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Airbus
A318/A319/A320/A321

ATA 35
Oxygen

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EASA Part-66
B1/B2

Training Manual

Lufthansa Technical Training

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- The LTT production process ensures that the Training Manual contains a complete set of all necessary pages in the latest finalized revision.

ATA 35 OXYGEN

35–00 OXYGEN-GENERAL

GENERAL LAYOUT

General

The aircraft has three separate oxygen systems.

These are

- a flight–crew oxygen system
- a passenger oxygen system
- a portable oxygen system.

Each system has its own controls and indicators.

Flight–Crew Oxygen System

The system supplies oxygen to the flight crew, if there is a sudden decrease in cabin pressurization. It also supplies oxygen if there is smoke or dangerous gases in the cockpit. Each crew station has a quick donning mask with a demand regulator installed.

The oxygen is supplied from a high pressure oxygen cylinder to the masks (through a pressure regulator/transmitter assembly and a distribution circuit).

Passenger Oxygen System

The emergency oxygen for the passengers and the cabin attendants is supplied from emergency oxygen containers. These are installed:

- above the passenger seats,
- in the lavatories,
- at the cabin attendant stations,
- in the galley working areas.

Each container has a chemical oxygen generator and two or more continuous–flow oxygen masks, each with a flexible supply hose.

Portable Oxygen System

The portable oxygen equipment is installed in the cabin and in the cockpit. It is used to supply oxygen to the crew and passengers in an emergency and for first aid treatment.

Safety Precautions

As a standard precaution, Oxygen System maintenance requires special care and cleanliness.

