |
| 3171        | N371NB          | 2095          | A319-114 |
| 3172        | N372NB          | 2369          | A319-114 |
| 3173        | N373NB          | 2373          | A319-114 |
| 3174        | N374NB          | 2464          | A319-114 |
| 3175        | N375NB          | 2474          | A319-114 |
| 3176        | N376NB          | 2618          | A319-114 |
| 3177        | N377NB          | 2641          | A319-114 |

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## **General**

The manufacturer has developed normal and non-normal procedures for the A319/320 aircraft. Delta Air Lines, Inc. has modified some of these procedures for simplification and standardization, when appropriate, with other aircraft operated by Delta Air Lines, Inc. Finally, the FAA has approved the procedures presented in this Operations Manual.

These procedures are intended to be followed during normal ground operations and in flight. Deviations from these procedures should be made only with good cause and based on the safest course of action. The captain's best judgment must be applied if an abnormality occurs that is not covered by these procedures.

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## **Manual Rights**

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## Corrections to the Manual

Log on to the Delta Flight Operations Portal, <http://deltanet.delta.com> and submit a Publications Change Request (PCR) to correct any errors or discrepancies discovered in this manual, or to submit a suggested change to any Aircraft Operating Manual, Volume 1, Volume 2, Quick Reference Handbook (QRH), Flight Crew Training Manual (FCTM), Normal Checklist, Airway Manual (AM), Flight Operations Manual (FOM), Operating Experience (OE/TOE) Guide, Fleet Bulletin (FB), or Flight Operations Bulletin (FOB).

There is a link to the PCR form at Deltanet > My Division > Pilot Support > Forms and Reports. Once submitted, the PCR is automatically routed to the applicable Fleet Technical Manager and Technical Writer for that manual.

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## Organization

The operations manual is organized in the following manner.

### Volume 1

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Limitations - Covers operational limitations.
- Normal Procedures - Covers all amplified normal operating procedures and are based on a thorough analysis of crew activity required to operate the aircraft, and reflect the latest knowledge and experience available.
- Normal Operational Information - Contains reference material used to support normal procedures.
- Supplementary Procedures is organized by system and covers:
  - any procedure that is non-routine in nature,
  - any first flight of the day test or other systems test,
  - guidance on lengthy operating procedures, and
  - adverse weather procedures and guidance.
- Differences - Notes differences between aircraft models and variants.

### Volume 2

- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.
- Contains general aircraft and systems information. These chapters are generally subdivided into sections covering controls and indicators and systems descriptions.

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## QRH

- Non-normal checklists - Contains checklists used to manage non-normal situations.
- Non-Normal Operational Information - Contains reference material used to support non-normal procedures.
- Non-Normal Checklist Instructions - Contains non-normal checklist instructions and evacuation flow/philosophy.
- Revision Record - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions and a list of effective pages.

## FCTM

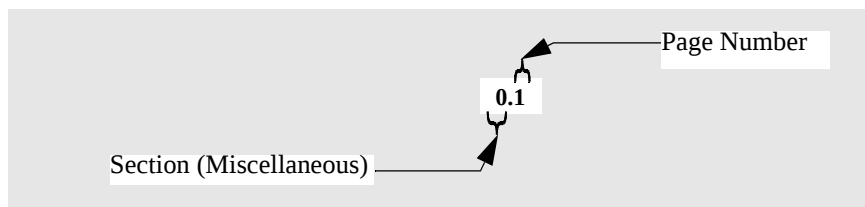
- Preface - Contains general information regarding the manual's purpose, structure, and content. It also contains lists of abbreviations, a record of revisions, and a list of effective pages.
- Provides information and recommendations on aircraft operations, maneuvers, techniques, and human factors.

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## Page Numbering

This manual uses a decimal page numbering system. The page number is divided into two fields; section and page. An example of a page number follows:

### Example Page Number



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## Warnings, Cautions, and Notes

The following levels of written advisories are used throughout the manual and are not to be confused with ECAM messages, which are identified in separate text.

**Warning** - A warning is an instruction about a hazard that if ignored could result in injury, loss of aircraft control, or loss of life. A warning will appear prior to the applicable step or item.

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**Warning! Do not pressurize any hydraulic or pneumatic system until clearance is obtained from Maintenance.**

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**Caution** - A caution is an instruction concerning a hazard that if ignored could result in damage to equipment. A caution will appear prior to the applicable step or item.

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**Caution! Do not set takeoff thrust until oil temperature is above 50°C.**

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**Note** - A note provides amplified information, instruction, or emphasis. A note will appear after the applicable step or item.

**Note:** The checklist must not be modified in any way.

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## **Aircraft Effectivities**

Differences in aircraft configuration are shown by use of aircraft effectivities throughout Volumes 1 and 2, QRH, and the FCTM. The following rules are used to express aircraft effectivities:

- Aircraft effectivities are listed by model and/or ship number. A range of aircraft is defined by a dash, e.g. 9901 - 9910. A comma in the effectivity range indicates a break in the range, e.g. 9901 - 9910, 9912 - 9925; aircraft 9911 is excluded from the range. Aircraft introduced to the fleet following manual publication are effective as subsequent ships, e.g. 9901 & Subsequent.
- Aircraft effectivities are listed in bold text throughout the manual.
- Aircraft effectivities apply only to the paragraph, illustration, operational note, procedural step, etc. and to subordinate items (if any). Refer to the examples below.

