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### PASSENGER DOORS

•2 forward and 2 aft passenger doors

The single aisle family is equipped with two forward and two aft passenger doors.

• Normal door operation is manual

•Plug type door, opens upward, outward, forward parallel to the fuselage

•Can be open from inside or outside

The normal door operation is fully manual.

They are plug type doors, which open upward, outward and forward parallel to the fuselage.

The door can be operated from inside or outside the aircraft.

• Emergency opening system:

- Escape slide/slide raft, stowed in containers, lower part of the door
- Door actuator for normal and emergency operation
- Slide ARMING/DISARMING lever

Each door is equipped with an emergency opening system:

- an escape slide or slide raft stowed in a container attached to the inboard lower side of the door,

- a door damping and emergency operation cylinder that assist normal door operation, but in an emergency acts as an actuator for automatic door opening,

- a slide ARMING/DISARMING lever.

•Emergency door operation, automatic slide deployment

When the slide arming lever is in the ARMED position, the slide is connected to the floor.

When the door is opened, the escape slide inflates automatically.

•Opening from outside will disarm the slide

Opening the door from the outside will disarm the door and the escape slide.

•ECAM indication: door LOCKING/UNLOCKING, slide ARMED/DISARMED

The ECAM page indicates the door in the locking/unlocking position and the escape slide/slide raft in the armed/disarmed condition (position).











## **EMERGENCY EXITS**

•A318 and A319: 2 overwing emergency exits (1 on each side)

•A319 could also have 4 overwing emergency exits optionally (2 on each side)

The A318 and A319 have two overwing emergency exits (one on each side). The A319 can also have four overwing emergency exits optionally (two on each side).

•A320: 4 overwing emergency exits (2 on each side) The A320 has four overwing emergency exits (two on each side).

•A321 4 emergency exits doors (two on each side)

The A321 aircraft has four emergency exits doors (two on each side) installed forward and aft of the wing.

• A318, A319 and A320: emergency exit door can be opened from inside or outside

•Normal operation: doors always armed

•To be disarmed for maintenance

On the A318, A319 and A320 aircraft, for emergency evacuation the exit can be opened from inside or outside the cabin to activate the **evacuation system**.

For normal operation, they are always armed.

To open the exit for maintenance work, authorized personnel must disarm it from inside the cabin.

• A321: emergency exit door can be opened from inside or outside

•Emergency exits are armed in flight but disarmed on ground

The A321 exit can be opened from inside or outside.

These emergency exits are armed in flight but disarmed on ground.



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### ESCAPE SLIDE AND SLIDING WINDOWS

•Overwing escape slide On the A318, A319 and A320, each overwing escape slide is stowed in a compartment at the wing root.

• An escape slide under each emergency exit on the A321

On the A321, an escape slide is packed in a container.

The slide is deployed automatically as soon as a door is opened in armed configuration.

• ECAM indication: emergency exit LOCKED/UNLOCKED and escape slide ARMED/DISARMED condition The ECAM page indicates the emergency exit in the locked/unlocked position or condition and the escape slide in the armed/disarmed condition or position.

•2 cockpit sliding windows The two cockpit sliding windows provide emergency exit from the cockpit.







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## CARGO DOOR

•2 cargo doors

•Manually locked/unlocked

•Hydraulically operated (yellow system)

The cargo compartment doors give access to the forward and aft cargo compartments. They open outwards and upwards from the fuselage. They are manually locked and unlocked by a locking handle on the door.

The operation of the door is hydraulically powered by the yellow electric pump.

•In case of electrical failure the door can be manually operated by a hand pump In case of electrical failure the door can be opened manually by using a hand pump.

• Bulk cargo door is only manually operated (optionally for A320 and A321 and not installed on A318 and A319) The optional bulk cargo door installed for the A320 and A321 gives access to the bulk cargo compartment. This door is manually operated and opens into the bulk cargo compartment.

• ECAM page cargo door closed/locked and unlocked condition The ECAM page indicates cargo doors in the closed/locked and unlocked condition or position



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## AVIONICS COMPARTMENT DOORS

•4 avionics compartment doors, manually operated

There are four avionics compartment doors in the lower fuselage around the nose landing gear bay.

These doors are manually operated and open inward.

The locking mechanism is identical on each door.

• ECAM indication

Each avionics compartment door is monitored by a proximity switch, which sends a signal to the ECAM system.







## COCKPIT DOOR

• Separation between cockpit and cabin The cockpit door separates the cockpit from the cabin.

## GENERAL

• Armored and bulletproof

It is an armored and bulletproof door made to prevent a hijacking attempt and protect the flight compartment against an intrusion.

Cockpit Door Lock System

A Cockpit Door Lock System (CDLS) controls its electrical release and prevents an unwanted access into the cockpit.

•Door escape hatch has two Pip - Pins

The door also has a door escape hatch, with two pip-pins which keep the hatch in position.











#### DOOR ELEMENTS

• Escape hatch:

Emergency exit

The door has an escape hatch which has the same structure as the door. The hatch is manually operable only from the flight deck for pilot emergency exit in case of cockpit door jamming.

•Three mechanical latches:

Magnetic door stop

Three mechanical latches engage in electrical release strikes actuated by solenoids. The door is always locked when closed and the A/C is powered.

During maintenance activity there is a magnetic door stop to keep the door fully open.