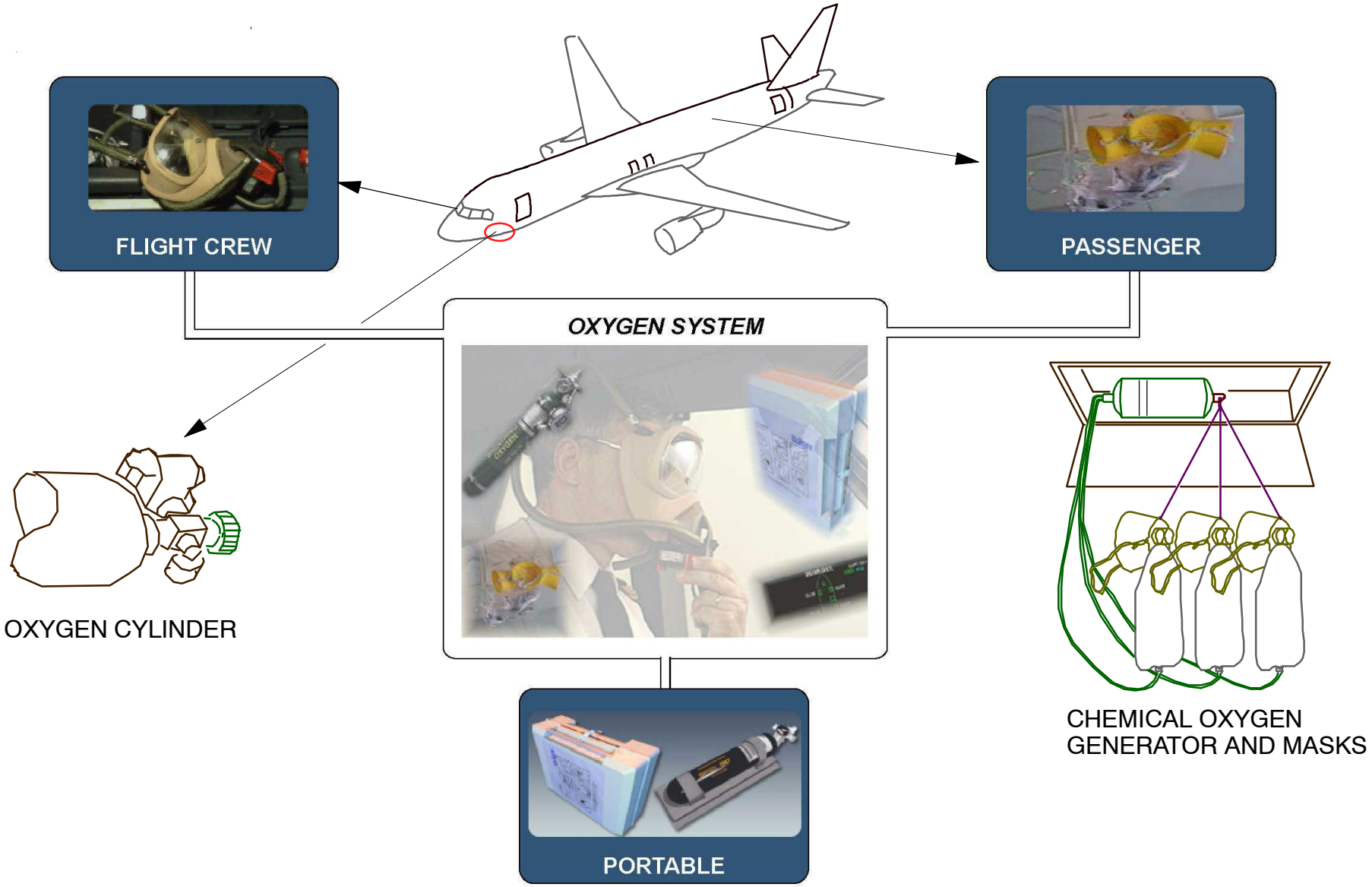


Figure 1 Oxygen System Overview

35–10 CREW OXYGEN

GENERAL

Purpose

The crew oxygen system will supply the flight crew with oxygen, if there is a loss of cabin pressurization or the emission of smoke and noxious gas. The crew oxygen system is for commercial aircraft that fly up to a height of 12000 m (39370.80 ft.).

In the AMM, the system has three sub-sections:

- Oxygen Storage (35–11)
- Oxygen Distribution (35–12)
- Control and Indicating (35–13)

Oxygen Storage

The flight crew oxygen is supplied from a high–pressure oxygen cylinder. The cylinder is installed between frames 11 and 13 in the avionics compartment. A pressure regulator/transmitter is directly connected to the cylinder.

Oxygen Distribution

The oxygen is supplied to the flight crew stations through a distribution circuit. The circuit is as follows:

- a low–pressure supply valve and distribution manifold,
- low–pressure stainless–steel distribution pipes,
- flexible supply hoses and stowage boxes,
- full–face quick–donning masks with a demand regulator.

Indicating

The indicating system gives control and monitoring of the crew oxygen supply.

Components

The principle components of the crew oxygen system are as follows:

- 4 Quick-Donning Masks
- Oxygen Cylinder
- Oxygen Pressure Regulator/Transmitter
- Overboard Discharge Indicator
- Crew Supply Pushbutton Switch
- Crew Supply Pushbutton Solenoid
- ECAM Indication
- External Filling Connection.

