AIRCRAFT SYSTEMS

AIR CONDITIONING / PRESSURIZATION / VENTILATION
Intentionally left blank
### DSC-21-10 Air Conditioning

#### DSC-21-10-10 General
- General
- Architecture

#### DSC-21-10-20 Main Components
- Air Conditioning Pack
- Pack Schematic (Simplified)
- PACK FLOW CONTROL VALVE
- RAM AIR
- MIXER UNIT
- Hot-Air Pressure-Regulating Valve
- Trim Air Valves

#### DSC-21-10-30 Temperature and Flow Regulation
- General
- Pack Controller
- Zone Controller
- Temperature Regulation

#### DSC-21-10-40 System Operation under Failure Condition
- General
- Zone Controller
- Pack Controllers
- AIR CYCLE MACHINE FAILURE
- HOT AIR PRESSURE REGULATING VALVE FAILURE
- TRIM AIR VALVE FAILURE

#### DSC-21-10-50 Controls and Indicators
- Controls on Overhead Panel
- ECAM Bleed Page
- ECAM COND Page
- ECAM CAB PRESS Page
- ECAM Cruise Page

#### DSC-21-10-60 Warnings and Cautions
- Warnings and Cautions

#### DSC-21-10-70 Electrical Supply
- BUS EQUIPMENT LIST
- Bus Equipment List

*Continued on the following page*
DSC-21-20 Pressurization

DSC-21-20-10 General

GENERAL................................................................................................................................................................ A
AUTOMATIC OPERATION.................................................................................................................................B
MANUAL OPERATION.................................................................................................................................C
SCHEMATICS..................................................................................................................................................D

DSC-21-20-20 Main Components

CABIN PRESSURE CONTROLLERS.....................................................................................................................A
OUTFLOW VALVE..............................................................................................................................................B
SAFETY VALVES.............................................................................................................................................C

DSC-21-20-30 System Operation

Automatic Pressure Control Mode...................................................................................................................... A
Pressurization Modes Switching.......................................................................................................................B
Pressurization Flight Profile.............................................................................................................................C
MANUAL PRESSURE CONTROL MODE...........................................................................................................D
DITCHING..........................................................................................................................................................E

DSC-21-20-40 Controls and Indicators

Overhead Panel...................................................................................................................................................A
ECAM CAB PRESS Page....................................................................................................................................B
ECAM Cruise Page..........................................................................................................................................C
ECAM Door Page............................................................................................................................................D

DSC-21-20-50 Warnings and Cautions

Warnings and Cautions...................................................................................................................................... A

DSC-21-20-60 Electrical Supply

BUS EQUIPMENT LIST.......................................................................................................................................A

DSC-21-30 Ventilation

DSC-21-30-10 General

General................................................................................................................................................................ A

DSC-21-30-20 Avionics Ventilation

General................................................................................................................................................................ A
Main Components..............................................................................................................................................B
Normal Operation, Open-Circuit Configuration...............................................................................................C
Normal Operation, Close-Circuit Configuration.............................................................................................D
Normal Operation, Intermediate Configuration.................................................................................................E
Abnormal Operation.........................................................................................................................................F

Continued on the following page
Continued from the previous page

DSC-21-30-40 Battery Ventilation
BATTERY VENTILATION...........................................................................................................................................A

DSC-21-30-50 Lavatory and Galley Ventilation
Lavatory and Galley.................................................................................................................................................A

DSC-21-30-60 Controls and Indicators
Overhead Panel.......................................................................................................................................................A
ECAM CAB PRESS Page........................................................................................................................................B

DSC-21-30-70 Warnings and Cautions
Warnings and Cautions........................................................................................................................................A

DSC-21-30-80 Electrical Supply
BUS EQUIPMENT LIST...........................................................................................................................................A

DSC-21-40 Cargo

DSC-21-40-10 General
General.....................................................................................................................................................................A
Schematic.................................................................................................................................................................B

DSC-21-40-20 System Operation
FORWARD CARGO COMPARTMENT VENTILATION............................................................................................A
AFT CARGO COMPARTMENT VENTILATION........................................................................................................B
AFT CARGO COMPARTMENT HEATING................................................................................................................C

DSC-21-40-30 Controls and Indicators
Overhead Panel.......................................................................................................................................................A

DSC-21-40-35 ECAM Cond Page
ECAM COND Page.................................................................................................................................................A

DSC-21-40-40 Warnings and Cautions
WARNINGS AND CAUTIONS.................................................................................................................................A

DSC-21-40-50 Electrical Supply
Bus Equipment List..................................................................................................................................................A
Intentionally left blank
<table>
<thead>
<tr>
<th>Localization</th>
<th>Toc</th>
<th>ID</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSC-21-PLP-TOC Main Components</td>
<td>1</td>
<td>Documentation update: Deletion of the &quot;00000303.0001001 Hot-Air Pressure-Regulating Valve&quot; documentary unit.</td>
<td></td>
</tr>
<tr>
<td>DSC-21-PLP-TOC General</td>
<td>2</td>
<td>Documentation update: Deletion of the &quot;00000357.0004001 Schematic&quot; documentary unit.</td>
<td></td>
</tr>
<tr>
<td>DSC-21-PLP-TOC Controls and Indicators</td>
<td>3</td>
<td>Documentation update: Deletion of the &quot;00000359.0005001 Overhead Panel&quot; documentary unit.</td>
<td></td>
</tr>
<tr>
<td>DSC-21-10-20 Hot-Air Pressure-Regulating Valve</td>
<td>F</td>
<td>1</td>
<td>Effectivity update: The information now applies to all MSN.</td>
</tr>
<tr>
<td>DSC-21-10-50 Controls on Overhead Panel</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-10-70 Bus Equipment List</td>
<td>B</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-20-30 DITCHING</td>
<td>E</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279.</td>
</tr>
<tr>
<td>DSC-21-20-30 DITCHING</td>
<td>E</td>
<td>2</td>
<td>Effectivity update: The information no longer applies to MSN 0395.</td>
</tr>
<tr>
<td>DSC-21-20-40 Overhead Panel</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279.</td>
</tr>
<tr>
<td>DSC-21-20-40 Overhead Panel</td>
<td>A</td>
<td>2</td>
<td>Effectivity update: The information no longer applies to MSN 0395.</td>
</tr>
<tr>
<td>DSC-21-20-50 Warnings and Cautions</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-30-10 General</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-40-10 General</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-40-10 Schematic</td>
<td>B</td>
<td>2</td>
<td>Effectivity update: The information no longer applies to MSN 0395.</td>
</tr>
<tr>
<td>DSC-21-40-20 FORWARD CARGO COMPARTMENT VENTILATION</td>
<td>A</td>
<td>1</td>
<td>Effectivity update: The information no longer applies to MSN 0395.</td>
</tr>
<tr>
<td>DSC-21-40-20 AFT CARGO COMPARTMENT VENTILATION</td>
<td>B</td>
<td>2</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
<tr>
<td>DSC-21-40-20 AFT CARGO COMPARTMENT HEATING</td>
<td>C</td>
<td>3</td>
<td>Effectivity update: The information no longer applies to MSN 0279, 0395.</td>
</tr>
</tbody>
</table>

Continued on the following page
<table>
<thead>
<tr>
<th>Localization Title</th>
<th>Toc Index</th>
<th>ID</th>
<th>Reason</th>
</tr>
</thead>
</table>
The air conditioning system is fully automatic. It provides continuous air renewal and maintains a constant, selected temperature in the following three zones: COCKPIT, FWD CABIN, AFT CABIN. These three zones are independently controlled.

Air is supplied by the pneumatic system, via:
- Two pack flow control valves,
- Two packs,
- The mixing unit, which mixes the air that comes from the cabin and the packs.

Air is then distributed to the cockpit and the cabin.

Temperature regulation is optimized via the hot air pressure regulating valve, and the trim air valves that add hot air, tapped upstream of the packs, to the mixing unit air.

In an emergency, a ram air inlet can provide ambient air to the mixing unit.

Temperature regulation is controlled by a zone controller and two pack controllers. Flight deck and cabin temperature can be selected from the cockpit’s AIR COND panel.