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### COCKPIT DOOR LOCK SYSTEM

- •CDLS: locking and unlocking control of the cockpit door
- •Control unit
- Cockpit door panel
- Buzzer
- Keypad
- •Three electrical release strikes
- •Optional back-up system

The CDLS controls the locking and unlocking of the cockpit door. It also monitors the door locking and unlocking system for faults. The system has different parts:

- the control unit on the overhead panel with an integrated pressure sensor part for cockpit decompression detection and integrated maintenance lights,

- the cockpit door panel on the center pedestal with a toggle switch to control the cockpit door and a fault indicator,
- the buzzer on the overhead panel,
- improved keypad in the cabin to indicate correct function of entry code for cockpit access authorization,
- three electrical release strikes,

- an optional back-up system may be installed to override an inadvertent mal function of the CDLS. It has an additional control unit, and a back-up control panel with a back-up switch and a fault light.



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### CONTROL AND INDICATING

• Door control In this topic the door control and indication will be shown.

## PASSENGER DOORS

• 2 different indicating systems:

- Mechanical
  - Electrical

The two different indicating systems are:

- a mechanical indicating system,
- an electrical indicating system.
- Mechanical indication:
  - Visual indicator on the door: LOCKED or UNLOCKED
  - · Visual indicator on the slide arming lever: ARMED or DISARMED

The mechanical indicating are:

- a visual indicator on the top of the door shows if the door is LOCKED or UNLOCKED,
- a visual indicator on the slide arming lever shows if the slide is ARMED or DISARMED.

· Electrical indicating:

• 2 warning lights below the door window, visible from inside or outside the door

The electrical indicating is:

- two warning lights,

they are visible from the inside and the outside.

• When a person tries to open the door, the white SLIDE ARMING light indicates: slide armed When a person tries to open the door the white SLIDE ARMED light indicates that the escape slide is in the ARMED mode.

• The red CABIN PRESSURE light flashes when there is a residual pressure in the cabin with the slide disarmed The red CABIN PRESSURE light flashes when there is a residual pressure in the cabin with the slide disarmed.

Warning

WARNING: Do not open a door when the aircraft is pressurized. This will cause explosive decompression, and kill or cause injury to persons and material.

Note: The A321 emergency exit doors have the same control indicating as the passenger doors.

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#### **EMERGENCY EXITS**

• Accidental opening of the cover flap will activate the white indication light Accidental opening of the cover flap for access to the inner control handle will automatically activate the white indication light beside the exit.

#### • ARMED/DISARMED condition indicated on ECAM page

The ARMED/DISARMED condition of the exit is indicated on the ECAM DOOR/OXY Page (DISARMED position only for maintenance work).



CONTROL HANDLE





## **CARGO DOORS**

•2 different indicating systems:

- Mechanical indicating system
- Electrical indicating system

There are two different indicating systems:

- a mechanical indicating system,
- an electrical indicating system.
- Mechanical indicating:
  - Indication windows at the bottom of the door to show if the door is correctly locked
- In the access panel at the bottom of the door, there are indication windows to check if the door is correctly locked:
- red marks: door not correctly locked,

- green marks: door correctly locked.

- Electrical Indicating:
  - Door open and locked
  - Green indicator light on control panel near each cargo door

When the door is fully open and locked, a green indicator light comes on, on the cargo door control panel.



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## ECAM DOOR/OXY PAGE

•ECAM - DOOR/OXY page:

• Status of the doors and escape slide/slide rafts

The ECAM page - DOOR/OXY monitors the status of all the doors and the escape slide/slide raft.

Indications:

- Green when the door is closed and locked
- Amber when the door is unlocked

The indications on the ECAM page are:

- green when the door is closed and locked,
- amber when the door is unlocked.

• SLIDE indication when slides armed

The white SLIDE indications on the ECAM DOOR page means that the slides are armed.

When the slide is disarmed on any door no indication is displayed.









A320



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## MAINTENANCE/TEST FACILITIES

•Trouble shooting:

• MCDU - INST/L/G keys

The MCDU is used to trouble shoot the monitored components through the INST and L/G keys. The proximity sensors, which monitor the status of the doors. are connected to the ECAM system or Landing Gear Control Interface Units (LGCIUs).







#### SAFETY PRECAUTIONS

#### Safety Precautions

When you work on the aircraft, make sure that you obey all the AMM safety procedures. This will prevent injury to personnel and/or damage to the aircraft. Here is an overview of main safety precautions about the door system.

#### • Do not open a cabin door if the red warning light flashes

Be careful before opening a cabin door. Make sure that the red warning light does not flash. If it flashes, it means a residual pressure remains in the cabin. When you open in this configuration a door it could kill or cause serious injury to persons and cause damage to the aircraft.

#### • Escape slide disarmed

Make sure that when you work on a cabin door the emergency control handle is in the disarmed position with the safety pin installed. Check that the percussion lever of the door damper and emergency operation cylinder is in disarmed position with the safety pin installed.

#### Install safety barrier or access platform

Install a safety barrier or an access platform before opening any cabin door. When opening or closing a cargo door, make sure that the access platform is at the correct height.

#### Maximum wind speed 40 knots

When the wind speed is expected to exceed 40 knots do not open the forward or aft cargo door and if open close the doors immediately.

- Stay beside the cargo door while you unlock it
- •Use solvent
- •Protective equipment
- •Obey manufacture's instruction

Stay beside the cargo door during opening or closing. Use protective clothes Use solvents/cleaning agents, sealants and other special materials only with a good flow of air through the work area. Put on protective clothing, rubber gloves, goggles and mask. Obey the manufacture's instructions when you use these materials.





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## SYSTEM OVERVIEW

Comp loc COCKPIT CDLS 20VU, 118VU

Doors:

- Passenger doors
- Emergency exits
- Cargo doors
- Avionics compartment doors
- Cockpit door

The different doors of the single aisle family are:

- Passenger doors,
- Emergency exits,
- Cargo doors,
- Avionics compartment doors,

- Cockpit door.