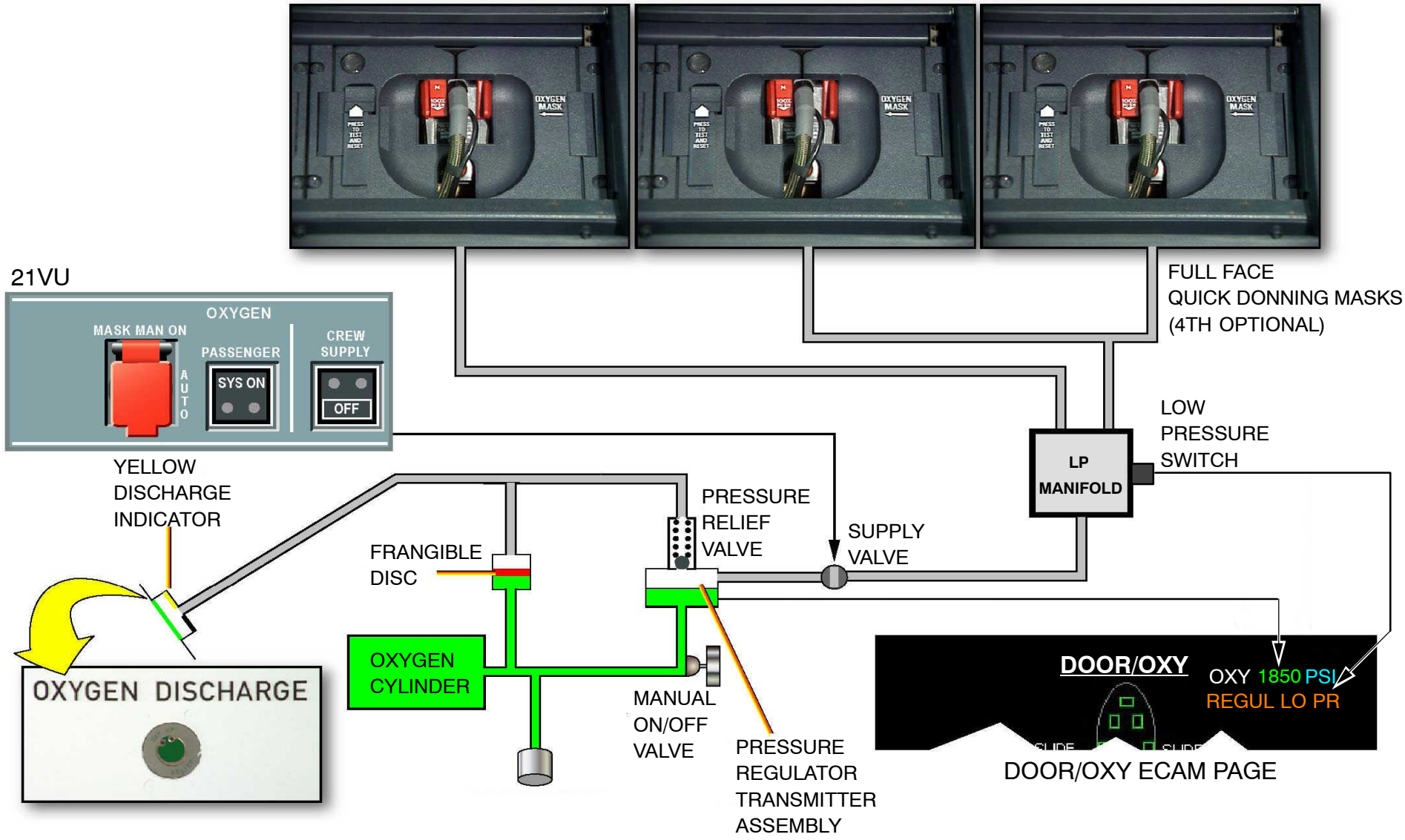


Figure 2 Crew Oxygen System Schematic

ARCHITECTURE

General

Each flight crew station is supplied with oxygen through a distribution circuit. The distribution circuit comprises:

- a low–pressure supply valve,
- a distribution manifold,
- low–pressure stainless–steel distribution pipes,
- flexible hoses and stowage box assemblies,
- full–face quick–donning masks with a demand regulator.

LP Oxygen-Supply Solenoid-Valve

The Low–Pressure Oxygen-Supply Solenoid-Valve is installed between the pressure regulator/transmitter and the distribution manifold. A flexible hose connects the valve to the pressure regulator/transmitter. A stainless–steel rigid pipe connects the valve to the distribution manifold.

Oxygen/Crew Supply Switch

The flight crew can control the supply valve from the Oxygen/Crew Supply Switch in the control panel 21VU.

The panel is located in the cockpit.

Manual ON/OFF Valve

The valve is used during the replacement of the cylinder and to isolate the cylinder if there is a leak in the oxygen system.

Discharge Indicator

The discharge indicator is a green blowout disc that can be seen from outside the aircraft. This disc will blow out at a pressure of 2.8 to 6.9 bar (40 to 100 psig) to show a yellow indicator. This shows that oxygen has been discharged.