Low-pressure air is supplied to the mixing unit by a ground connection.
The two packs operate automatically and independently of each other. Pack operation is controlled by pack controller signals. Warm pre-conditioned bleed air enters the cooling path via the pack flow control valve, and is ducted to the primary heat exchanger. Then, the cooled bleed air enters the compressor section of the air-cycle machine and is compressed to a higher pressure and temperature. It is cooled again in the main heat exchanger and enters the turbine section, where it expands and, in expanding, generates power to drive the compressor and cooling air fan. The removal of energy during this process reduces air temperature, resulting in very low air temperature at turbine discharge. A water separator system dries the air before it enters the turbine section.
PACK FLOW CONTROL VALVE

Ident.: DSC-21-10-20-0000300.0001001 / 09 DEC 09
Applicable to: ALL

This valve is pneumatically-operated and electrically-controlled. It regulates the air flow in accordance with signals received from the pack controller. In the absence of air pressure, a spring keeps the valve closed. The valve closes automatically in case of pack overheating, engine starting, or operation of the fire or ditching pushbutton. The valve is controlled from the AIR COND panel.

RAM AIR

Ident.: DSC-21-10-20-0000301.0001001 / 14 NOV 11
Applicable to: ALL

An emergency ram air inlet ventilates the cockpit and cabin to remove smoke, or if both packs fail. The emergency ram air inlet valve is controlled by the RAM AIR pushbutton on the AIR COND panel. This pushbutton opens the ram air valve, provided that ditching is not selected. When the RAM AIR pushbutton is ON: The outflow valve opens about 50%, provided that it is under automatic control and ΔP is less than 1 PSI. The outflow valve does not automatically open if it is under manual control, even if ΔP is less than 1 PSI. If ΔP is greater than 1 PSI, the check valve located downstream the ram air door will not open, even if the ram air door has been selected open. No airflow will then be supplied.

MIXER UNIT

Ident.: DSC-21-10-20-0000302.0001001 / 09 DEC 09
Applicable to: ALL

This unit mixes cold fresh air from the packs with the cabin air being recirculated through recirculation fans. The mixer unit is also connected to the emergency ram air inlet and the low pressure ground inlets.

HOT-AIR PRESSURE-REGULATING VALVE

Ident.: DSC-21-10-20-0000303.0002001 / 15 FEB 11
Applicable to: ALL

This valve regulates the pressure of hot air, tapped upstream of the packs. It is pneumatically-operated and electrically-controlled from the HOT AIR pushbutton on the AIR COND panel. In the absence of air, a spring keeps the valve closed.
The valve closes automatically, if:
- The duct overheats, or
- The cockpit trim air valve fails, or
- Both cabin trim air valves fail.

The hot-air pressure-regulating valve remains operative, even if either the forward or aft cabin trim air valve fails.

**TRIM AIR VALVES**

Ident.: DSC-21-10-20-00000304.0001001 / 15 FEB 11
Applicable to: ALL

These valves are electrically-controlled by the zone controller. A trim air valve, associated with each zone, adjusts the temperature by adding hot air.
Temperature regulation is automatic and controlled by one zone controller and two pack controllers.

**PACK CONTROLLER**

Each pack controller regulates the temperature of its associated pack, in accordance with a demand signal from the zone controller, by modulating the bypass valve, the ram air inlet flaps and the ram air outlet flaps.

The ram air inlet and outlet flaps close during takeoff and landing to avoid ingestion of foreign matter.

*Note:* During takeoff, the ram air inlet and outlet flaps close when TO power is set and the main landing gear struts are compressed.

During landing they close as soon as the main landing gear struts are compressed, as long as speed is at or above 70 kt.

They open 20 s after the speed drops below 70 kt.

The pack controllers also regulate flow by modulating the associated pack flow control valve.

**ZONE CONTROLLER**

**PACK FLOW CONTROL**

The crew can use the PACK FLOW pushbutton to adjust the pack flow for the number of passengers and for external conditions.

Whatever the crew selects, the system delivers higher flow for any of the following circumstances:

- In single-pack operation,
- When the APU is supplying bleed air.

The system delivers normal flow if the crew selects LO flow and the temperature demand cannot be satisfied.

**ENGINE PRESSURE DEMAND**

When the cooling demand in one zone cannot be satisfied, if the bleed pressure is too low, the zone controller sends a pressure demand signal to both Engine Interface Units (EIU) to increase the minimum idle and to raise the bleed pressure.
APU FLOW DEMAND

When the APU bleed valve is open, the zone controller signals the APU's Electronic Control Box (ECB) to increase the APU flow output when any zone temperature demand cannot be satisfied.

TEMPERATURE REGULATION

The zone controller regulates the temperature of the two cabin zones and the cockpit.

BASIC TEMPERATURE REGULATION

The flight crew uses the temperature selectors on the air conditioning panel in the cockpit to select the reference temperatures. The zone controller computes a temperature demand from the selected temperature and the actual temperature.

The actual temperature is measured by sensors:
- In the cockpit, for the cockpit zone;
- In the lavatory extraction circuit and galley ventilation system, for the cabin.

A signal corresponding to the lowest demanded zone temperature goes to the pack controller, which then make both packs produce the required outlet temperature.

OPTIMIZED TEMPERATURE REGULATION

The zone controller optimizes the temperature by action on the trim air valves. The temperature selection range is from 18 °C (64 °F) to 30 °C (86 °F).
Each controller consists of a primary channel that is normally in control and a secondary channel that acts as a backup if the primary channel fails.

**ZONE CONTROLLER**

**PRIMARY CHANNEL FAILURE**

The secondary channel operates as backup.
The flow setting function and optimized temperature regulation are not available. HOT AIR and TRIM AIR valves close.
The zones are controlled to 24 °C (76 °F) (backup regulation). Pack 1 controls the cockpit temperature. Pack 2 controls the FWD and AFT cabin temperatures. ALTN MODE appears on the ECAM (Electronic Centralized Aircraft Monitoring) COND page.

**SECONDARY CHANNEL FAILURE**

This has no effect on zone temperature regulation. Backup mode is lost.

**PRIMARY AND SECONDARY CHANNEL FAILURE**

Optimized and backup temperature regulation is lost.
The packs deliver a fixed temperature: 20 °C (68 °F) for pack 1, 10 °C (50 °F) for pack 2. The failure removes all information from the ECAM COND page, which then displays PACK REG.

**PACK CONTROLLERS**

**PRIMARY CHANNEL FAILURE**

The secondary computer operates as a backup.
Regulation is not optimized.
Pack flow is fixed at the previous setting.

**SECONDARY CHANNEL FAILURE**

This failure has no effect on pack regulation. Backup mode is lost.
ECAM signals related to the corresponding pack are lost.
PRIMARY AND SECONDARY CHANNEL FAILURE

As a backup, corresponding pack outlet temperature is controlled by the anti-ice valve and is stabilized to a temperature between 5 °C (41 °F) and 30 °C (86 °F) in a maximum of 6 min. ECAM signals, related to the corresponding pack, are lost.

AIR CYCLE MACHINE FAILURE

Ident.: DSC-21-10-40-00000312.0001001 / 09 DEC 09
Applicable to: ALL

If the Air Cycle Machine (ACM) fails (compressor/turbine seizure), the affected pack may be operated in heat exchanger cooling mode. Warm pre-conditioned bleed air enters the cooling path via the pack valve and goes to the primary heat exchanger. Then, the main part of the cooled air goes directly downstream of ACM turbine through the bypass valve, and the rest goes through the failed ACM. The ACM seizure reduces the pack flow.

As for normal pack operation:
- The pack controller regulates temperature, in accordance with zone controller demand, by modulating the bypass valve and the ram air inlet and outlet flaps.
- The zone controller regulates the hot air flow through the hot air valves to optimize cockpit/cabin temperature regulation. Hot air flow is lower than in normal pack operation, because pack flow is reduced.

HOT AIR PRESSURE REGULATING VALVE FAILURE

Ident.: DSC-21-10-40-00000313.0001001 / 15 FEB 11
Applicable to: ALL

Failed open : No effect.
Failed closed : Optimized regulation is lost. Trim air valves are driven to the fully closed position. Pack 1 controls the cockpit temperature to the selected value and pack 2 controls the cabin temperature (FWD and AFT) to the mean value of the selected temperatures.