## PASSENGER DOORS

• 2 forward and 2 aft passenger doors

- Plug doors
- Open up, out and forward

The single aisle family is equipped with two forward and two aft passenger doors. These are plug-type doors that open upward, outward and forward parallel to the fuselage. The doors can be operated from the inside or the outside the aircraft. Normal operation of the doors is manual, with hydraulic damping.

· Doors equipped with an emergency system

- Escape slide
- Emergency door opening actuator
- Slide arming/disarming

Each door is equipped with an emergency opening system:

- An escape slide stowed in a container attached to the lower side of the door,

- A door damping and emergency operation cylinder that assists normal door operation and acts as an actuator for automatic door opening in an emergency,

- a slide ARMING/DISARMING lever. When the slide-arming lever is in the ARMED position, the slide is connected to the floor. When the door is opened from inside, the escape slide inflates and deploys automatically. Opening the door from the outside disarms the escape slide mechanism automatically. The slide remains then undeployed.









## EMERGENCY EXITS

•A318 and A319 equipped with 2 overwing emergency exits

•Optionally A319 equipped with 4 overwing emergency exits

•A320 equipped with 4 overwing emergency exits

•A321 equipped with 4 emergency exits

The A318 and A319 are equipped with two overwing emergency exits (one on each side). The A319 can also have four overwing emergency exits optionally (two on each side).

The A320 is equipped with four overwing emergency exits (two on each side).

The A321 is equipped with four emergency exit doors (two on each side) located forward and aft of the wing.

• Opened from inside or outside

•Disarmed from inside for maintenance

•A321 emergency exit opened from inside or outside

On the A318, A319, and A320 aircraft, for emergency evacuation, the exit can be opened from inside or outside the cabin to activate the evacuation system. Normally these emergency exits are always armed. To open the exit for maintenance, authorized personnel must disarm it from the inside.

The A321 emergency exit door can be opened from inside or outside. These exits must be armed in flight and disarmed on the ground.







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## CARGO DOORS

• Fwd and AFT cargo doors on right hand side

The cargo compartment doors, installed on the lower right hand side of the fuselage, give access to the forward and aft cargo compartments. They open outwards and upwards from the fuselage. They are manually locked and unlocked by a locking handle on the door. The forward and aft cargo doors are operated hydraulically using the yellow system electric pump.

• Manual operation in case of electrical failure

In case of electrical failure the door can be opened manually using a hand pump.

• Bulk door on A320 & A321 only

The bulk cargo door is installed aft of the aft cargo door on the A320 and A321. The bulk door gives access to the bulk cargo compartment. The door is operated manually and opens into the compartment.



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LR Family to A319/A320/A321 PW1100G - T1+T2

A320/ARBAS

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FORWARD CARGO DOOR



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## AVIONICS COMPARTMENT DOORS

#### •4 avionics access doors

There are four avionics compartment access doors on the lower fuselage around the nose landing gear bay. These doors are manually operated and open inward. The locking mechanism is identical on each door.





## COCKPIT DOOR

• Armored, bulletproof door

•Always locked when closed and aircraft is powered

•CDLS control

The cockpit door separates the cockpit from the cabin. It is an armored and bulletproof door designed to prevent a hijacking attempt and to protect the flight compartment against an intrusion. The door is always locked when closed and the aircraft is powered. A Cockpit Door Locking System (CDLS) controls the electrical release of the door lock and prevents unauthorized access into the cockpit. The door has a door escape hatch with two pip-pins, which keep the hatch in position.

- Components of the cockpit door locking system
  - · Cockpit door panel on the pedestal with toggle switch to control the cockpit door locking and unlocking
  - Keypad in the cabin for cockpit access authorization
  - Three electrical release strikes
  - Overhead control unit in cockpit with integrated maintenance annunciators
  - Buzzer on cockpit overhead panel

The components of the cockpit door locking system include:

- Cockpit door panel on the pedestal with toggle switch to control the cockpit door locking and unlocking,
- Improved keypad in the cabin to indicate correct function of entry code for cockpit access authorization,
- Three electrical release strikes,
- Overhead control unit in cockpit with integrated maintenance annunciators,
- Buzzer on cockpit overhead panel.


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### normal opening

•FILM: opening procedure

- Before normal door opening:
- check that the arming lever is in the disarmed position,
- check that the cabin pressure indicator is not flashing,
- hold the assist handle on the door frame,
- lift the door control handle fully up,
- push the door outward,
- move the door forward by using the door assist handle.
- The door locks when it is in fully open position.

# normal closing

• FILM: closing procedure

For closing:

- push the gust lock and move the door rearward towards the frame,

- with the help of the door assist handle pull the door in,

- lower the control handle.

The locking indicator turns from red to green which indicates the correct locking.













#### warning

Safety precautions

Prior to opening a passenger door from outside, some safety precautions must be taken.







#### opening

## • FILM: opening procedure

Labels next to the exterior handle indicate how to open the door from the outside. Check through the observation window that the cabin pressure indicator does not flash. Push the flap in and grasp the handle, lift it fully up to the horizontal green line. Pull the door outward and push forward until it locks in the fully open position. For safety reasons, lower the handle into its recess.

### closing

### • FILM: closing procedure

Prior to closing, push the gust lock to unlock the door. Lift the control handle and move the door towards the frame. Push the door in and lower the control handle. The door is locked when the handle is flush with the fuselage.













# emergency opening

•2 FILM: emergency opening procedure

In case of emergency opening, check that the arming lever is in the armed position. Hold the frame assist handle. Check the conditions outside. Pull the door control handle rapidly fully up and release it. Door opens and locks automatically. Protect the exit until it is safe for the evacuation.