Example (with subordinate items):

|                                    |     |
|------------------------------------|-----|
| <b>9951 – 9961</b>                 |     |
| CTR TK PUMP (affected).....        | OFF |
| Do not open the WING X FEED valve. |     |
| OUTR TK XFR.....                   | ON  |

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP.....) and the further indented/subordinate step (Do not...). The effectivity does not apply to the next equivalently indented step (OUTR TK XFR.....).

Example (without subordinate items):

Using ship number:

|                             |     |
|-----------------------------|-----|
| <b>9951 – 9961</b>          |     |
| CTR TK PUMP (affected)..... | ON  |
| OUTR TK XFR.....            | OFF |

In this example, the effectivity 9951 - 9961 applies to the first procedural step (CTR TK PUMP ..... ) only. The effectivity does not apply to the next procedural step (OUTR TK XFR .....).

When airplane effectivities are centered immediately below a checklist title, the entire checklist applies to the listed airplanes. In the following example, the FUEL L + R CTR PUMPS LO PR checklist is applicable to 9951-9961 only:

FUEL L + R CTR PUMPS LO PR  
**9951-9961**

## Revision Record

### Abbreviations

## Chapter RR

### Section Abbrev

### General

The following abbreviations may be found throughout the manual. Some abbreviations may also appear in lowercase letters. Abbreviations having very limited use are explained in the chapter where they are used. Since this list is compiled across several fleets, there may be some abbreviations that do not apply to this specific fleet.

| A     |                                                         |
|-------|---------------------------------------------------------|
| ABV   | Above                                                   |
| AC    | Alternating Current or Aircraft                         |
| ACARS | Aircraft Communications Addressing and Reporting System |
| ACE   | Actuator Control Electronics                            |
| ACP   | Audio Control Panel                                     |
| ACT   | Active                                                  |
| ADC   | Air Data Computer                                       |
| ADF   | Automatic Direction Finder                              |
| ADI   | Attitude Director Indicator                             |
| ADIRS | Air Data Inertial Reference System                      |
| ADIRU | Air Data Inertial Reference Unit                        |
| ADM   | Air Data Module                                         |
| AED   | Automated External Defibrillator                        |
| AFDC  | Autopilot Flight Director Computer                      |

|           |                                                          |
|-----------|----------------------------------------------------------|
| AFDS      | Autopilot Flight Director System                         |
| AFE       | Above Field Elevation                                    |
| AFM       | Airplane Flight Manual (FAA approved)                    |
| AFM - DPI | Airplane Flight Manual - Digital Performance Information |
| AFS       | Automatic Flight System (Autopilot or Autothrottle)      |
| A/G       | Air/Ground                                               |
| AGL       | Above Ground Level                                       |
| AH        | Alert Height                                             |
| AHRS      | Attitude Heading Reference System                        |
| AI        | Anti-Ice                                                 |
| AIL       | Aileron                                                  |
| ALFA      | Safe Stall Margin Speed                                  |
| ALT       | Altitude                                                 |
| ALT ACQ   | Altitude Acquire                                         |
| ALT HOLD  | Altitude Hold                                            |
| ALTN      | Alternate                                                |
| AM        | Amplitude Modulation                                     |
| AIMS      | Airplane Information Management System                   |

|       |                                             |
|-------|---------------------------------------------|
| AMI   | Airline Modifiable Information              |
| ANP   | Actual Navigational Performance             |
| ANT   | Antenna                                     |
| ANU   | Aircraft Nose Up                            |
| AOA   | Angle of Attack                             |
| AOC   | Airline Operational Communication Data Link |
| A/P   | Autopilot                                   |
| APL   | Airplane                                    |
| APP   | Approach                                    |
| APU   | Auxiliary Power Unit                        |
| AR    | Authorization Required                      |
| ARINC | Aeronautical Radio, Incorporated            |
| ARM   | Aircraft Restrictions Manual                |
| ARPT  | Airport                                     |
| ARR   | Arrival                                     |
| ART   | Automatic Reserve Thrust                    |
| ASA   | Autoland Status Annunciator                 |
| ASI   | Airspeed Indicator                          |
| ASR   | Airport Surveillance Radar                  |
| ASYM  | Asymmetry                                   |
| A/T   | Autothrottle                                |
| ATA   | Actual Time of Arrival                      |
| ATC   | Air Traffic Control                         |
| ATIS  | Automated Terminal Information Service      |

|                            |                                      |
|----------------------------|--------------------------------------|
| ATM                        | Assumed Temperature Method           |
| ATT                        | Attitude                             |
| AUTO                       | Automatic                            |
| AUTO-THROT                 | Autothrottle                         |
| AUX                        | Auxiliary                            |
| AVAIL                      | Available                            |
| AWABS                      | Automated Weight and Balance System  |
| <b>B</b>                   |                                      |
| BARO                       | Barometric                           |
| BAT                        | Battery                              |
| B/C or B/CRS or BAC or BCS | Back Course                          |
| BFO                        | Beat Frequency Oscillator            |
| BITE                       | Built-In Test Equipment              |
| BKR                        | Breaker                              |
| BLD                        | Bleed                                |
| BLW                        | Below                                |
| BRG                        | Bearing                              |
| BRT                        | Bright                               |
| BTL                        | Bottle                               |
| BTL DISCH                  | Bottle Discharge (fire extinguisher) |
| BTMS                       | Brake Temperature Monitoring System  |