TRIM AIR VALVE FAILURE

Ident.: DSC-21-10-40-00000314.0001001 / 09 DEC 09
Applicable to: ALL

Optimized temperature regulation of the corresponding zone is lost.
(1) Zone temperature selector
   - 12 o'clock position : 24 °C (76 °F).
   - COLD position : 18 °C (64 °F).
   - HOT position : 30 °C (86 °F).

(2) HOT AIR pushbutton
    ON : The valve regulates hot air pressure.
    OFF : The valve closes, and the trim air valves close.
    The FAULT circuit is reset.
    FAULT : The FAULT light comes on amber, along with an associated ECAM caution, when duct overheat is detected. The fault circuit detects an overheat when the duct temperature reaches 88 °C (190 °F) once.
    The valve and trim air valves close automatically.
    The FAULT light goes off when the temperature drops below 70 °C (158 °F), and the flight crew selects OFF.
(3) **PACK pushbutton**

**ON**: The pack flow control valve is automatically-controlled.

It opens, except in the following cases:
- Upstream pressure below minimum.
- Compressor outlet overheat.
- Engine start sequence:
  1. Both valves immediately close, if the MODE selector is set to IGN (or CRK).
  2. They remain closed when, on either engine:
     - the MASTER switch is set to ON (or MAN START pushbutton is set to ON) and,
     - the start valve is open and,
     - N2 < 50%.
  3. On ground, reopening of the valves is delayed for 30 s to avoid a supplementary pack closure cycle during second engine start.
- Fire pushbutton, of the engine on the related side, is pressed,
- Ditching is selected.

**OFF**: The pack flow control valve closes.

**FAULT lt**: Comes on amber, and a caution appears on the ECAM, if the pack flow control valve position disagrees with the selected position, or in the case of compressor outlet overheat or pack outlet overheat.

(4) **PACK FLOW selector**

- Permits the selection of pack valve flow, according to the number of passengers and ambient conditions (smoke removal, hot or wet conditions).
  LO (80 %) – NORM (100 %) – HI (120 %).
- Manual selection is irrelevant in single pack operation, or with APU bleed supply. In these cases, HI is automatically selected.
- If LO is selected, the pack flow can be automatically selected up to 100 % when the cooling demand cannot be satisfied.
(5) **RAM AIR pushbutton (guarded)**

**ON**: The ON light comes on white.

If the DITCHING pushbutton, on the CABIN PRESS panel, is in normal position:
- The RAM air inlet opens.
- If $\Delta p \geq 1$ PSI: The outflow valve control remains normal. No emergency RAM air flows in.
- If $\Delta p < 1$ PSI: The outflow valve opens to about 50% when under automatic control. It does not automatically open when it is under manual control. Emergency RAM airflow is directly supplied to the mixer unit.

**OFF**: The RAM air inlet closes.

(1) **CAB FAN pb**

**ON**: The two cabin fans are on.

**OFF**: The two cabin fans are off.
(1) Zone temperature rotary selector
   - 12 o’clock position: 24 °C (76 °F).
   - COLD position: 18 °C (64 °F).
   - HOT position: 30 °C (86 °F).

(2) HOT AIR pushbutton
   ON : The valve regulates hot air pressure.
   OFF : The valve closes, and the trim air valves close. The FAULT circuit is reset.
   FAULT : The FAULT light comes on amber, along with an associated ECAM caution, when duct overheat is detected. The fault circuit detects an overheat when the duct temperature reaches 88 °C (190 °F) once. The valve and trim air valves close automatically. The FAULT light goes off when the temperature drops below 70 °C (158 °F), and the flight crew selects OFF.
(3) PACK pb-sw

ON : The pack flow control valve is automatically-controlled.

   It opens, except in the following cases:
   - Upstream pressure below minimum.
   - Compressor outlet overheat.
   - Engine start sequence:
     1. If the crossbleed valve is closed, the valve located on the starting engine side immediately closes, when the MODE selector is set to IGN (or CRK).
     2. It remains closed on the starting engine side (provided the crossbleed valve is closed) when:
        - the MASTER switch is set to ON (or MAN START pushbutton is set to ON) and,
        - the start valve is open and,
        - N2 < 50 %.

   Note: If the crossbleed valve is open at engine start, both pack flow control valves close.

   3. On ground, reopening of the valves is delayed for 30 s to avoid a supplementary pack closure cycle during second engine start.
      - Fire pushbutton, of the engine on the related side, is pressed,
      - Ditching is selected.

OFF : The pack flow control valve closes.

FAULT lt : Comes on amber, and a caution appears on the ECAM, if the pack flow control valve position disagrees with the selected position, or in the case of compressor outlet overheat or pack outlet overheat.

(4) PACK FLOW sel

- Permits the selection of pack valve flow, according to the number of passengers and ambient conditions (smoke removal, hot or wet conditions).
  LO (80 %) – NORM (100 %) – HI (120 %).
- Manual selection is irrelevant in single pack operation, or with APU bleed supply. In these cases, HI is automatically selected.
- If LO is selected, the pack flow can be automatically selected up to 100 % when the cooling demand cannot be satisfied.
(5) **RAM AIR pushbutton (guarded)**

**ON:** The ON light comes on white.

If the DITCHING pushbutton, on the CABIN PRESS panel, is in normal position:
- The RAM air inlet opens.
- If $\Delta p \geq 1$ PSI: The outflow valve control remains normal. No emergency RAM air flows in.
- If $\Delta p < 1$ PSI: The outflow valve opens to about 50% when under automatic control. It does not automatically open when it is under manual control. Emergency RAM airflow is directly supplied to the mixer unit.

**OFF:** The RAM air inlet closes.

---

(1) **CAB FAN pb**

**ON:** The two cabin fans are on.

**OFF:** The two cabin fans are off.
(1) Pack outlet temperature
   It appears in green. It becomes amber, if the temperature is higher than 90 °C.

(2) RAM AIR inlet
   Crossline: The flap is normally closed.
      - Green
   In transit: The flap is partially open
      - Amber
   Inline – : The flap is fully open on ground.
   Amber
   Inline – : The flap is fully open in flight.
   Green

(3) Pack bypass valve position
   Indication is green.
   C = Cold – Valve closed
   H = Hot – Valve open.
(4) Pack compressor outlet temperature
It appears in green. It becomes amber, if the temperature is higher than 230 °C.

(5) Pack flow
It appears in green. It becomes amber, if the pack flow control valve is closed.

Note: The pack flow indication can be up to 30 % below the actual flow rate.

(6) Pack flow control valve
Inline - Green : Open.
Inline - Amber : Open, and disagrees with the control position.
Crossline - Green : Fully closed.
Crossline - Amber : Fully closed, and disagrees with the control position.

(7) User Indication
It appears in green. It becomes amber, in flight, when RAM AIR flap is not fully open, and both pack flow control valves are closed.
(1) Zone controller fault indication
   ALTN MODE : Primary zone controller fault (green).
   PACK REG  : Zone controller fault (basic regulation by packs only) (green).
   No indication : Zone controller normal operation.

(2) Cabin FAN fault indication
   It appears in amber, if the recirculation fan is detected as faulty.

(3) Zone temperature indication
   It is in green.

(4) Zone duct temperature
   It appears in green, and becomes amber at 80 °C (176 °F).

(5) Zone trim air valve position indication
   The arrow is green. It is replaced by amber crosses (“XX”) if the valve fails.
   C = Cold valve fully closed.
   H = Hot valve fully open.

(6) Hot air pressure regulating valve
   In line - Green : The valve is open.
   In line - Amber : The valve is not closed; disagrees with the control position.
   Crossline - Green : The valve is fully closed, and the pushbutton is at auto.
   Crossline - Amber : The valve is closed, and pushbutton is OFF, or the valve disagree is closed.

(7) TEMP
   Unit of measure (°C or °F) is indicated in cyan.
   Note: When the hot air valve is closed, a spurious FWD CRG HEAT message may appear in the INOP SYS list, even if the system remains operative.
(1) **PACK indication**
Triangle normally green, PACK 1(2) indication normally white. Both become amber when pack flow control valve is closed with associated engine running.
(1) **Zone indication**
This field also displays the temperature scale in use (°C or °F).