Distribution Manifold

The distribution manifold is a forged component to decrease the possibility of leaks. Two distribution pipes are connected to the manifold. The chamber in the distribution manifold helps to increase the performance and safety of the distribution circuit.

A low–pressure switch is installed on the distribution manifold. It operates when the oxygen supply pressure decreases to 3.45 plus or minus 0.35 bar (50 plus or minus 5 psig) and transmits an alert signal REGUL LO PR to the ECAM system.

Test Point

A rigid pipe connects the test point to the distribution manifold. The test point permits a pressure test and leak test to be carried out.

The maximum pressure that can be used at the test point is 10 bar (145 psig).

Distribution Pipes

The two distribution pipes are rigid and made of stainless–steel. They supply oxygen to the flight crew stations. One pipe supplies the captain and 4th occupant stations. The other pipe supplies the 1st officer and 3rd occupant stations.

Flexible hoses make the connection to the stowage box assemblies.

Power Supply

The Oxygen-Supply Solenoid-Valve is supplied with 28 V DC from the essential busbar 801PP.

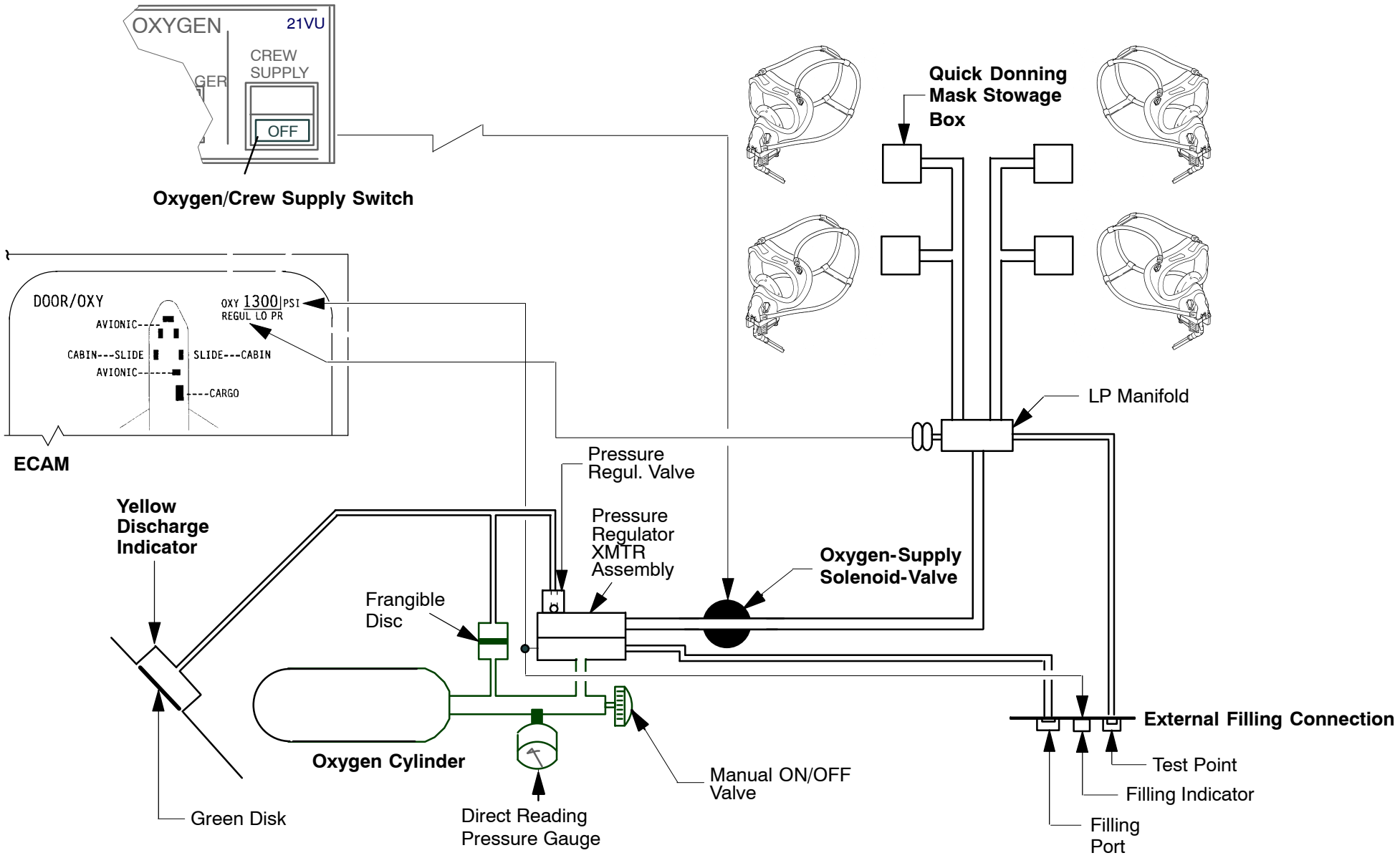


Figure 3 Crew Oxygen System Architecture