| C        |                                       |
|----------|---------------------------------------|
| C        | Captain or Celsius or Center or Cool  |
| CAA      | Civil Aviation Authority              |
| CADC     | Central Air Data Computer             |
| CALSEL   | Call Select                           |
| CANC/RCL | Cancel/Recall                         |
| CANPA    | Constant Angle Non-Precision Approach |
| CAP      | Capture                               |
| CAPT     | Captain                               |
| CAWS     | Central Aural Warning System          |
| CB       | Circuit Breaker                       |
| CCD      | Cursor Control Device                 |
| CDS      | Common Display System                 |
| CDU      | Control Display Unit                  |
| CFIT     | Controlled Flight Into Terrain        |
| CG       | Center of Gravity                     |
| CHKL     | Checklist                             |
| CHR      | Chronograph                           |
| CKD      | Checked                               |
| CKT      | Circuit                               |
| CL       | Close                                 |
| CLB      | Climb                                 |
| CLMP     | Computer Lockout Manual Power         |
| CLR      | Clear                                 |
| CMD      | Command                               |

| CO      | Company                                  |
|---------|------------------------------------------|
| COMM    | Communication                            |
| COMP    | Comparator                               |
| COMPT   | Compartment                              |
| CON     | Continuous                               |
| CONFIG  | Configuration                            |
| CONT    | Control                                  |
| COOL    | Cooling                                  |
| CRM     | Crew Resource Management                 |
| CRS     | Course                                   |
| CRT     | Cathode Ray Tube                         |
| CRZ     | Cruise                                   |
| CTL     | Control                                  |
| CTR     | Center                                   |
| CWS     | Control Wheel Steering                   |
| D       |                                          |
| DA      | Decision Altitude                        |
| DA(H)   | Decision Altitude (Height)               |
| DC      | Direct Current                           |
| DCU     | Display Concentrator Unit                |
| D/D     | Direct Descent                           |
| DDA     | Derived Decision Altitude (MDA +50 feet) |
| DDG     | Dispatch Deviations Guide                |
| DEL     | Delete                                   |
| DEP     | Departure                                |
| DEP ARR | Departure Arrival                        |
| DEPR    | Depressurize                             |

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|       |                                        |
|-------|----------------------------------------|
| DES   | Descent                                |
| DEU   | Display Electronic Unit                |
| DFCS  | Digital Flight Control System          |
| DFGC  | Digital Flight Guidance Computer       |
| DFGS  | Digital Flight Guidance System         |
| DH    | Decision Height                        |
| DIFF  | Differential                           |
| DIR   | Direct                                 |
| DISC  | Disconnect                             |
| DISCH | Discharge                              |
| DK    | Deck                                   |
| DME   | Distance Measuring Equipment           |
| DN    | Down                                   |
| DPC   | Display Processing Computer            |
| DSP   | Display Select Panel                   |
| DSPL  | Display                                |
| DTG   | Distance to Go                         |
| DTW   | Distance to Waypoint                   |
| DU    | Display Unit                           |
| E     |                                        |
| EADI  | Electronic Attitude Director Indicator |
| ECON  | Economy                                |
| E/D   | End of Descent                         |
| E/E   | Electrical/Electronic                  |
| EEC   | Electronic Engine Control              |
| EFB   | Electronic Flight Bag                  |

|               |                                                     |
|---------------|-----------------------------------------------------|
| EFI           | Electronic Flight Instruments                       |
| EFIS          | Electronic Flight Instrument System                 |
| EGPWS         | Enhanced Ground Proximity Warning System            |
| EGT           | Exhaust Gas Temperature                             |
| EHSI          | Electronic Horizontal Situation Indicator           |
| EICAS         | Engine Indication and Crew Alerting System          |
| EIS           | Electronic Instrument System                        |
| ELEC          | Electrical                                          |
| ELEV          | Elevator                                            |
| EMER          | Emergency                                           |
| ENG           | Engine                                              |
| ENG OUT       | Engine Out                                          |
| ENT           | Entry                                               |
| EO or E/O     | Engine Out                                          |
| EOAP          | Electronic Overhead Annunciation Panel              |
| EPC           | Electrical Power Center                             |
| EPR           | Engine Pressure Ratio                               |
| EQPT or EQUIP | Equipment                                           |
| ETOPS         | Extended Range Operation with Twin Engine Airplanes |
| ETP           | Equal Time Point                                    |
| EVAC          | Evacuation                                          |
| EXEC          | Execute                                             |