(2) **Zone temperature**
Intentionally left blank
WARNINGS AND CAUTIONS

Ident.: DSC-21-10-60-00000320.0001001 / 18 NOV 13
Applicable to: ALL
<table>
<thead>
<tr>
<th>E/WD : FAILURE TITLE conditions</th>
<th>AURAL WARNING</th>
<th>MASTER LIGHT</th>
<th>SD PAGE CALLED</th>
<th>LOCAL WARNING</th>
<th>FLT PHASE INHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>PACK 1 (or 2) OVHT Pack compressor outlet temperature above 260 °C, or Pack compressor outlet temperature above 230 °C four times during one flight, or pack outlet temp above 95 °C.</td>
<td>BLEED</td>
<td>PACK FAULT lt</td>
<td>3, 4, 5, 7, 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACK 1 (or 2) FAULT Pack valve disagree with selected position, or Pack compressor outlet temperature above 230 °C four times during one flight.</td>
<td>SINGLE CHIME</td>
<td>MASTER CAUT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACK 1 + 2 FAULT One pack off, then the other fault.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PACK 1 (2) OFF Pack pb-sw at off with no failure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CKPT (FWD CAB OR AFT CAB) DUCT OVHT Duct temperature above 88 °C.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1, 2, 3, 4, 5, 7, 8, 9, 10</td>
</tr>
<tr>
<td>HOT AIR FAULT Hot air pressure regulating valve disagrees with selected position.</td>
<td>COND</td>
<td>HOT AIR FAULT lt</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L + R CAB FAN FAULT Both fan failure.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td>PACK 1(2) REGUL FAULT Pack main channel, or pack main and secondary channels failed.</td>
<td>BLEED</td>
<td></td>
<td></td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td>ZONE REGUL FAULT Zone controller main channel, or main and secondary channels failed.</td>
<td>NIL</td>
<td>COND</td>
<td>NIL</td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td>LAV + GALLEY FAN FAULT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td>TRIM AIR SYS FAULT One trim air valve fault, or overpressure downstream hot air valve.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
</tbody>
</table>

**MEMO DISPLAY**

RAM AIR ON appears in green if the ram air pushbutton switch is ON.
### BUS EQUIPMENT LIST

**Ident.: DSC-21-10-70-00000321.0000001 / 15 FEB 11**

**Applicable to: MSN 0112**

<table>
<thead>
<tr>
<th>PACK CONT</th>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td>1 PRIM SEC.</td>
<td>AC1</td>
<td>DC1</td>
</tr>
<tr>
<td></td>
<td>AC1</td>
<td>DC1</td>
</tr>
<tr>
<td>2 PRIM SEC.</td>
<td>AC2</td>
<td>DC2</td>
</tr>
<tr>
<td></td>
<td>AC2</td>
<td>DC2</td>
</tr>
<tr>
<td>ZONE CONT</td>
<td>PRIM. SEC.</td>
<td>AC1</td>
</tr>
<tr>
<td></td>
<td>AC2</td>
<td>DC2</td>
</tr>
<tr>
<td>PACK 1 VALVE CLOSURE</td>
<td>DC BAT</td>
<td>DC2</td>
</tr>
<tr>
<td>PACK 2 VALVE CLOSURE</td>
<td>DC BAT</td>
<td>DC2</td>
</tr>
<tr>
<td>RAM AIR INLET</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**BUS EQUIPMENT LIST**

**Ident.: DSC-21-10-70-00000321.0000001 / 15 FEB 11**

**Applicable to: MSN 0189-0042**

<table>
<thead>
<tr>
<th>PACK CONT</th>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td>1 PRIM SEC.</td>
<td>AC 1</td>
<td>DC 1</td>
</tr>
<tr>
<td></td>
<td>AC 1</td>
<td>DC 1</td>
</tr>
<tr>
<td>2 PRIM SEC.</td>
<td>AC 2</td>
<td>DC 2</td>
</tr>
<tr>
<td></td>
<td>AC 2</td>
<td>DC 2</td>
</tr>
<tr>
<td>ZONE CONT</td>
<td>PRIM. SEC.</td>
<td>AC 1</td>
</tr>
<tr>
<td></td>
<td>AC 2</td>
<td>DC 2</td>
</tr>
<tr>
<td>PACK 1 VALVE CLOSURE</td>
<td></td>
<td>SHED</td>
</tr>
<tr>
<td>PACK 2 VALVE CLOSURE</td>
<td>DC 2</td>
<td></td>
</tr>
<tr>
<td>RAM AIR INLET</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>
Intentionally left blank
The cabin pressurization system has four general functions:
- **Ground function**: Fully opens the outflow valve on ground.
- **Prepressurization**: During takeoff, increases cabin pressure to avoid a surge in cabin pressure during rotation.
- **Pressurization in flight**: Adjusts cabin altitude, and rate of change to provide passengers with a comfortable flight.
- **Depressurization**: After touchdown, gradually releases residual cabin overpressure before the ground function fully opens the outflow valve.

The system consists of:
- Two Cabin Pressure Controllers (CPC)
- One outflow valve, with an actuator that incorporates three motors (two for automatic operation, one for manual operation)
- One control panel
- Two safety valves

Any one of the three independent electric motors may power the outflow valve.

Normally, one of the two cabin pressure controllers operates the outflow valve by means of its associated automatic motor.

In case of ditching, an override switch on the control panel allows the flight crew to close the outflow valve and all valves below the flotation line.

The flight crew can set the system to operate automatically, semi-automatically, or manually.

In normal operation, cabin pressurization is fully automatic.

**AUTOMATIC OPERATION**

The flight crew monitors the operation of the system, but does nothing to control it. Air pressure in the cabin follows external schedules that the system receives as signals from the Flight Management and Guidance System (FMGS).

When FMGS data is not available for automatic pressurization, the crew only needs to select the landing field elevation.

The pressurization system then uses the manually-selected landing field elevation for internal schedules.
In manual mode, the flight crew controls the cabin altitude via the manual motor of the outflow valves, by operating controls on the pressurization control panel.
Intentionally left blank
CABIN PRESSURE CONTROLLERS

Two identical, independent, digital controllers automatically control the system, by maintaining the proper cabin pressure. They receive signals from the Air Data Inertial Reference System (ADIRS), the Flight Management and Guidance Computer (FMGC), the Engine Interface Unit (EIU), and the Landing Gear Control Interface Unit (LGCIU).

When the system is in automatic or semi-automatic mode, one controller is active, the other is on standby.

The controllers also generate signals for the Electronic Centralized Aircraft Monitoring (ECAM). For operation in manual mode, each controller has a backup section, which is powered by an independent power supply in the controller N°1 position. This section also has a pressure sensor that generates the cabin altitude and pressure signal for the ECAM, when MAN mode is selected.

The controllers communicate with each other via a cross-channel link.

OUTFLOW VALVE

The outflow valve is on the right-hand side of fuselage, behind the aft cargo compartment and below the flotation line.

The outflow valve assembly consists of a flush, skin-mounted, rectangular frame, carrying inward and outward opening flaps linked to the actuator. The actuator contains the drives of the two automatic motors and the manual motor. Either of two automatic motors operates the valve in automatic mode, and the manual motor operates it in manual mode.

In automatic mode, the operating controller signals the position of the valve to the ECAM.

In manual mode, the backup section of the N° 1 controller signals the position of the valve to the ECAM.

Note: When the RAM AIR pushbutton is ON, and Δp is below 1 PSI, the system drives the outflow valve about 50 % open if it is under automatic control. If the system is under manual control, the outflow valve does not automatically open, even if Δp is below 1 PSI.

SAFETY VALVES

Two independent pneumatic safety valves prevent cabin pressure from going too high (8.6 PSI above ambient) or too low (1 PSI below ambient). They are located on the rear pressure bulkhead, above the flotation line.
Intentionally left blank
GENERAL

- Two identical, independent, automatic systems (each consisting of a controller and its associated motors) control cabin pressure. Either system controls the single outflow valve. Only one controller operates at a time.

  An automatic transfer occurs:
  • 70 s after each landing.
  • If the operating system fails.