CREW OXYGEN CONTROL

Crew Supply ON/OFF Switch

The Crew Supply ON/OFF Pushbutton Switch controls the low pressure Oxygen-Supply Valve of the Flight–Crew Oxygen System.

- ON
  - the valve is open, low pressure oxygen is supplied to the masks. (Normal position in flight)
- OFF:
  - the valve is closed.

    The OFF light illuminates white and the OXY Indication on the ECAM DOOR/OXY page becomes amber.

CREW OXYGEN INDICATION

General

There are three indicators:

- ECAM
- Filling Indicator
- Direct Reading Pressure Gage.

ECAM

Oxygen parameters are indicated on the DOOR/OXY page.

The oxygen pressure in the cylinder is indicated as follows:

- 0 to 27.5 bar (0 to 400 psig) in amber.
- 27.5 to 127.5 bar (400 to 1850 psig) in green.

An amber half frame appears when the oxygen pressure is lower than 1500 psig.

The parameter OXY turns to amber when the Crew Supply ON/OFF Switch is in the OFF position.

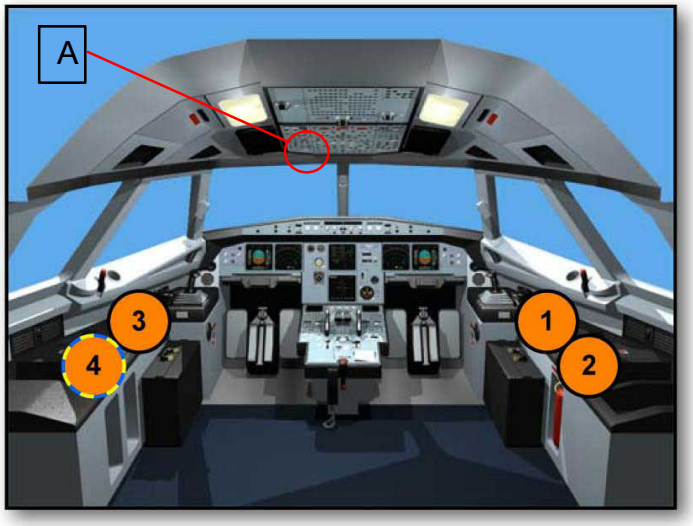
If the oxygen pressure drops below the minimum operating pressure of 3.45 plus or minus 0.35 bar (50 plus or minus 5 psig), the indication REGUL LO PR is shown amber on the DOOR/OXY page.

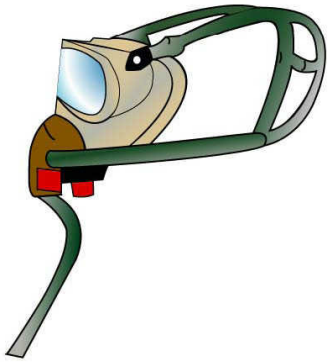
Filling Indicator

The filling indicator is installed near the replenishing connector.