|                    |                                       |
|--------------------|---------------------------------------|
| EXT                | Extend or External                    |
| F                  |                                       |
| F                  | Fahrenheit                            |
| FAC                | Final Approach Course                 |
| FAA                | Federal Aviation Administration       |
| FADEC              | Full Authority Digital Engine Control |
| FAF                | Final Approach Fix                    |
| FAR                | Federal Aviation Regulation           |
| FB                 | Fleet Bulletin                        |
| FCC                | Flight Control Computer               |
| FCTL               | Flight Control                        |
| FCTM               | Flight Crew Training Manual           |
| FDIU               | Flight Data Interface Unit            |
| FD, F/D or FLT DIR | Flight Director                       |
| FF                 | Fuel Flow                             |
| FFM                | Force Fight Monitor                   |
| FGCP               | Flight Guidance Control Panel         |
| FGS                | Flight Guidance System                |
| FILT               | Filter                                |
| FIR                | Flight Information Region             |
| FL CH or FLCH      | Flight Level Change                   |
| FLT                | Flight                                |
| FLT CTRL           | Flight Control                        |
| FLPRN              | Flaperon                              |
| FMA                | Flight Mode Annunciator               |

|            |                                    |
|------------|------------------------------------|
| FMC        | Flight Management Computer         |
| FMS        | Flight Management System           |
| F/O or F O | First Officer                      |
| FOM        | Flight Operations Manual           |
| FPA        | Flight Path Angle                  |
| FPM        | Feet Per Minute                    |
| FPV        | Flight Path Vector                 |
| FREQ       | Frequency                          |
| F/S        | Fast/Slow                          |
| FT         | Feet                               |
| FWD        | Forward                            |
| FWSOV      | Fire Wall Shut Off Valve           |
| FX         | Fix                                |
| G          |                                    |
| GA         | Go-Around                          |
| GEN        | Generator                          |
| GLS        | GNSS Landing System                |
| GMT        | Greenwich Mean Time                |
| GND        | Ground                             |
| GNSS       | Global Navigation Satellite System |
| GP or G/P  | Glidepath                          |
| GPS        | Global Positioning System          |
| GPWS       | Ground Proximity Warning System    |
| GS         | Ground Speed                       |
| GS or G/S  | Glideslope                         |

|         |                                                                             |
|---------|-----------------------------------------------------------------------------|
| GW      | Gross Weight                                                                |
| H       |                                                                             |
| HAA     | Height Above Airport                                                        |
| HAT     | Height Above Touchdown                                                      |
| HDG     | Heading or Hydraulic Driven Generator                                       |
| HDG REF | Heading Reference                                                           |
| HDG SEL | Heading Select                                                              |
| HF      | High Frequency                                                              |
| HGS     | Head-Up Guidance System (HGS® is a registered trademark of Flight Dynamics) |
| HI      | High                                                                        |
| HLD     | Hold                                                                        |
| HPA     | Hectopascals                                                                |
| HPSOV   | High Pressure Shut Off Valve                                                |
| HSI     | Horizontal Situation Indicator                                              |
| HUD     | Head-Up Display                                                             |
| HYD     | Hydraulic                                                                   |
| I       |                                                                             |
| IAF     | Initial Approach Fix                                                        |
| IAN     | Integrated Approach Navigation                                              |
| IAS     | Indicated Airspeed                                                          |
| ICAO    | International Civil Aviation Organization                                   |
| IDENT   | Identification                                                              |
| IFE     | In-Flight Entertainment System                                              |

|              |                                      |
|--------------|--------------------------------------|
| IFR          | Instrument Flight Rules              |
| IGN          | Ignition                             |
| IGS          | Instrument Guidance System           |
| ILS          | Instrument Landing System            |
| IM           | Inner Marker                         |
| IMC          | Instrument Meteorological Conditions |
| IN           | Inches                               |
| INBD         | Inboard                              |
| IND          | Indicator                            |
| IND LTS      | Indicator Lights                     |
| INOP         | Inoperative                          |
| INIT         | Initialization                       |
| INSTR        | Instrument                           |
| INT or INTPH | Interphone                           |
| INTC         | Intercept                            |
| INTC CRS     | Intercept Course                     |
| IP           | Instructor Pilot                     |
| IRS          | Inertial Reference System            |
| IRU          | Inertial Reference Unit              |
| ISA          | International Standard Atmosphere    |
| ISDU         | Inertial System Display Unit         |
| ISFD         | Integrated Standby Flight Display    |
| ISLN         | Isolation                            |

|                  |                                   |
|------------------|-----------------------------------|
| <b>J</b>         |                                   |
| JAA              | Joint Aviation Authority          |
| <b>K</b>         |                                   |
| K or KTS         | Knots                             |
| KCAS             | Knots Calibrated<br>Airspeed      |
| KGS              | Kilograms                         |
| KIAS             | Knots Indicated Airspeed          |
| <b>L</b>         |                                   |
| L                | Left                              |
| LAT              | Latitude                          |
| LBS              | Pounds                            |
| LD               | Load                              |
| LDA              | Localizer-type<br>Directional Aid |
| LDG              | Landing                           |
| LDG ALT          | Landing Altitude                  |
| LE               | Leading Edge                      |
| LIM              | Limit                             |
| LIM SPD          | Limit Speed                       |
| LKD              | Locked                            |
| L NAV or<br>LNAV | Lateral Navigation                |
| LOC              | Localizer                         |
| LOC-BC           | Localizer Back Course             |
| LOM              | Locator Outer Marker              |
| LON              | Longitude                         |
| LRC              | Long Range Cruise                 |
| LRU              | Line Replaceable Unit             |
| LSK              | Line Select Key                   |
| LT               | Light                             |