#### arming

### • FILM: slide arming procedure

In order to arm the evacuation device, the safety pin with the red flag must be removed and stored away. Push the arming control lever down. The red ARMED/green DISARMED indicator must show ARMED. If someone opens the armed door from the outside, by moving up the exterior control handle, the slide arming lever moves automatically to the disarmed position, which avoids accidental slide deployment.

### disarming

### • FILM: slide disarming procedure

To disarm the door, lift the arming control lever fully up. The ARMED-DISARMED indicator must be green and indicate DISARMED. Install the safety pin with the red flag to avoid inadvertent movement of the arming lever













## LOCKING HOOK

Locks the door

The locking hook engages on a roller mounted on the doorframes. The door is locked by a hook.

## SAFETY PIN

• Prevents upward door movement

A safety pin blocks the door even if a double mechanical failure in the locking mechanism and the lifting mechanism occurs. The safety pin prevents any upward door movement.

## LOCKING SHAFT

Locked in an over centered position

Connected to the hook

The locking shaft is locked in an over centered position. An arm on the locking shaft forms the visual locking indicator. The locking shaft is connected to the hook by a rod and bell crank.

## SPRING ROD

• Maintains the locking shaft in an over centered position The over centered position is maintained by a clearance even if structural deformation occurs. A spring rod maintains the locking shaft in an over centered position.

# LOWERING SHAFT

• Locks the control handle

The door cannot be lowered in the open position while beyond the doorframe. The lowering shaft mechanism locks the control handle to prevent the door from being lowered when not in contact with the doorsill.

# EMERGENCY CONTROL HANDLE

• Connected to girt bar actuating mechanism

The emergency control handle is located far from the inner control handle. It is connected via rods and levers to the girt bar actuating mechanism.

# GEAR BOX

Connected to the locking shaft and lifting lever

The shaft of the door central handles is coupled via a gear box so that the outer handle will not move when the door is lifted by operation of the inner handle. The gear box is connected by rods to the locking shaft and lifting lever.

# **DISARMING MECHANISM**

• Disarmed position when outer control handle is operated •Cam disk and roller

When the outer control handle is operated, the release mechanism of the emergency escape slide/raft is returned to the disarmed position. A cam disk and a roller connect the emergency control handle and the outer control handle.

# LIFTING LEVER

• Transmits a lifting movement to the door

The door moves upwards until it clears the stop fitting and then moves outwards. The lifting lever is connected, to the support arm, which acts as a fixed point, and to the control mechanism mounted on the movable door, which transmits a lifting movement to the door.

# TORSION BAR SPRING

· Compensates weight of the door

A torsion bar spring compensates the weight of the door.

# GIRT BAR

• Connected with the escape slide/raft and the emergency control handle

The escape slide/raft is fastened to the girt bar. The emergency control handle is connected to the girt bar.



## LR Family to A319/A320/A321 PW1100G - T1+T2





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LR Family to A319/A320/A321 PW1100G - T1+T2









## DESCRIPTION

•Main systems of the escape slide/raft mechanism

Here are the main systems of the escape slide/raft mechanism:

- control mechanism,
- automatic disarming,
- disarmed position,
- armed position.







### CONTROL MECHANISM

•Control handle, the bell crank and the flexible control

·Girt bar assembly

The control mechanism includes the control handle, the bell crank and the flexible control. The girt bar assembly which is connected to a flexible control is operated via the control handle and a bell crank.

### **AUTOMATIC DISARMING**

Outside opening

•Cam disk and roller

A cam disk and a roller attach the escape slide/raft control lever to the exterior control handle in order to disarm the system automatically if the door is opened from the outside.

### DISARMED POSITION

• Girt bar remains part of the door

When the lever is in the DISARMED position, the girt bar remains part of the door when it is opened and remains in the telescopic forks.







## **ARMED POSITION**

•Girt bar remains part of the floor

In this case, the girt bar remains part of the floor when the door is opened in an emergency situation. When the arming lever is set to ARMED, the girt bar slides towards the girt bar fitting, and the emergency operation cylinder percussion lever is moved to the door emergency configuration.









#### operation

### • Film: Overwing Exits Operations

Two emergency exits are located over each wing. The exits can be opened from the outside and the inside. Inside opening instructions are placarded on the exit frame. To open an exit, the cover flap must be removed. The "SLIDE ARMED" indicator illuminates white immediately. To unlock the latch mechanism, the control handle must be used. Pull down the control handle and pull the exit top inwards. With your free hand grasp the lower grip mould and lift the exit. Turn exit inward and throw it out away from the opening. Should the exit opening not initialize the automatic slide deployment, the red handle must be pulled for manual deployment. If a ditching line is provided, it has to be fixed to the yellow fittings located in the exit frame and on the wing.









# WARNING

•Warning

WARNING: MAKE SURE THAT THE LOCKPIN ASSEMBLY IS CORRECTLY INSTALLED IN THE OPERATING HEAD OF THE INFLATION RESERVOIR. IT PREVENTS AN ACCIDENTAL DEPLOYMENT OF THE OFFWING ESCAPE SLIDE.

NOTE: In this module the EMERGENCY EXIT/OPENING FOR MAINTENANCE is described on the A320 but the principle is the same for the A319 and the A318.





### **OPENING FOR MAINTENANCE**

#### •Film: Overwing Exit Operations AMM SUBTASK: 52-21-11-010-058

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













# OUTER SKIN

#### Composition

The outer skin of the hatch has to cover the cutout in the fuselage, the outer skin area is bigger than the area of the fuselage cutout. Thus the hatch is a pure plug type door. The pressure load on the hatch is transferred along the stop profiles via the seal into the fuselage skin. The material of the outer skin is aluminum alloy. Its thickness has been reduced locally by chemical etching for weight saving purpose.