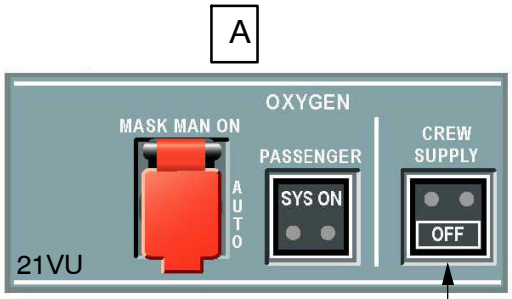
Direct Reading Pressure Gage

A direct–reading pressure gage is installed on the oxygen cylinder to indicate the oxygen pressure. This gives an indication to the maintenance personnel when to fill the oxygen cylinder.

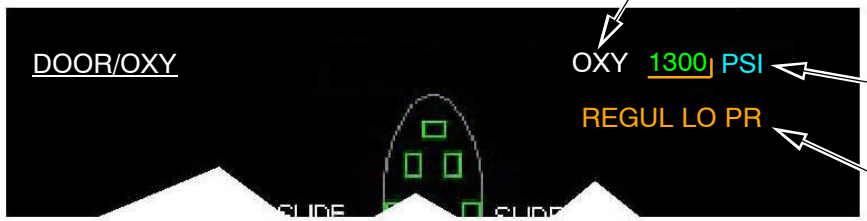




4 OPTIONAL WITH THE 4TH OCCUPANT SEAT



CREW SUPPLY ON/OFF SWITCH



ECAM

OXY INDICATION

Becomes amber when:
- Pressure is < 400 PSI
- Oxygen low pressure is detected
- OXYGEN CREW SUPPLY P/BSW is OFF

OXY HIGH PRESSURE INDICATION

GREEN - WHEN PRESSURE IS ≥ 400 PSI
AMBER - WHEN PRESSURE IS < 400 PSI
An amber half frame appears when oxygen pressure is < 1500 PSI.

REGUL LO PR INDICATION (AMBER)

Appears in case of oxygen low pressure (50 PSI) detected on the low pressure circuit.

Figure 4 Panel Description

OXYGEN MASK-GENERAL DESCRIPTION

General

A flight crew member can put on the Full Face Quick Donning Mask in less than 5s.

The mask has an inflatable harness, a face piece, a demand regulator, and a microphone.

Harness

The mask is kept in the stowage box with the harness deflated. When the mask is removed from the box, the red right side of the grip has to be pressed to inflate the harness. A valve opens in the mask and permits the oxygen supply pressure to inflate the harness. When the mask has been put on, the grip is released and the oxygen pressure is released. The harness will then deflate and pull the mask face piece tightly onto the user's face.

Face Piece

The mask face piece is full face and gives protection to the user's eyes, nose and mouth. It will be pulled tightly onto the face when the harness deflates. The face piece has been designed to permit the user to keep glasses on.

The mask is equipped with a plastic window. In order to protect this window during normal operation (pulling out of its stowage box during maintenance) a protective film is installed on the face mask window. This film is made of soft plastic (with electrostatic adhesive) and can be re moved easily by the user by means of its side strip.

The face piece has a high level dynamic microphone installed.

Demand Regulator

The demand regulator has two controls and three supply functions.

The controls are

- Normal/100 % selector
- Emergency Overpressure Knob.

Supply Functions

The three supply functions are as follows:

- An air/oxygen supply is given with the Normal/100 % selector in the Normal position. Above 10600 m (34777.54 ft.), an aneroid capsule in the demand regulator automatically closes the air inlet to give a 100 % oxygen supply.
- A 100 % oxygen supply is given with the Normal/100 % selector in the 100 % position. The selector locks in the 100 % position when selected.
- A 100 % oxygen supply with overpressure is given with the Normal/100 % selector in the 100 % position and the emergency overpressure knob in the overpressure position. When the emergency overpressure knob is pushed, the overpressure is momentarily selected.