|                             |                                           |
|-----------------------------|-------------------------------------------|
| LWR CTR                     | Lower Center                              |
| LWR<br>DSPLY or<br>LWR DSPL | Lower Display                             |
| <b>M</b>                    |                                           |
| M                           | Mach                                      |
| MAG                         | Magnetic                                  |
| MAHP                        | Missed Approach<br>Holding Point          |
| MAN                         | Manual                                    |
| MAP                         | Missed Approach Point                     |
| MASI                        | Mach/Airspeed Indicator                   |
| MAX                         | Maximum                                   |
| MCC                         | Maintenance Control<br>Center             |
| MCDU                        | Multi-purpose Control<br>and Display Unit |
| MCO                         | Maintenance Carry Over                    |
| MCP                         | Mode Control Panel                        |
| MCT                         | Maximum Continuous<br>Thrust              |
| MDA                         | Minimum Descent<br>Altitude               |
| MDA(H)                      | Minimum Descent<br>Altitude (Height)      |
| MDM                         | Mechanical Dispatch<br>Manual             |
| MEA                         | Minimum Enroute<br>Altitude               |
| MEL                         | Minimum Equipment<br>List                 |
| MFD                         | Multifunction Display                     |
| MHZ                         | Megahertz                                 |
| MIC                         | Microphone                                |

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|           |                                              |
|-----------|----------------------------------------------|
| MIN       | Minimum                                      |
| MKR       | Marker                                       |
| MLS       | Microwave Landing System                     |
| MM        | Middle Marker                                |
| MMO       | Maximum Mach Operating Speed                 |
| MNPS      | Minimum Navigation Performance Specification |
| MOCA      | Minimum Obstruction Clearance Altitude       |
| MOD       | Modify                                       |
| MORA      | Minimum Off Route Altitude                   |
| MSA       | Minimum Safe Altitude                        |
| MSG       | Message                                      |
| MSGS RCVD | Messages Received                            |
| MSL       | Mean Sea Level                               |
| MTRS      | Meters                                       |
| MUH       | Minimum Use Height                           |
| N         |                                              |
| N         | Normal                                       |
| NADP      | Noise Abatement Departure Procedures         |
| NAR       | North American Route                         |
| NAV       | Navigation                                   |
| NAV RAD   | Navigation Radio                             |
| ND        | Navigation Display                           |
| NGS       | Nitrogen Generation System                   |
| NLT       | No Later Than                                |

|            |                                                                                                                       |
|------------|-----------------------------------------------------------------------------------------------------------------------|
| NLT        | No Later Than                                                                                                         |
| NM         | Nautical Mile(s)                                                                                                      |
| NNC        | Non-Normal Checklists                                                                                                 |
| NNM        | Non-Normal Maneuvers                                                                                                  |
| NPS        | Navigation Performance Scales                                                                                         |
| NORM       | Normal                                                                                                                |
| N1         | Low Pressure Rotor Speed                                                                                              |
| N2         | High Pressure Rotor Speed (Pratt & Whitney and GE engines) or Intermediate Pressure Rotor Speed (Rolls Royce Engines) |
| N3         | High Pressure Rotor Speed (Rolls Royce Engines)                                                                       |
| O          |                                                                                                                       |
| OAP        | Overhead Annunciator Panel (a.k.a. EOAP)                                                                              |
| OAT        | Outside Air Temperature                                                                                               |
| OCC        | Operations Control Center                                                                                             |
| ODM        | Operational Data Manual                                                                                               |
| OFST       | Offset                                                                                                                |
| OHU        | Overhead Unit                                                                                                         |
| OM         | Outer Marker                                                                                                          |
| OP         | Open                                                                                                                  |
| OUTBD DSPL | Outboard Display                                                                                                      |
| OVHD       | Overhead                                                                                                              |
| OVHT       | Overheat                                                                                                              |
| OVRD       | Override                                                                                                              |

|           |                                                                                         |
|-----------|-----------------------------------------------------------------------------------------|
| OVSPD     | Overspeed                                                                               |
| OXY or O2 | Oxygen                                                                                  |
| <b>P</b>  |                                                                                         |
| PA        | Passenger Address                                                                       |
| PAPI      | Precision Approach Path Indicator                                                       |
| PAR       | Precision Approach Radar                                                                |
| PASS      | Passenger                                                                               |
| PBE       | Protective Breathing Equipment                                                          |
| PCP       | Pilot Call Panel                                                                        |
| PDC       | Pitch Data Computer<br>or<br>Performance Data Computer<br>or<br>Pre-Departure Clearance |
| PERF      | Performance                                                                             |
| PERF INIT | Performance Initialization                                                              |
| PES       | Pitch Enhancement System                                                                |
| PF        | Pilot Flying                                                                            |
| PFAF      | Precision Final Approach Fix                                                            |
| PFC       | Primary Flight Computer                                                                 |
| PFD       | Primary Flight Display                                                                  |
| PI        | Performance Inflight                                                                    |
| PIP       | Product Improvement Package                                                             |
| PLI       | Pitch Limit Indicator                                                                   |
| PM        | Pilot Monitoring                                                                        |