## HORIZONTAL BEAMS

### Composition

The horizontal beams are acting as stiffeners for the outer skin, they prevent a large deflection of the outer skin. The horizontal beams are made from aluminum formed sheet metal.

## FRAME SEGMENTS

### Composition

Like the horizontal beams, the frame segments are acting as stiffeners for the outer skin. They are also made from aluminum formed sheet metal. It includes aluminum alloy formed sheet vertical frame segments.

## **INNER SKIN**

### Composition

The inner skin maintains the position of frame segments and horizontal beams and prevents them from buckling on the inside. The inner skin consists of several segments. These segments are made from aluminum formed sheet metal.

## EDGE MEMBERS

### Composition

The purpose of the edge members is to stiffen the skin at its edges and to maintain torsion stiffness of the exit door structure.

## **STOP PROFILES**

• Loads taken by the stop profiles when the passenger compartment is pressurized

•Extruded parts integrated by the retaining channel

When the passenger compartment is pressurized, the pressure loads are transferred into the fuselage structure via the two extruded stop profiles which are riveted to the vertical edge members. At the vertical stop profiles, the retaining channel is integrated in the extruded parts. **WINDOW** 

## Composition

The structure includes an aluminum alloy forged frame, which is identical to a passenger window frame.

# SEAL

• Retained by the retaining channel and riveted to the hatch structure

Composition

The seal is retained by a formed sheet metal retaining channel, which is riveted to the hatch structure. The hatch seal is a fabric reinforced silicone rubber lip-type seal.













### SLIDE RELEASE MECHANISM

•Function of guide pin

•Positions of the latch pin

•Latch pin disarmed for maintenance

The guide pin locks the spring-loaded latch pin. When the spring-loaded latch pin is extended it is in the ARMED position, and when the latch pin is retracted it is in the DISARMED position. The slide release mechanism includes the guiding fitting, the spring and the latch pin. For maintenance purposes, the latch pin can be disarmed by turning it counter-clockwise.

## LOCKING SHAFT UNIT

• Two locking hooks and a locking shaft

•Hatch handle attached to the locking shaft

The locking shaft unit includes the two locking hooks and the locking shaft. A connection rod attaches the hatch handle to the locking shaft.

## **CONTROL HANDLE**

• Two tension springs retain the handle in up position

•Handle controls the locking shaft unit movement

The hatch control handle has two tension springs which retain the handle in the up position. When the hatch control is released, the connection causes a movement of the locking shaft unit.

## LOCKING HOOKS

Control handles lock or unlock hatch

•Hatch correctly locked when locked hooks engaged in the upper roller fittings

Inside or outside operation of the control handles locks or unlocks the hatch. When the emergency exit hatch is correctly locked, the locked hooks engage in the upper roller fittings.

## LOWER ROLLER

Position during installation

•Attached on the hatch bottom beam

The lower rollers put the emergency exit hatch in line with the fuselage during the installation. The lower roller brackets, attached on the hatch bottom beam, engage in their pivot fitting.

## LATERAL GUIDE

Position during installation

•Fitting attached on the vertical edge

The lateral guides put the hatch in the center position during the installation. A lateral guide fitting is attached on each vertical edge member of the emergency exit hatch.



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### **DESCRIPTION/OPERATION**

•2 Film: Passengers Compartment Emergency Exit

For the evacuation of the passengers, there are four emergency exit doors as well as four regular passenger/crew doors. Two emergency exit doors are installed on each side of the cabin, two FWD of the wing leading edge and two aft of the wing trailing edge. The operation is similar to that of the normal passenger doors. The FWD left emergency exit door is larger in size than the others and is known as a 73" door. The three other emergency exit doors are 60" doors. Door operation from outside or inside and in emergency is identical for all the emergency doors. The emergency exit door is installed with a support arm and two guide arms which maintain the door parallel to the fuselage in operation. The door mechanism is manually operated, it locks and keeps the door in the safety closed position. It also unlocks and lifts the door before you can move the unlocked door to the open position.

The primary components of the door locking mechanism are:

- the door handle mechanism,
- the locking shaft mechanism,
- the balance mechanism,
- the lifting mechanism.

The lifting mechanism will lock, unlock the door and operate the lifting mechanism. This moves the door up so that the lateral guide rollers come free from the fuselage guide fittings. A balance mechanism decreases the force necessary to operate the lifting mechanism. The door moves inwards, upwards and forward parallel to the fuselage and is locked by a mechanical lock in the open position. The door lock open mechanism is installed on the support arm. To close the door, operate the release button so that the spring-loaded linkage releases the locking hook.

The escape slide-release mechanism operates the automatic inflation system. There are two modes:

- the ARMED mode for the emergency door operation,

- the DISARMED mode for normal door operation.