- The controller automatically controls the cabin pressure. It limits the cabin pressure to 8 000 ft maximum and optimizes it during climb and descent phases.
- The controller normally uses the landing elevation and the QNH from the FMGC, and the pressure altitude from ADIRS.
  If FMGC data are not available, the controller uses the captain BARO Reference from the ADIRS and the LDG ELEV selection.
- Pressurization is assumed through the following modes:

GROUND (GN)

Before takeoff, and 55 s after landing, the outflow valve fully opens to ensure that there is no residual cabin pressure. At touchdown, any remaining cabin pressure is released at a cabin vertical speed of 500 ft/min.

TAKEOFF (TO)

To avoid a pressure surge at rotation, the controller pre-pressurizes the aircraft at a rate of 400 ft/min, until the ΔP reaches 0.1 PSI. At liftoff, the controller initiates the climb phase.

CLIMB (CL)

During climb, the cabin altitude varies according to a fixed pre-programmed law that takes into account the aircraft’s actual rate of climb.

CRUISE (CR)

During cruise, the controller maintains cabin altitude at the level-off value, or at the landing field elevation, whichever is higher.
**DESCENT (DE)**

During descent, the controller maintains a cabin rate of descent, such that the cabin pressure is equal to the landing field pressure +0.1 PSI, shortly before landing. The maximum descent rate is 750 ft/min.

**ABORT (AB)**

If the aircraft does not climb after takeoff, the abort mode prevents the cabin altitude from climbing. Cabin pressure is set back to the takeoff altitude +0.1 PSI.

### PRESSURIZATION MODES SWITCHING

<table>
<thead>
<tr>
<th>CONDITIONS</th>
<th>FROM TO</th>
<th>GN TO</th>
<th>GN CL</th>
<th>AB TO</th>
<th>CL CR</th>
<th>CR DE</th>
<th>DE CL</th>
<th>GN CR</th>
<th>CL</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 1 and ENG 2 TLA ≥ MCT (1)</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L/G SYS1 or SYS 2 COMPRESSED</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One L/G SYS UNLOADED and A/C speed above 100 kt</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One L/G SYS COMPRESSED and A/C speed below 100 kt</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C ALT. &lt; 8 000 ft</td>
<td>1A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C ALT. ≥ 8 000 ft</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C ALT. CHANGE SINCE T/O ≤ 5 075 SLFT</td>
<td>1A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C ALT. CHANGE SINCE T/O ≥ 5 075 SLFT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C RATE OF CLIMB ≥ 21 SL FPM FOR 60 s.</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C RATE OF CLIMB ≥ 100 SL FPM FOR 30 s.</td>
<td>0</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C RATE OF DESCENT ≥ 200 SL FPM FOR 30 s.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A/C RATE OF DESCENT ≥ 250 SL FPM FOR 30 s.</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Engine running

0 : Condition not valid
1 : Condition valid
1A : Only one A condition is necessary
EXAMPLE

The cabin pressure controller switches from Climb mode (CL) to Abort mode (AB) when:
- The aircraft is below 8,000 ft, or the aircraft has changed altitude less than 5,075 ft since takeoff and,
- The aircraft rate of descent is greater than 200 ft/min for 30 s.

PRESSURIZATION FLIGHT PROFILE

IDENT.: DSC-21-20-30-00000331.0001001 / 24 JUN 13
Applicable to: ALL

MANUAL PRESSURE CONTROL MODE

IDENT.: DSC-21-20-30-00000332.0001001 / 16 MAR 11
Applicable to: ALL

If both automatic systems fail, the flight crew may use the CABIN PRESS control panel to take over manual control of cabin pressurization.

- Release the MODE SEL pushbutton to select MAN, and
- Push the MAN V/S CTL switch UP or DN to increase or decrease cabin altitude.

The first of these actions cuts off power to the AUTO motors, and enables the MAN motor to control the outflow valve.
Note: 1. Due to the slow operation of the outflow valves in manual mode, and the limited resolution of the outflow valves' position on the ECAM, the visual ECAM indication of a change in the outflow valves' position can take up to 5 s.
2. As the pressurization system is manually-controlled, the outflow valve does not open automatically at touchdown.

DITCHING

Ident.: DSC-21-20-30-0000333.0001001 / 09 DEC 09
1 Applicable to: MSN 0112, 0342

To prepare for ditching, the flight crew must press the DITCHING pushbutton on the CABIN PRESS control panel to close the outflow valve, the emergency ram air inlet, the avionics ventilation inlet and extract valves, and the pack flow control valves.

DITCHING

Ident.: DSC-21-20-30-0000333.0002001 / 09 DEC 09
2 Applicable to: MSN 0189

To prepare for ditching, the flight crew must press the DITCHING pushbutton on the CABIN PRESS control panel to close the outflow valve, the emergency ram air inlet, the avionics ventilation inlet and extract valves, the pack flow control valves, and the forward cargo outlet isolation valve.
(1) **LDG ELEV knob**

**AUTO** : The pressurization system uses the FMGS data to construct an optimized pressure schedule.

Other positions : The pressurization schedule does not use the landing elevation from the FMGS, but instead uses the landing elevation selected with this knob (from -2 000 to +14 000 ft) as its reference.

*Note:* The LDG ELEV knob scale is only given as an indication; refer to the ECAM information for accurate adjustment.

(2) **MODE SEL pb**

**AUTO** : Automatic mode is operating. One of the two systems controls the outflow valve.

**MAN** : This legend appears in white, and FAULT does not come on. The flight crew then uses the MAN V/S CTL selector to control the outflow valve.

*Note:* Switching the MODE SEL pb to MAN, for at least 10 s, then returning it to AUTO will select the other system.
FAULT lt: This legend appears in amber and the ECAM caution light comes on only when both automatic systems are faulty.

Note: The pilot may notice a variation in the CAB ALT indication on the ECAM PRESS page, when the system switches from the cabin pressure control AUTO mode to MAN mode, due to the reduced resolution of the backup pressure sensor.

(3) MAN V/S CTL toggle switch
The switch, springloaded to neutral, controls the outflow valve position through operation of the MAN motor, when the MODE SEL pb is in the MAN position.

UP: The valve moves towards the open position.
DN: The valve moves towards the closed position.

Note: To target precise cabin vertical speed rate, only short inputs should be applied on the toggle switch.

(4) DITCHING guarded pushbutton
Normal: The system functions normally.
ON: The operating system sends a “close” signal to the outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, pack flow control valves.

Note: The outflow valve will not close automatically, if it is under manual control.

CAUTION: If the ditching pb is set to ON, with the low pressure ground cart connected and all doors closed, a differential pressure will build up.
(1) LDG ELEV knob

AUTO: The pressurization system uses the FMGS data to construct an optimized pressure schedule.

Other positions: The pressurization schedule does not use the landing elevation from the FMGS, but instead uses the landing elevation selected with this knob (from -2 000 to +14 000 ft) as its reference.

Note: The LDG ELEV knob scale is only given as an indication; refer to the ECAM information for accurate adjustment.

(2) MODE SEL pb

AUTO: Automatic mode is operating. One of the two systems controls the outflow valve.

MAN: This legend appears in white, and FAULT does not come on. The flight crew then uses the MAN V/S CTL selector to control the outflow valve.

Note: Switching the MODE SEL pb to MAN, for at least 10 s, then returning it to AUTO will select the other system.
FAULT lt: This legend appears in amber and the ECAM caution light comes on only when both automatic systems are faulty.

Note: The pilot may notice a variation in the CAB ALT indication on the ECAM PRESS page, when the system switches from the cabin pressure control AUTO mode to MAN mode, due to the reduced resolution of the backup pressure sensor.

(3) MAN V/S CTL selector
The switch is springloaded to neutral and controls the outflow valve position through operation of the MAN motor, when the MODE SEL pb is in the MAN position.

UP: The valve moves towards the open position.
DN: The valve moves towards the closed position.

Note: To target precise cabin vertical speed rate, only short inputs should be applied on the selector.

(4) DITCHING pb (guarded)
Normal: The system functions normally.
ON: The operating system sends a “close” signal to the outflow valve, emergency ram air inlet, avionics ventilation inlet and extract valves, pack flow control valves, and forward cargo isolation outlet valve. The cargo extract fans stop automatically.

Note: The outflow valve will not close automatically, if it is under manual control.

| CAUTION | On ground, If the ditching pb is set to ON, with the low pressure ground cart connected and all doors closed, a differential pressure will build up. |
(1) **LDG ELEV AUTO/MAN**
   - **LDG ELEV AUTO**: appears in green when the LDG ELEV selector is in AUTO.
   - **LDG ELEV MAN**: appears in green when the LDG ELEV selector is not in AUTO.