|               |                                                     |
|---------------|-----------------------------------------------------|
| PMC           | Power Management Control                            |
| PNL           | Panel                                               |
| POS           | Position                                            |
| POS INIT      | Position Initialization                             |
| POS REF       | Position Reference                                  |
| PPI           | Planned Position Indicator                          |
| PPOS          | Present Position                                    |
| PRES or PRESS | Pressure                                            |
| PREV          | Previous                                            |
| PRI           | Primary                                             |
| PRAIM         | Predictive Receiver Autonomous Integrity Monitoring |
| PROG          | Progress                                            |
| PROX          | Proximity                                           |
| P/RST         | Push To Reset                                       |
| PRV           | Pressure Regulating Valve                           |
| PSI           | Pounds Per Square Inch                              |
| PTH           | Path                                                |
| PTT           | Push To Talk                                        |
| PTU           | Power Transfer Unit                                 |
| PWR           | Power                                               |
| PWS           | Predictive Windshear System                         |
| <b>Q</b>      |                                                     |
| Q             | Quantity                                            |
| QFE           | Local Station Pressure                              |
| QNH           | Altimeter Setting                                   |

|                 |                                        |
|-----------------|----------------------------------------|
| QRH             | Quick Reference Handbook               |
| QTY             | Quantity                               |
| R               |                                        |
| R               | Right                                  |
| RA              | Radio Altitude or Resolution Advisory  |
| RAD             | Radio                                  |
| RAT             | Ram Air Temperature or Ram Air Turbine |
| RCL             | Request for Clearance                  |
| RDMI            | Radio Distance Magnetic Indicator      |
| REC             | Recorder                               |
| RECIR or RECIRC | Recirculation                          |
| REF             | Reference                              |
| RET             | Retract                                |
| REV             | Reverse                                |
| RF              | Radius-to-Fix (RF) Legs or Refill      |
| RMI             | Radio Magnetic Indicator               |
| RON             | Remain Overnight                       |
| RNAV or RNV     | Area Navigation                        |
| RNP             | Required Navigational Performance      |
| RPL             | Rudder Pressure Limiter                |
| RPM             | Revolutions Per Minute                 |
| RPR             | Rudder Pressure Reducer                |
| RSEP            | Rudder System Enhancement Program      |
| RST             | Reset                                  |

|        |                                                     |
|--------|-----------------------------------------------------|
| RSVR   | Reservoir                                           |
| R/T    | Radio Transmit                                      |
| RTE    | Route                                               |
| RTO    | Rejected Takeoff                                    |
| RTP    | Radio Tuning Panel                                  |
| RUD    | Rudder                                              |
| RVR    | Runway Visual Range                                 |
| RVSM   | Reduced Vertical Separation Minimum                 |
| S      |                                                     |
| SAAAR  | Special Aircraft and Aircrew Authorization Required |
| SAARU  | Secondary Attitude Air Data Reference Unit          |
| SAT    | Static Air Temperature or Satellite                 |
| SB     | Service Bulletin                                    |
| S/B    | Speedbrake                                          |
| S/C    | Step Climb                                          |
| SDF    | Simplified Directional Facility                     |
| SEI    | Standby Engine Indicator                            |
| SEL    | Select                                              |
| SELCAL | Selective Calling                                   |
| SENS   | Sensitivity                                         |
| SERV   | Service                                             |
| SG     | Symbol Generator                                    |
| SMGCS  | Surface Movement and Guidance Control System        |
| SPD    | Speed                                               |
| SPDBRK | Speedbrake                                          |

|                |                                              |
|----------------|----------------------------------------------|
| STA            | Station                                      |
| STAB           | Stabilizer                                   |
| STAT           | Status                                       |
| STBY           | Standby                                      |
| STD            | Standard                                     |
| SYS            | System                                       |
| T              |                                              |
| T or TRU       | True                                         |
| T or TK or TRK | Track (to a Navaid)                          |
| TA             | Traffic Advisory                             |
| TAA            | Terminal Arrival Area                        |
| TACAN          | Tactical Air Navigation                      |
| TAC            | Thrust Asymmetry Compensation                |
| TAI            | Thermal Anti-Ice                             |
| TAS            | True Airspeed                                |
| TAT            | Total Air Temperature                        |
| T/C            | Top of Climb                                 |
| TCA            | Terminal Control Area                        |
| TCAS           | Traffic Alert and Collision Avoidance System |
| T/D            | Top of Descent                               |
| TDZ            | Touch Down Zone                              |
| TDZE           | Touch Down Zone Elevation                    |
| TE             | Trailing Edge                                |
| TEMP           | Temperature                                  |
| TERR           | Terrain                                      |
| TFC            | Traffic                                      |
| TFR            | Transfer                                     |