The DISARMED mode allows the door to be manually opened without escape slide operation. When the door is opened from the inside of the cabin in the ARMED mode the emergency operation cylinder releases nitrogen to assist the door into its fully open position. The cylinder is shown in maintenance position with the safety pin installed. The escape slide-release mechanism operates the automatic inflation system to inflate the escape slide installed below the door. When the door is unlocked from the outside in the ARMED mode the escape slide-release mechanism is automatically DISARMED. The door damper hydraulically limits the speed of the door under normal operating conditions. Under emergency conditions the door damper acts as an actuator to open the door rapidly. To initiate emergency operation, the release lever is raised by door upward movement. The percussion mechanism breaks the diaphragm of the pressure accumulator and causes the nitrogen gas from the pressure accumulator to extend the actuator piston rod. A pressure gage and pressure switch are mounted on the pressure accumulator. The pressure gage has a red, yellow and green indicator area to show the actual pressure in the gas cylinder. The pressure switch relays a signal to the CIDS if pressure is low. Two proximity switches monitor the locked/unlocked condition and the





DISARMED/ARMED condition of the door. One proximity sensor, which is part of the escape slide warning system, transmits a signal to the ECAM system. It gives a warning in the cockpit on the lower ECAM display panel when a door is opened in the ARMED mode. At the same time the white indicator light SLIDE ARMED located near the door window comes on. The other proximity sensor is part of the door warning system and also transmits a signal to the ECAM system. It shows on the lower ECAM display panel, when the door is unlocked. An additional proximity sensor and target is installed in the fuselage above the door. This sensor is part of the door warning system and monitors the OPEN/CLOSE position on the ECAM page. Now is shown the door ECAM page, door 1 LH side locked and slide armed. All the doors in green are locked and in amber open. The red warning light CABIN PRESSURE near the window flashes on ground if the door, check warning lights. Now we will show the emergency exit door in more detail. The structural door components are made of aluminum alloy, they are riveted together to give the door its rigidity. Integrated in the door skin is the exterior handle and window. The door has two hoisting points integrated in the frame segments above the door centerline. The door seal is an extruded rubber seal profile with equally-spaced pressurization holes. When the cabin is pressurized, the door seal inflates and makes the door pressure-tight. Blankets are installed in the interspace of the primary structure for sound and thermal protection. They are attached with Velcro tapes on the inner face of the outer skin.

The primary components of the escape slide-release mechanism are:

- the arm/disarm unit,
- the release assembly.

Here is shown the operation of the components. The doorstop assemblies include the adjustable stops and the related stop fittings. The guide assembly contains the guide rollers and the related guide fittings. Here we see its operation during door movement.






FILM DURATION: 11 min 30 s







## **OUTER SKIN**

#### •General

The outer skin covers the door cutout area in the fuselage skin. When the cabin is pressurized, the outer skin carries the whole internal pressure on this area.

## LONGERON

#### Fixation

The horizontal longerons are stiffening elements for the outer skin and there are vertical frame segments. They also act as load concentrators: the pressure load on the skin is concentrated on the ends of the seven horizontal longerons, where the door stops are located. Longerons and outer skin edge members are riveted together.

### DOOR STOPS

• Transmit loads from cabin pressure to doorframe fuselage

The loads resulting from the cabin pressure are transmitted by adjustable stops into the door frame and into the fuselage structure. The door stops are made from forged titanium.

#### **GUIDE ROLLERS**

• Block the door in closed position

Location

The guide rollers, mounted on the door frame, guide the door movement precisely from its lifted to its lowered position and vice versa, preventing any unintended collision. They move within the guide ramps, which are mounted on the fuselage frame. Guide rollers and guide fittings also block the door in the closed position. The guide rollers engage in a ramp to block the door. Two additional guide rollers, located only on the aft edge of each door, prevent door jamming when loaded with extreme forces.

#### SEAL

· Composition and role

The door seal consists of a rubber extrusion with equally spaced pressurization holes. The door seal is installed around the edge of the door and a sealing section is fitted onto the door frame.

#### WINDOW

Role

The observation window permits the door warning to be checked from outside.









### GENERAL

- Door locked and unlocked manually
- Door locking mechanism components

The door locking mechanism, which is manually operated, locks and keeps the door in the safety closed position, and lifts it when the door is moved to the open position.

- It is composed of:
- the door handle mechanism,
- the locking shaft mechanism,
- the balance mechanism,
- the lifting mechanism.

## DOOR HANDLE MECHANISM

Composition

•Handles connected to the internal control shaft and operate the locking shat and the lifting mechanism

The door handle mechanism is composed of the inboard handle assembly and the outboard handle assembly. The inboard handle and the outboard handle are connected to the internal control shaft and operate the locking shaft mechanism and the lifting mechanism. The control mechanism disarms the slide release mechanism when the external handle is moved.

## LOCKING SHAFT MECHANISM

Visual indicator

Components

·Locking shaft must always be in overcentered position

The locking shaft is locked in an overcentered position. An arm on the locking shaft forms the visual locking indicator. The locking shaft is connected to the locking hook by a connection rod. A spring unit is installed between the twin lever and the door structure. It makes sure that the locking shaft mechanism is always in the overcentered position.

## **BALANCE MECHANISM**

· Location and composition

The balance mechanism is installed in the lower section of the door. It is composed of the torsion bar assembly, the pretension unit and the connection rod.

## LIFTING MECHANISM

Location and composition

The lifting mechanism is installed in the lower section of the door. It is composed of the lifting shaft assembly, the door detent shaft and the adjustment lever unit.







DOOR HANDLE MECHANISM

> LIFTING MECHANISM







## NORMAL DOOR OPENING

• Film: Normal Cargo Door Opening

NOTE: In this module the CARGO DOORS/NORMAL OPERATION is described on the A320 but the principle is the same for the A318, A319 and A321.

The cargo door is mechanically locked and operated by the yellow hydraulic system. The door opening operation procedure is labeled next to the door controls. Let's open the door under normal conditions. To operate the door handle, press in the PUSH 1 button and hold down until flap PUSH 2 is pushed. Pull the door handle fully out. When the handle rotates the locking shaft, it moves the cam of the latches, shows the red indicators retracting, retracts the side pins, and opens the vent door.

Pull the door handle outwards and up to the fully unlocked position. Check that the vent door opens to make sure there is no residual pressure in the cargo hold before the door is unlatched. Check that the locking indicators are red, indicating that the locking looks are released and the door is unlocked. Due to internal leakage and the door weight, the door may open to its vertical position. Open the access panel below the fuselage to gain access to the door hydraulic control system. Check the door open green indicator by pressing it.