Neither appears when the MODE SEL pushbutton switch is in MAN.

(2) **Landing elevation**
The landing elevation selected either automatically by the FMGS or manually by the pilot appears in green (but not when the MODE SEL pushbutton switch is in MAN).

(3) **V/S FT/MIN (cabin vertical speed)**
The analog and digital presentations appear in green when V/S is in the normal range. They appear in amber when V/S ≥ 2 000 ft/min.
The digital presentation pulses when V/S > 1 800 ft/min (resets at 1 600 ft/min).

(4) **ΔP PSI (cabin differential pressure)**
The analog and digital presentations appear in green when ΔP is in the normal range. They appear in amber when ΔP ≤ –0.4 PSI or ≥ 8.5 PSI.
The digital presentation pulses if $\Delta p > 1.5$ PSI (resets at 1 PSI) during flight phase 7. (Refer to DSC-21-20-50 Warnings and Cautions).

5) CAB ALT FT (cabin altitude)
The analog and digital presentations appear in green, in normal range. They appear in red if the cabin altitude goes above 9550 ft. The digital presentation pulses if the cabin altitude is at or above 8800 ft (resets at 8600 ft).

6) Active system indication (SYS 1 or SYS 2 or MAN)
SYS 1 or SYS 2 appears in green when active and in amber when faulty. When either system is inactive, its title does not appear. MAN appears in green when the MODE SEL switch is in MAN.

7) Safety valve position
SAFETY appears in white and the diagram in green when both safety valves are fully closed. SAFETY and the diagram appear in amber when either valve is not closed.

*Note:* The safety valve opens when the cabin differential pressure is between 8.2 and 8.9 PSI. The range is due to the reduced accuracy of $\Delta P$ measurements (in MAN mode), combined with the decrease in cabin differential pressure that occurs immediately after the safety valves open.

8) Outflow valve position
The diagram is green when the valve is operating normally. The diagram becomes amber when the valve opens more than 95% during flight.
(1) **LDG ELEV AUTO/MAN**  
Identical to the CAB PRESS page.

(2) **CAB V/S FT/MIN (cabin vertical speed)**  
Green, in normal range.  
Amber, when out of normal range: V/S ≥ 2 000 ft/min  
Pulses, when the V/S > 1 800 ft/min (resets at 1 600 ft/min).

(3) **CAB ALT FT (cabin altitude)**  
Green, in normal range.  
Red, for excessive cabin altitude: ≥ 9 550 ft.  
Pulses for cabin altitude at, or above, 8 800 ft (resets at 8 600 ft).

(4) **ΔP indication**  
It is normally green.  
It becomes amber, when out of normal range Δp ≤ -0.4 PSI or ≥ 8.5 PSI.
V/S (cabin vertical speed)
This number only appears during flight phases 5, 6 and 7. (Refer to DSC-21-20-50 Warnings and Cautions for flight phase definitions).
- It is normally green.
- It becomes amber, when the V/S is greater than 2 000 ft/min, or less than -2 000 ft/min.
## WARNINGS AND CAUTIONS

Ident.: DSC-21-20-50-00000338.0002001 / 14 NOV 11
Applicable to: MSN 0342

### E/WD : FAILURE TITLE

<table>
<thead>
<tr>
<th>Conditions</th>
<th>AURAL WARNING</th>
<th>MASTER LIGHT</th>
<th>SD PAGE CALLED</th>
<th>LOCAL WARNING</th>
<th>FLT PHASE INHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EXCESS CAB ALT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cabin altitude exceeds :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- In CLB and DES the higher of :</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 550 ft or landing field elevation plus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 000 ft</td>
<td>CRC</td>
<td>MASTER WARN</td>
<td>CAB PRESS</td>
<td>NIL</td>
<td>2, 3, 4, 5, 7, 8, 9, 10</td>
</tr>
<tr>
<td>- In CRZ 9 550 ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SYS 1 + 2 FAULT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both pressure controllers fail.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LO DIFF PR</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time to reach $\Delta P = 0 &lt; 1.5$ min, and time to reach $\Delta P = 0 \leq (\text{time for cab alt to reach landing elevation}) + 30$ s and aircraft is at least 3 000 ft above landing field.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: The warning is maintained, when the aircraft descends below 3 000 ft above landing field.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OUTFLOW VALVE NOT OPEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Valve not fully open on ground (time delay 3 min)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SAFETY VALVE OPEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Either safety valve not fully closed on ground or not fully closed for more than 1 min in flight.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LDG ELEV FAULT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No FMGS LDG ELEV data is available.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SYS 1 (or 2) FAULT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure controller fault.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The warning is maintained, when the aircraft descends below 3 000 ft above landing field.
## MEMO DISPLAY

The “MAN LDG ELEV” message is displayed in green, if the LDG ELEV knob is not in the AUTO position.

## WARNINGS AND CAUTIONS

<table>
<thead>
<tr>
<th>Identified:  DSC-21-20-50-00000338.0006001 / 14 NOV 11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable to: MSN 0112-0189</td>
</tr>
</tbody>
</table>

![Diagram showing various stages of flight with time intervals and速度](image-url)
### PRESSURIZATION - WARNINGS AND CAUTIONS

<table>
<thead>
<tr>
<th>E/WD : FAILURE TITLE</th>
<th>AURAL WARNING</th>
<th>MASTER LIGHT</th>
<th>SD PAGE CALLED</th>
<th>LOCAL WARNING</th>
<th>FLT PHASE INHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXCESS CAB ALT</td>
<td></td>
<td>CRC</td>
<td>MASTER WARN</td>
<td>CAB PRESS</td>
<td>1 to 5 7 to 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYS 1 + 2 FAULT</td>
<td></td>
<td></td>
<td></td>
<td>MODE SEL FAULT</td>
<td>4, 5, 7, 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LO DIFF PR</td>
<td>SINGLE CHIME</td>
<td>MASTER CAUT</td>
<td></td>
<td>CAB PRESS</td>
<td>2, 3, 4, 5, 7, 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFV NOT OPEN</td>
<td></td>
<td></td>
<td></td>
<td>NIL</td>
<td>3, 4, 5, 6, 7, 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAFETY VALVE OPEN</td>
<td></td>
<td></td>
<td></td>
<td>NIL</td>
<td>4, 5, 7, 8, 9, 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LDG ELEV FAULT</td>
<td></td>
<td></td>
<td></td>
<td>NIL</td>
<td>3, 4, 5, 7, 8, 9, 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYS 1 (or 2) FAULT</td>
<td>NIL</td>
<td>NIL</td>
<td></td>
<td></td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MEMO DISPLAY**

The “MAN LDG ELEV” message is displayed in green, if the LDG ELEV knob is not in the AUTO position.
Intentionally left blank
## BUS EQUIPMENT LIST

Ident.: DSC-21-20-60-0000339.0001001 / 09 DEC 09

Applicable to: ALL

<table>
<thead>
<tr>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td>CAB PRESS CONT</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>MANUAL CTL</td>
<td></td>
</tr>
</tbody>
</table>
Intentionally left blank
The ventilation system includes ventilation for:
- The avionics, controlled by the avionics equipment ventilation controller (AEVC),
- The battery,
- The lavatories and galleys.

Note: For more information about cargo ventilation, Refer to DSC-21-40-10 General
Intentionally left blank
The avionics ventilation system is fully automatic. It cools the electrical and electronic components in the avionics compartment and on the flight deck, including the instrument and circuit breaker panels. It uses two electric fans to force the circulation of cooling air. Whatever the configuration of the avionics ventilation system is, a part of the avionics ventilation air is sucked from the cockpit through the different cockpit panels.

**FANS**

Two electric fans operate continuously, as long as the aircraft’s electrical system is supplied. They make the air circulate around the avionics equipment.

**SKIN AIR INLET AND EXTRACT VALVES**

These valves admit air from outside the aircraft and evacuate hot air from the avionics equipment.

**SKIN EXCHANGE INLET AND OUTLET BYPASS VALVES**

These valves enable air to circulate between the avionics bay and the space under the cargo compartment floor.