|                   |                            |
|-------------------|----------------------------|
| THR               | Throttle or Thrust         |
| THR HOLD          | Throttle Hold              |
| TMC               | Thrust Management Computer |
| TMI               | Track Message Identifier   |
| TMSP              | Thrust Mode Select Panel   |
| TO or T/O         | Takeoff                    |
| TOC               | Top of Climb               |
| TOD               | Top of Descent             |
| TO/GA             | Takeoff/Go-Around          |
| TR                | Traffic Resolution         |
| TRK               | Track                      |
| TRP               | Thrust Rating Panel        |
| TRU               | Transformer Rectifier Unit |
| TURB              | Turbine or Turbulence      |
| U                 |                            |
| UNLKD             | Unlocked                   |
| UNSCHD or UNSCHED | Unscheduled                |
| UPR DSPL          | Upper Display              |
| U.S.              | United States              |
| USB               | Upper Side Band            |
| UTC               | Universal Time Coordinated |
| UTIL              | Utility                    |
| V                 |                            |
| VA                | Design maneuvering speed   |
| VAL               | Valve                      |

|               |                                                                    |
|---------------|--------------------------------------------------------------------|
| VANP          | Vertical Actual Navigational Performance                           |
| VASI          | Visual Approach Slope Indicator                                    |
| VDP           | Visual Descent Point                                               |
| VEF           | Speed at Engine Failure                                            |
| VERT          | Vertical                                                           |
| VFR           | Visual Flight Rules                                                |
| VG            | Vertical Gyro                                                      |
| VHF           | Very High Frequency                                                |
| VIB           | Vibration                                                          |
| VLV           | Valve                                                              |
| VMC           | Visual Meteorological Conditions                                   |
| VMCA          | Minimum Control Airspeed or Single Engine Minimum Control Airspeed |
| VMCG          | Minimum Control Speed Ground                                       |
| VMO           | Maximum Operating Speed                                            |
| V NAV or VNAV | Vertical Navigation                                                |
| VOR           | VHF Omnidirectional Range                                          |
| VR            | Rotation Speed                                                     |
| VREF          | Reference Speed                                                    |
| VRNP          | Vertical Required Navigation Performance                           |
| V/S           | Vertical Speed                                                     |
| VSCF          | Variable Speed Constant Frequency                                  |

|               |                                      |
|---------------|--------------------------------------|
| VSD           | Vertical Situation Display           |
| VSI           | Vertical Speed Indicator             |
| VTK           | Vertical Track                       |
| V1            | Takeoff Decision Speed               |
| V1 (MCG)      | Minimum V1 for Control on the Ground |
| V2            | Scheduled Takeoff Target Speed       |
| W             |                                      |
| W             | Warm                                 |
| WATRS         | Western Atlantic Route System        |
| WDR           | Weight Data Record                   |
| WGS-84        | World Geodetic System of 1984        |
| WHL           | Wheel                                |
| WPT           | Waypoint                             |
| WT            | Weight                               |
| WXR           | Weather Radar                        |
| X             |                                      |
| X-FEED        | Crossfeed                            |
| XPDR or XPNDR | Transponder                          |
| XTK           | Cross Track                          |

**Revision Record**  
**Revision Record**

**Chapter RR**  
**Section RR**

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**Revision Transmittal Letter**

To: All holders of Delta Air Lines, Inc., A319/320 Operations Manual, QRH.

Subject: Operations Manual Revision.

This revision reflects the most current information available to Delta Air Lines, Inc. through the subject revision date. General information below explains the use of revision bars to identify new or revised information.

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**Revision Record**

| No. | Revision Date    | Date Filed |
|-----|------------------|------------|
| 0   | January 1, 2010  |            |
| 2   | April 12, 2010   |            |
| 4   | August 9, 2010   |            |
| 6   | February 3, 2011 |            |
| 8   | July 21, 2011    |            |
| 10  | March 1, 2012    |            |
| 12  | November 7, 2012 |            |
| 14  | November 5, 2013 |            |
| 16  | June 17, 2014    |            |
| 18  | December 2, 2014 |            |
| 20  | July 14, 2015    |            |
| 22  | November 3, 2015 |            |
| 24  | July 29, 2016    |            |

| No. | Revision Date      | Date Filed |
|-----|--------------------|------------|
| 1   | April 11, 2010     |            |
| 3   | June 14, 2010      |            |
| 5   | November 29, 2010  |            |
| 7   | March 31, 2011     |            |
| 9   | September 15, 2011 |            |
| 11  | June 21, 2012      |            |
| 13  | March 26, 2013     |            |
| 15  | December 31, 2013  |            |
| 17  | August 12, 2014    |            |
| 19  | May 19, 2015       |            |
| 21  | September 8, 2015  |            |
| 23  | December 29, 2015  |            |
| 25  | September 23, 2016 |            |

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## **General**

Delta Air Lines, Inc. issues operations manual revisions to provide new or revised procedures and information. Formal revisions may also incorporate appropriate information from previously issued Fleet Bulletins.

The revision date is the date the revision material is distributed and considered current. EFB revision downloads and/or flight deck distribution should be accomplished as soon as possible, but may take as much as 21 days after the revision date for completion.

Revisions include a Transmittal Letter, Revision Record, Revision Highlights, and a List of Effective Pages. Use the information on the new Revision Record to review the revised operations manual content.

---

## **Revision Highlights**

Pages containing revised technical and non-technical material have revision bars associated with the changed text or illustration.

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## **Chapter NNCI - Non-Normal Checklist Instructions**

### **Completing the Non-Normal Procedure**

#### **ECAM Operation**

NNCI.1.6 - Updated ECAM Operation information to match current procedures.