The light will come on. Set the selector on the control panel to open and hold it in this position. The door is open by means of two hydraulic actuators pressurized by the yellow electric pump. When the door is in the fully open and locked position, this is indicated by the green indicator light, which comes on. Then, release the control lever, the yellow pump remains operative during a time delay.

In this configuration, all required safeties must be applied.

The door opening instructions are labeled on the access control panel.

## NORMAL DOOR CLOSING

•Film: Normal Cargo Door Opening

•To close the cargo door hydraulically, if the cargo loading option is installed, make sure that the door still latches are in the raised position and all required safeties are supplied. Set the control selector to close. The yellow hydraulic pump starts running, pressurizes the actuators and unlocks the door. The green indicator light goes off and the door closes. When the door is in its frame, release the control selector. The yellow electric pump remains operative during a time delay.

•Lock the door before it is able to open again, due to internal leakage and the door weight.

•Pull the door handle down to its locked position. Push it into the recess of the door structure and check that the locking indicators are green, and the door is flush with its door frame.

•Check that the vent flap on the door is fully closed. Check that the push 1 button is flush with the handle surface. The handle must be flush with the door profile. Check that access panels are closed.









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#### MAIN STRUCTURAL COMPONENTS

Composition

#### •Components

The door is made of sheet metal and machined parts. Note the position of the hoist points. The primary structure consists of vertical and horizontal edge members, longitudinal beams, frames, and an inner and outer skin. All these parts are riveted together.

## DOOR SEAL RETAINER

Composition

Purpose

Fixation

The door seal is a round hose-type seal and made of silicone and fabric. When the cargo doors are locked, the door seal makes the related compartment pressure-tight. For attachment of the door seal, the retainers are riveted to the edge members around the cargo door.

## HINGES AND FITTINGS

Composition of the connection

•Actuator attachment fitting

•FWD and AFT identical but not interchangeable

The connection of the cargo door to the fuselage includes the two halves of the titanium and aluminum alloy piano hinges, and two hinge pins for the actuators. The actuator attachment fitting is attached with screws to the inboard side of frames 25A / 53A, and 26A / 54A. The FWD and AFT cargo doors are structurally the same, but they are not interchangeable.

Note that, on the A318 the vent door is located near to the door handle.



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## LATCHING SHAFT

#### Connection

The latching shaft, which is connected to the operating handle by an adjustable rod, operates all the hooks. It is the main part of the locking mechanism.

## LOCKING HOOK

Purpose

In the closed and locked position, the hooks are in contact with the fuselage slide spools and eccentric bolts and transmit the loads resulting from the internal pressure and circumferential fuselage loads. The hooks fulfill the latching of the cargo door to the fuselage.

## LOCKING SHAFT

#### Operation

When the locking handle is in the LOCKED position, the locking shaft turns and the safety cams move into the recess of the locking hooks. The locking shaft is the main part of the safety mechanism. It is actuated by the operating handle.

## CAM

Fastening and purpose

The cam is fastened on the locking shaft and blocks the hooks in the locked position.



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# UNLOCKING AND UNLATCHING OPERATION

Introduction

The unlocking and unlatching operation may be described in three positions.

## LOCKED POSITION

• Green mark visible

Locking shaft locked

•Hooks latched

Green marks are visible through the locking indicators. The door cannot be opened because the locking shaft is in the locked and the hooks are in the latched position.

### UNLOCKED POSITION

#### • Red mark visible

- Locking shaft unlocked
- •Hooks still latched

Red marks are visible through the locking indicators. The locking shaft is in the unlocked position but the hooks are still in the latched position, so the door cannot be opened.

## UNLATCHED POSITION

- Red mark visible
- •Latching shaft and hooks unlatched

Red marks are still visible through the locking indicators. The latching shaft and the hooks are in the unlatched position, so the door can be opened.

















#### INTERLOCK MECHANISM

• Blocks the latching mechanism in the unlatched position.

•Door handle is not movable.

•Latching hooks stay in the lifted position.

The interlock mechanism blocks the latching mechanism in the unlatched position when the cargo door is not closed. Then the door handle is not movable and the latching hooks stay in the lifted position. The interlock mechanism includes the interlock lever with the stop bolt, the connection rod and the spring unit. The spring unit moves the interlock lever to the blocked position so that its stop bolt touches the interlock cam.

#### SWITCH MECHANISM

• Installed in the lower part of the cargo door.

•The proximity sensor sends information to the ECAM

The switch mechanism is installed in the lower part of the cargo door. This mechanism includes the target lever with the related target and the link assy. The target lever is attached on the support fitting which is riveted on the frame structure. The link assy transmits the movement of the drive shaft to the target lever. The target moves to or away from the proximity sensor which is installed below the door sill of the fuselage. The proximity sensor monitors the position of the cargo door. It sends information to the ECAM system when the cargo door is closed or opened.





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### PASSENGER DOORS

Composition

NOTE: on the A321, the procedures for the passenger and emergency exit doors are identical.

Each door is monitored by three proximity switches that are:

- the locking hook proximity switch,
- the locking shaft proximity switch,
- the escape slide proximity switch.

#### **DOOR INDICATING AND WARNING - PRINCIPLE**

• SDAC

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

### DOOR INDICATING AND WARNING - LOCKED

• Door symbol is green

When the door is locked, the locking hook and the locking shaft proximity switch targets are near, and the door symbol is green on the ECAM DOOR page.