**AIR CONDITIONING INLET VALVE**

This valve opens to enable the air conditioning circuit to supply fresh air to the avionics bay.

**SKIN EXCHANGE ISOLATION VALVE**

This valve connects or isolates the skin heat exchanger.

**AVIONICS EQUIPMENT VENTILATION CONTROLLER (AEVC)**

The AEVC controls the operation of all fans and valves in the avionics ventilation system.

**NORMAL OPERATION, OPEN-CIRCUIT CONFIGURATION**

The open-circuit configuration operates when skin temperature is above the on-ground threshold.
On-ground threshold = +12 °C (53 °F), temperature increasing, or 
+9 °C (48 °F), temperature decreasing.

**NORMAL OPERATION, CLOSE-CIRCUIT CONFIGURATION**

**FLIGHT OPERATIONS**

The close-circuit configuration operates when skin temperature is beneath the in-flight threshold.

In flight threshold = +35 °C (95 °F), temperature increasing, or 
+32 °C (90 °F), temperature decreasing.

**GROUND OPERATIONS**

The close-circuit configuration operates when skin temperature is beneath the on-ground threshold.
On ground threshold = +12 °C (53 °F), temperature increasing, or +9 °C (48 °F), temperature decreasing.

NORMAL OPERATION, INTERMEDIATE CONFIGURATION

Ident.: DSC-21-30-20-00000344.0001001 / 09 OCT 12
Applicable to: ALL

FLIGHT OPERATIONS

The intermediate configuration operates when skin temperature is above the in-flight threshold.

In flight threshold = +35 °C (95 °F), temperature increasing, or +32 °C (90 °F), temperature decreasing.
Note: The measuring range of the skin temperature sensed is between -50 °C and 80 °C. Outside of this range, the AEVC sets the avionics ventilation configuration to the intermediate configuration (partially open) until the temperature is within the operation range again.
BLOWER FAULT OR EXTRACT FAULT WARNING

When the BLOWER or the EXTRACT pushbutton switch is set at the OVRD (override) position, the system is in closed-circuit configuration and adds air from the air conditioning system to the ventilation air.

When the BLOWER pushbutton switch is set at OVRD, the blower fan is stopped and the extract fan continues to run.

When the EXTRACT pushbutton switch is set at OVRD, the extract fan is controlled directly from the pushbutton. Both fans continue to run.
SMOKE CONFIGURATION

When the smoke detector detects smoke in the avionics ventilation air the BLOWER and the EXTRACT FAULT lights come on.

When both the BLOWER and the EXTRACT pushbuttons are set to the OVRD position, the air conditioning system supplies cooling air, which is then exhausted overboard. The blower fan stops.

CONTROLLER FAILURE

The system goes to the same configuration as above, except that the skin exchange isolation valve stays open.
The inlet valve and the skin exchange inlet bypass valve remain in the position they were in before the failure occurred. The extract fan keeps running.
Intentionally left blank
BATTERY VENTILATION

Ident.: DSC-21-30-40-00000350.0001001 / 09 DEC 09
Applicable to: ALL

A venturi in the skin of the aircraft draws air from the space around the batteries and vents it overboard. The resulting airflow ventilates the batteries.
Intentionally left blank
An extraction fan draws ambient cabin air through the lavatories and galleys and exhausts it near the outflow valve.

The extraction fan runs continually when electric power is available.
Intentionally left blank
OVERHEAD PANEL

VENTILATION

(1) BLOWER pb-sw and EXTRACT pb-sw

AUTO: When both pushbutton switches are on AUTO:
- On the ground before the application of TO power, the ventilation system is in open circuit configuration (closed configuration when the skin temperature is below the ground threshold).
- On the ground after the application of TO power, and in flight, the ventilation system is in closed circuit configuration.

OVRD: When either pushbutton switch is on OVRD:
- The system goes to closed circuit configuration.
- Air from the air conditioning system is added to ventilation air. (The blower fan stops if the BLOWER pushbutton switch is in the OVRD position).

When both pushbutton switches are on OVRD:
- Air flows from the air conditioning system and then overboard.
- The extract fan continues to run.

FAULT: Lights up amber (and ECAM activates)

In the blower switch, if:
- blowing pressure is low (See *)
- duct overheats (See *)
- computer power supply fails
- smoke warning is activated

In the extract switch, if:
- extract pressure is low (See *)
- computer power supply fails
- smoke warning is activated.

* If the warning occurs on the ground when the engines are stopped, the external horn sounds.

(2) Refer to DSC-21-10-50 Controls on Overhead Panel
(1) **VENT**
This normally appears in white. It becomes amber, if there is a BLOWER FAULT, EXTRACT FAULT, or AVNCS SYS FAULT.

(2) **INLET and EXTRACT Indications**
Normally white. The corresponding indication becomes amber, in case of a BLOWER FAULT or EXTRACT FAULT.
(3) INLET and EXTRACT Valve Diagrams

- This indicates that the valve is fully closed.
  It is normally green, but is amber if there is a disagreement.

- This indicates that the valve is fully open.
  It is normally green, but is amber if there is a disagreement.
  **NOTE:** Because of the accuracy of the temperature sensors, on the
  ground the closed or open indication may become amber when the
  temperature is close to the valve opening or closing threshold.

- This indicates that the inlet valve is in transit (inlet valve only).
  It is amber.

- This indicates that the outlet valve is partially open (the outlet
  valve is closed but a small internal flap is open).

- If the valve position is not available or the received status for the valve is
  inconsistent, **XX** appears in amber.
Intentionally left blank
## WARNINGS AND CAUTIONS

Ident.: DSC-21-30-70-00000354.0001001 / 24 FEB 11
Applicable to: ALL

### E/WD: FAILURE TITLE conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>AURAL WARNING</th>
<th>MASTER LIGHT</th>
<th>SD PAGE CALLED</th>
<th>LOCAL WARNING</th>
<th>FLT PHASE INHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BLOWER FAULT</strong></td>
<td></td>
<td></td>
<td></td>
<td>BLOWER(1) FAULT lt</td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td>Blowing pressure low or duct overheat</td>
<td></td>
<td></td>
<td></td>
<td>EXTRACT (1) FAULT lt</td>
<td></td>
</tr>
<tr>
<td><strong>EXTRACT FAULT</strong></td>
<td></td>
<td>SINGLE CHIME</td>
<td>MASTER CAUT</td>
<td>NIL</td>
<td>4, 5, 7, 8</td>
</tr>
<tr>
<td>Extract pressure low</td>
<td></td>
<td></td>
<td>CAB PRESS</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>SKIN VALVE FAULT</strong></td>
<td>SINGLE CHIME</td>
<td>MASTER CAUT</td>
<td>CAB PRESS</td>
<td>BLOWER and EXTRACT FAULT lts (2)</td>
<td>3, 4, 5, 6, 7, 8, 9</td>
</tr>
<tr>
<td>1. Extract valve fully open in phase 3 or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Extract valve fully open in flight or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Inlet valve not fully closed in flight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>AVNCS SYS FAULT</strong></td>
<td></td>
<td></td>
<td></td>
<td>BLOWER and EXTRACT FAULT lts (2)</td>
<td>3, 4, 5, 6, 7, 8, 9</td>
</tr>
<tr>
<td>Power up test not satisfactory or AEVC not supplied or valves position disagree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

(1) Associated with ground external call.
(2) Only in case of AEVC power supply failure on ground.
# BUS Equipment List

**Ident.:** DSC-21-30-80-00000355.0001001 / 09 DEC 09  
**Applicable to:** ALL

<table>
<thead>
<tr>
<th></th>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td>CABIN FANS</td>
<td>1</td>
<td>DC1</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>DC2</td>
</tr>
<tr>
<td>AEVC</td>
<td></td>
<td>DC1</td>
</tr>
<tr>
<td>AVIONIC FANS</td>
<td>AC1</td>
<td>DC1</td>
</tr>
<tr>
<td></td>
<td>AC2</td>
<td>SHED</td>
</tr>
<tr>
<td>FAN BLOWER</td>
<td></td>
<td>DC1</td>
</tr>
<tr>
<td>EXTRACT</td>
<td>AC2</td>
<td>SHED</td>
</tr>
<tr>
<td>GND COOL UNIT &lt;UNIT FAN CONTROL&gt;</td>
<td>AC2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC1</td>
<td></td>
</tr>
</tbody>
</table>
An extraction fan draws air from the cargo compartments and exhausts it overboard. Air from the cabin replaces the exhausted air, thus ventilating the cargo compartments. The system can add hot bleed air to the air entering from the cabin, thus giving the flight crew control of the temperature in the forward or aft cargo compartment.
Intentionally left blank
FORWARD CARGO COMPARTMENT VENTILATION

Ident.: DSC-21-40-20-0000358.0001001 / 09 DEC 09

Applicable to: MSN 0189

Air from the cabin goes via the inlet isolation valve to the forward cargo compartment, driven either by an extraction fan or by differential pressure in flight. A skin-mounted venturi discharges the air overboard via the outlet isolation valve. The cargo ventilation controller controls the operation of the inlet and outlet isolation valves and the extraction fan.