## Revision Record

### QRH List of Effective Pages - FAA Approved

## Chapter RR

### Section LEP

| Page                                                          | Date               |
|---------------------------------------------------------------|--------------------|
| <b>Quick Reference Handbook</b>                               |                    |
| Quick Action Index                                            |                    |
| * QA.Index.1-2                                                | September 23, 2016 |
| Annunciated Index (tab)                                       |                    |
| * Annun.Index.1-12                                            | September 23, 2016 |
| Unannunciated Index (tab)                                     |                    |
| * Unann.Index.1-4                                             | September 23, 2016 |
| Alphabetical Index (tab)                                      |                    |
| * Alpha.Index.1-14                                            | September 23, 2016 |
| 0 Miscellaneous (tab)                                         |                    |
| * 0.TOC.1-2                                                   | September 23, 2016 |
| * 0.1-28                                                      | September 23, 2016 |
| 1 Airplane General, Emergency Equipment, Doors, Windows (tab) |                    |
| * 1.TOC.1-2                                                   | September 23, 2016 |
| * 1.1-10                                                      | September 23, 2016 |
| 2 Air Systems (tab)                                           |                    |
| * 2.TOC.1-2                                                   | September 23, 2016 |
| * 2.1-48                                                      | September 23, 2016 |
| 3 Anti-Ice, Rain (tab)                                        |                    |
| * 3.TOC.1-2                                                   | September 23, 2016 |
| * 3.1-18                                                      | September 23, 2016 |
| 4 Automatic Flight (tab)                                      |                    |
| * 4.TOC.1-2                                                   | September 23, 2016 |
| * 4.1-16                                                      | September 23, 2016 |
| 5 Communications (tab)                                        |                    |
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| * 5.1-8                                                       | September 23, 2016 |

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| 6 Electrical (tab)                     |                    |
| * 6.TOC.1-2                            | September 23, 2016 |
| * 6.1-52                               | September 23, 2016 |
| 7 Engines, APU (tab)                   |                    |
| * 7.TOC.1-4                            | September 23, 2016 |
| * 7.1-80                               | September 23, 2016 |
| 8 Fire Protection (tab)                |                    |
| * 8.TOC.1-2                            | September 23, 2016 |
| * 8.1-26                               | September 23, 2016 |
| 9 Flight Controls (tab)                |                    |
| * 9.TOC.1-2                            | September 23, 2016 |
| * 9.1-66                               | September 23, 2016 |
| 10 Flight Instruments, Displays (tab)  |                    |
| * 10.TOC.1-2                           | September 23, 2016 |
| * 10.1-18                              | September 23, 2016 |
| 11 Flight Management, Navigation (tab) |                    |
| * 11.TOC.1-2                           | September 23, 2016 |
| * 11.1-54                              | September 23, 2016 |
| 12 Fuel (tab)                          |                    |
| * 12.TOC.1-2                           | September 23, 2016 |
| * 12.1-32                              | September 23, 2016 |
| 13 Hydraulics (tab)                    |                    |
| * 13.TOC.1-2                           | September 23, 2016 |
| * 13.1-44                              | September 23, 2016 |
| 14 Landing Gear (tab)                  |                    |
| * 14.TOC.1-2                           | September 23, 2016 |
| * 14.1-30                              | September 23, 2016 |

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**September 23, 2016**

**RR.LEP.1**

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|-----------------------------------------|--------------------|
| 15 Warning Systems (tab)                |                    |
| * 15.TOC.1-2                            | September 23, 2016 |
| Non Normal Ops Info (tab)               |                    |
| * NNOI.TOC.1-2                          | September 23, 2016 |
| * NNOI.1-12                             | September 23, 2016 |
| Non Normal Checklist Instructions (tab) |                    |
| * NNCI.TOC.1-2                          | September 23, 2016 |
| * NNCI.1.1-16                           | September 23, 2016 |
| ECAM Exceptions (tab)                   |                    |
| * EE.TOC.1-2                            | September 23, 2016 |
| * EE.1.1-2                              | September 23, 2016 |
| Revision Record (tab)                   |                    |
| * RR.TOC.RR.1-2                         | September 23, 2016 |
| * RR.ModID.1-6                          | September 23, 2016 |
| * RR.Abbrev.1-12                        | September 23, 2016 |
| * RR.RR.1-2                             | September 23, 2016 |
| * RR.LEP.1-2                            | September 23, 2016 |
| Evacuation                              |                    |
| * Back Cover.1-2                        | September 23, 2016 |

\* = Revised, Added, or Deleted

**Evacuation Checklist is on the  
reverse side of this page.**

**Evacuation**

**Condition:** Evacuation of passengers and crew is required.

1. Set parking brake.
2. Notify Tower or Ground Control.
3. Verify cabin is depressurized:
  - ▶ If cabin pressure is not zero:
    - CAB PRESS MODE SEL . . . . . MAN
    - MAN V/S CTL . . . . . Full UP
4. Notify the flight attendants “EASY VICTOR” three times.
5. Both ENG MASTERS . . . . . OFF
6. Notify the flight attendants:  
“THIS IS THE CAPTAIN EVACUATE, EVACUATE.”
7. ENGINE and APU FIRE pbs . . . . . Push
8. ENG and APU AGENT pbs, as required . . . . Push
9. Perform assigned crew evacuation duties.