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# DOOR INDICATING AND WARNING - NOT LOCKED

•Door symbol is amber

As soon as the frame or the door handle proximity sensor detects target far the door is indicated as unlocked and the symbol is amber on the ECAM DOOR page.







# DOOR INDICATING AND WARNING - NOT LOCKED

•Door indication is amber

As soon as at least one of the locking hook and the locking shaft proximity switch target is far, the door indication is amber on the ECAM DOOR page.







## ESCAPE SLIDE INDICATING AND WARNING - PRINCIPLE

•Escape slide indication

The slide proximity switches give an escape slide indication on the ECAM DOOR page and slide and locking shaft proximity sensors trigger a "SLIDE ARMED" indication on the door itself.

# ESCAPE SLIDE INDICATING AND WARNING - SLIDE ARMED, DOOR LOCKED

•"SLIDE" appears

•Door symbol is green

The white indication "SLIDE" appears on the ECAM DOOR page. The door symbol is green







# ESCAPE SLIDE INDICATING AND WARNING - SLIDE ARMED, DOOR NOT LOCKED

• "SLIDE" appears

•Door symbol is amber

•"SLIDE ARMED" light comes on

On the ECAM DOOR page, the name of the door is shown in amber, the door symbol is amber and the white SLIDE ARMED light comes on steadily on the door.







# **RESIDUAL CABIN PRESSURE**

•Red flashing light: residual cabin pressure is greater than 2.5 mbars (0.04 psi)

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







# **EMERGENCY EXIT DOORS**

Composition

NOTE: only for the A318/319/320.

Each door is monitored by two proximity switches:

- the cover flap proximity switch,

- the escape slide proximity switch.

# **DOOR INDICATING AND WARNING - PRINCIPLE**

• SDAC

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

# DOOR INDICATING AND WARNING - LOCKED

• Door symbol is green

When the door is locked, the cover flap proximity switch target is near, and the door symbol is green on the ECAM DOOR page.







# DOOR INDICATING AND WARNING - NOT LOCKED

•Door symbol and indication is amber

As soon as the cover flap proximity switch target is far, the door symbol and indication is amber on the ECAM DOOR page.







# ESCAPE SLIDE INDICATING AND WARNING - PRINCIPLE

• Escape slide indication

•SLIDE ARMED indicator light comes on near the emergency exits

The escape slide proximity switch gives an escape slide indication on the ECAM DOOR page via the SDAC and directly to the SLIDE ARMED indicator light near the emergency exits.

# ESCAPE SLIDE INDICATING AND WARNING - SLIDE ARMED, DOOR LOCKED

"SLIDE" appears

•Door symbol is green

The white indication "SLIDE" appears on the ECAM DOOR page. The door symbol is green.







# ESCAPE SLIDE INDICATING AND WARNING - SLIDE ARMED, DOOR NOT LOCKED

"SLIDE" appears

•Door symbol and indication is amber

•SLIDE ARMED light comes on near the emergency exits

On the ECAM DOOR page, the name of the door is shown in amber, the door symbol is amber and the white SLIDE ARMED light, near the emergency exits, comes on steadily.





# FWD & AFT CARGO DOORS

- Composition
- The FWD and aft cargo doors have three similar proximity switches:

- the handle proximity switch,
- the frame proximity switch,
- the latching shaft proximity switch.

# **DOOR INDICATING AND WARNING - PRINCIPLE**

LGCIU

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

# DOOR INDICATING AND WARNING - LOCKED

• Door symbol is green

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



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# DOOR INDICATING AND WARNING - NOT LOCKED

•Door symbol is amber

As soon as the frame or the door handle proximity sensor detects target far the door is indicated as unlocked and the symbol is amber on the ECAM DOOR page.




## ELECTRICAL CONTROL SYSTEM - ENABLE LOGIC

• Electro selector valve supply

The electro selector valve is supplied when:

- the latching shaft proximity switch target is near, (this target near position is only available when the locking handle is in the fully open position),

- the manual selector valve is operated.

# **ELECTRICAL CONTROL SYSTEM - CONTROL**

LGCIU

•Electric pump

When the manual selector valve is operated, the integrated proximity sensor sends a signal to the LGCIU to open the electric selector valve and to start the electric pump of the yellow hydraulic system.

## DOOR INDICATING AND WARNING - FULLY OPEN

Green indicator

When the cargo door actuators are in the fully open and locked position, their internal proximity switches control illumination of the green indicator light fitted in the manual selector recess.



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### AVIONICS, BULK CARGO & AIRSTAIRS DOORS

Composition

Bulk cargo and Airstairs doors are optional. The avionics, bulk cargo and airstairs doors use a single proximity switch for the door warning function. It is installed in the door frame on the fuselage.

#### DOOR INDICATING AND WARNING - PRINCIPLE

SDAC

•Airstairs door indications not displayed when door closed and locked

The proximity switch gives door indications on the ECAM DOOR page via the SDAC, except for the airstairs door indications, which are not displayed when the door is closed and locked.

#### DOOR INDICATING AND WARNING - LOCKED

Door symbol is green

When the door is locked, the proximity switch target is near and the door symbol is green on the ECAM DOOR page.



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### DOOR INDICATING AND WARNING - NOT LOCKED

•Door symbol and indication is amber

As soon as the proximity switch target is far, the door symbol and indication is amber on the ECAM DOOR page.







## CIDS WARNINGS FAP DOOR PAGE

• DOORS/SLIDES status:

- Red
- Green
- Amber

This page displays the doors/slides status on the A/C:

- a red symbol indicates a door unlocked/open,
- a green symbol indicates a door locked and its escape slide armed,

- an amber symbol indicates a door locked but its escape slide disarmed. The indications SLIDE DISARMED are also shown in amber near the associated symbol.







END