The ventilation system operates in two modes:
- On the ground or when △P ≤ 1 PSI in flight, the controller opens the isolation valves, then starts the extraction fan.
- In flight when △P > 1 PSI, the controller stops the fan, and differential pressure maintains the ventilation.

The controller closes the isolation valves and stops the extraction fan when:
- the flight crew turns the FWD ISOL VALVE pushbutton switch OFF, or
- the forward cargo smoke detection unit detects smoke.

The outlet valve closes and the extraction fan stops when the flight crew turns the DITCHING pushbutton switch ON.

AFT CARGO COMPARTMENT VENTILATION

Ident.: DSC-21-40-20-00005986.0001001 / 09 DEC 09

Applicable to: MSN 0189

Air from the cabin goes via the inlet isolation valve to the aft cargo compartment, driven by an extraction fan. Air is controlled by the outlet isolation valve and then goes outboard through the outflow valve.

The cargo ventilation controller controls the operation of the inlet and outlet isolation valves and the extraction fan.

When the isolation valves are fully open, the extraction fan operates continuously when the aircraft is on the ground and during flight.

The controller closes the isolation valves and stops the extraction fan when:
- the flight crew turns the AFT ISOL VALVE pushbutton switch OFF, or
- the aft cargo smoke detection unit detects smoke.
The ventilation system for the aft cargo compartment uses hot engine bleed air (upstream of the packs), mixing it with the ambient cabin air that flows through the cargo compartment. The cargo regulating valve regulates the pressure of this hot air supply, and the trim air valve, which is modulated electrically by the controller, controls the flow. The cargo pressure regulating valve is pneumatically operated and electrically controlled from the HOT AIR pushbutton on the CARGO HEAT panel. The hot air is controlled by the cargo trim air valve which is modulated electrically by the controller. The hot air is then mixed with air from the cabin and supplied to the cargo compartment through the ventilation inlet isolation valve. According to the temperature selector demand, the controller regulates the amount of hot air added by the trim air valve, until the desired temperature is reached. If the inlet temperature exceeds 70 °C, the controller closes the trim air valve. If the inlet temperature exceeds 88 °C, the controller interprets this as a duct overheat and closes the pressure regulating valve. This valve then remains closed until the flight crew resets the system by pressing the HOT AIR pushbutton — which it cannot do until the temperature drops below 70 °C.
(1) **FWD ISOL VALVE pb**

The switch controls the forward isolation valves and the extraction fan.

- **Auto** : The inlet and outlet isolation valves open, extraction fan runs if there is no smoke detected in the aft cargo bay.
- **OFF** : The inlet and outlet isolation valves and the trim air valve close, the extraction fan stops.
- **FAULT lt** : The light, associated with the ECAM caution, comes on amber when either inlet or outlet valve is not in the selected position.

(2) **AFT ISOL VALVE pb**

The switch controls the aft isolation valves and the extraction fan.

- **Auto** : The inlet and outlet isolation valves open, extraction fan runs if there is no smoke detected in the aft cargo bay.
- **OFF** : The inlet and outlet isolation valves and the trim air valve close, the extraction fan stops.
FAULT lt: The light, associated with the ECAM caution, comes on amber when either inlet or outlet valve is not in the selected position.

(3) HOT AIR pb

Auto: The pressure regulating valve regulates the hot air pressure.
OFF: The pressure regulating valves and the trim air valve close. The fault circuit is reset.

FAULT lt: The amber light and ECAM caution come on, when a duct overheat is detected (88 °C – 190 °F).
The light goes out, when the temperature drops below 70 °C (158 °F), and OFF is selected. Then, if the pushbutton is set to on, the system resets.

(4) Temperature selector

- COLD position: Approximately 5 °C (41 °F)
- HOT position: Approximately 26 °C (79 °F)
- Middle position: Approximately 15 °C (59 °F)

Note: 1. The cargo compartment temperature may vary, depending on external factors (flight duration, outside temperature...).
2. The actual bulk cargo compartment temperature may be 10 °C (18 °F) lower than the selected temperature.
(1) Cargo compartment temperature
   This indication is green.

(2) Zone indication
   It is white.

(3) Duct inlet temperature
   This is normally green, it becomes amber when $T \geq 80^\circ C$.

(4) Inlet isolation valve
   - In line – Green : Valve is open.
   - Crossline – Amber : Valve is closed.

(5) Outlet isolation valve
   - Crossline – Green : Valve is open.
   - In line – Amber : Valve is closed.
(6) **Trim air valve**

H - Hot (Green) : Valve is open.

C - Cold (Green) : Valve is closed.

(7) **Hot air pressure regulating valve**

In line and green : valve is open.

In line and amber : valve failed open.

Cross line and green : valve normally closed with the pushbutton in ON position.

Cross line and amber : valve is closed and the pushbutton in OFF position.
### WARNINGS AND CAUTIONS

Ident.: DSC-21-40-40-00000361.0003001 / 14 FEB 11

Applicable to: MSN 0189

<table>
<thead>
<tr>
<th>Conditions</th>
<th>AURAL WARNING</th>
<th>MASTER LIGHT</th>
<th>SD PAGE CALLED</th>
<th>LOCAL WARNING</th>
<th>FLT PHASE INHIB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFT (FWD) CARGO DUCT temperature OVHT</strong>&lt;br&gt;Duct Temperature &gt; 88 °C (190 °F)</td>
<td>SINGLE CHIME</td>
<td>MASTER CAUT</td>
<td>COND</td>
<td>HOT AIR FAULT It</td>
<td>3, 4, 5, 7, 8</td>
</tr>
<tr>
<td><strong>AFT (FWD) CRG HEAT FAULT</strong>&lt;br&gt;Cargo heating controller fault</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td></td>
</tr>
<tr>
<td><strong>AFT (FWD) CRG VENT FAULT</strong>&lt;br&gt;Cargo fan fault</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>ISOL VALVE FAULT It</td>
<td></td>
</tr>
<tr>
<td><strong>AFT (FWD) CRG ISOL VALVE</strong>&lt;br&gt;Cargo isolation valve</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td>NIL</td>
<td></td>
</tr>
</tbody>
</table>

### AIRCRAFT SYSTEMS

**AIR CONDITIONING / PRESSURIZATION / VENTILATION**

CARGO - WARNINGS AND CAUTIONS
Intentionally left blank
### BUS EQUIPMENT LIST

**Ident.:** DSC-21-40-50-00000362.0001001 / 14 FEB 11  
**Applicable to:** MSN 0112

<table>
<thead>
<tr>
<th></th>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td><strong>FWD/AFT CARGO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VENT CONT</td>
<td></td>
<td>DC BAT</td>
</tr>
<tr>
<td>HEAT CONT</td>
<td></td>
<td>DC BAT</td>
</tr>
<tr>
<td>VENT/HEAT FANS(S)</td>
<td></td>
<td>AC 1</td>
</tr>
</tbody>
</table>

**Ident.:** DSC-21-40-50-00000362.0002001 / 14 FEB 11  
**Applicable to:** MSN 0189-0342

<table>
<thead>
<tr>
<th></th>
<th>NORM</th>
<th>EMER ELEC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AC</td>
<td>DC</td>
</tr>
<tr>
<td><strong>FWD/AFT CARGO</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VENT CONT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEAT CONT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VENT/HEAT FANS(S)</td>
<td></td>
<td>AC1</td>
</tr>
</tbody>
</table>
Intentionally left blank