Overpressure Knob

When the Emergency Overpressure Knob is turned the overpressure is continuously selected. Overpressure is used in unusual flight conditions to make breathing easier and stop the inhalation of smoke or noxious gas.

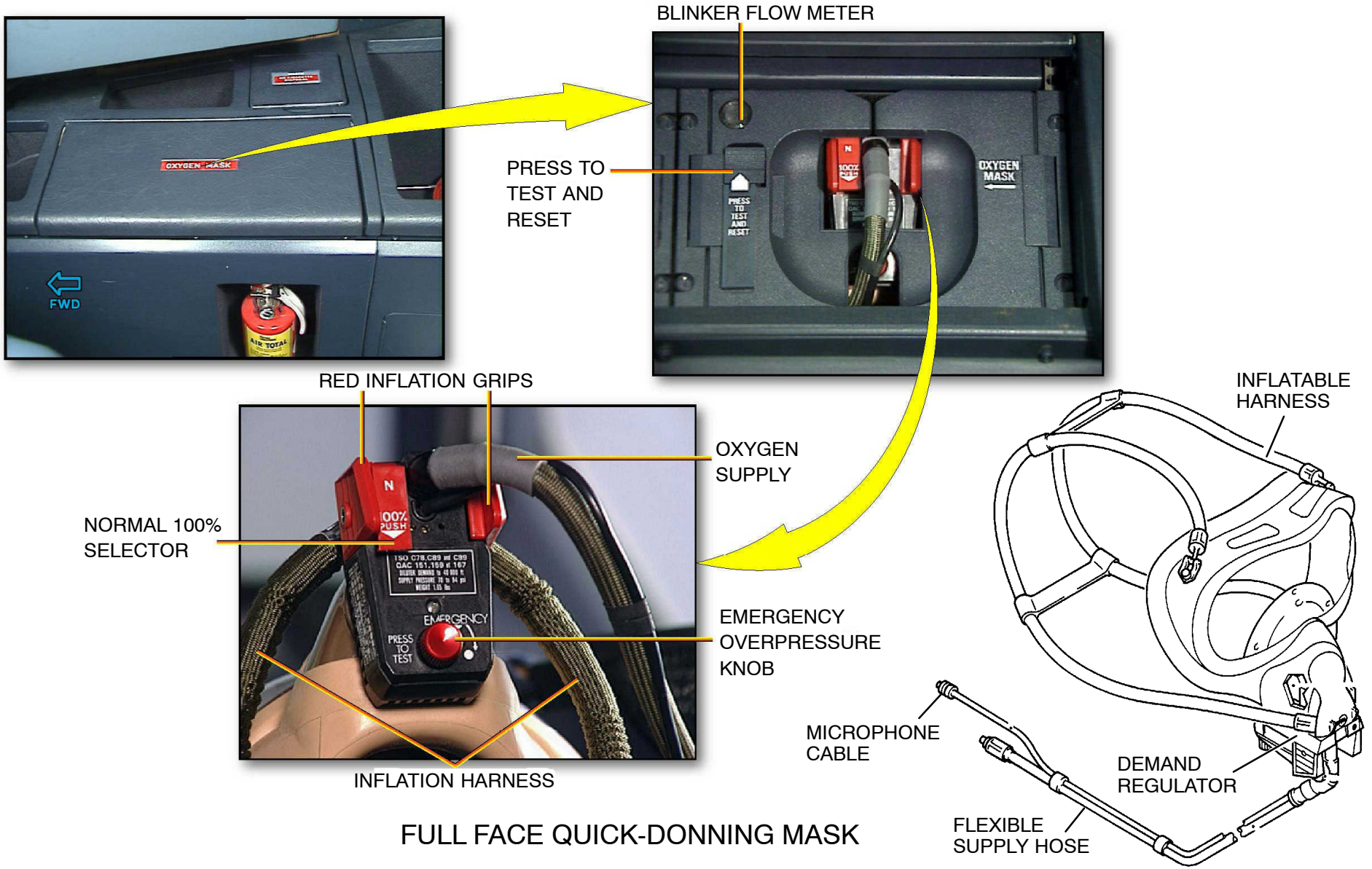


Figure 5 Oxygen Mask

STOWAGE BOX-DESCRIPTION

General

The stowage box assemblies are installed in the cockpit next to each flight crew station. Each box is the connection point for the full face quick–donning mask which is kept in the box until required for use. When the mask is removed, the oxygen system is automatically switched on. A flow indicator blinks to show that the oxygen flows.

The two doors on the stowage box keep the mask in the box. When the left door is opened with the removal of the mask, the oxygen supply valve in the stowage box will open and permit oxygen to flow to the mask.

Reset/Test Control Slide

The left door of the stowage box has a reset/test control slide. The slide is pressed in the direction of the arrow to reset the oxygen supply valve when the left door is closed. It is also pressed in the direction of the arrow to do a test of the oxygen supply without removing the mask from the stowage box.

Flow Indicator

An oxygen flow indicator is an integral part of the supply valve. The indicator blinks when there is an oxygen flow.

Mask Microphone Activation

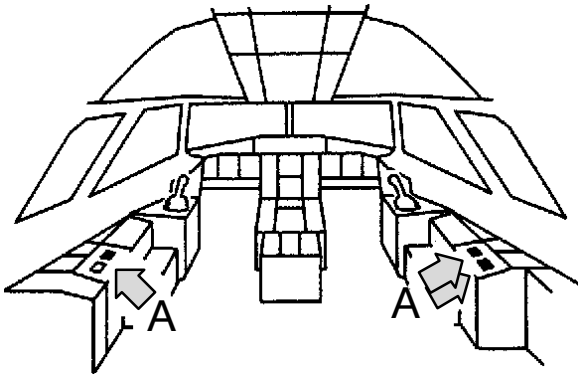
A pressure switch is an integral part of the supply valve. When the supply valve is open and oxygen flows, the oxygen pressure will close the pressure switch. With the pressure switch closed, the microphone installed in the mask will be switched on.

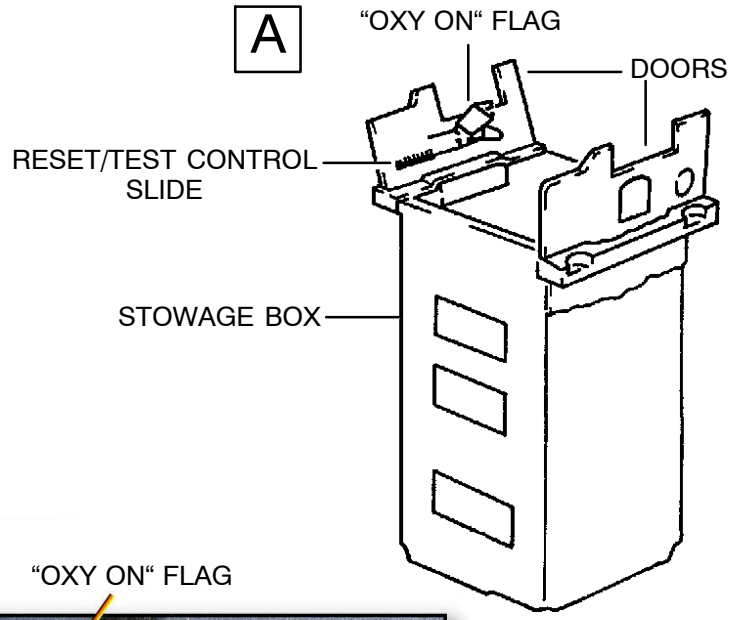
Connection

Flexible hoses are used to connect the distribution pipe to the supply valve and the supply valve to the oxygen mask. A microphone lead is attached to the flexible hose that is connected to the supply valve and the oxygen mask.

4th Occupant

For the 4th occupant, the mask installed is identical to the other masks. The audio communication is not possible because the stowage box assembly is not connected to the audio circuit of the aircraft.





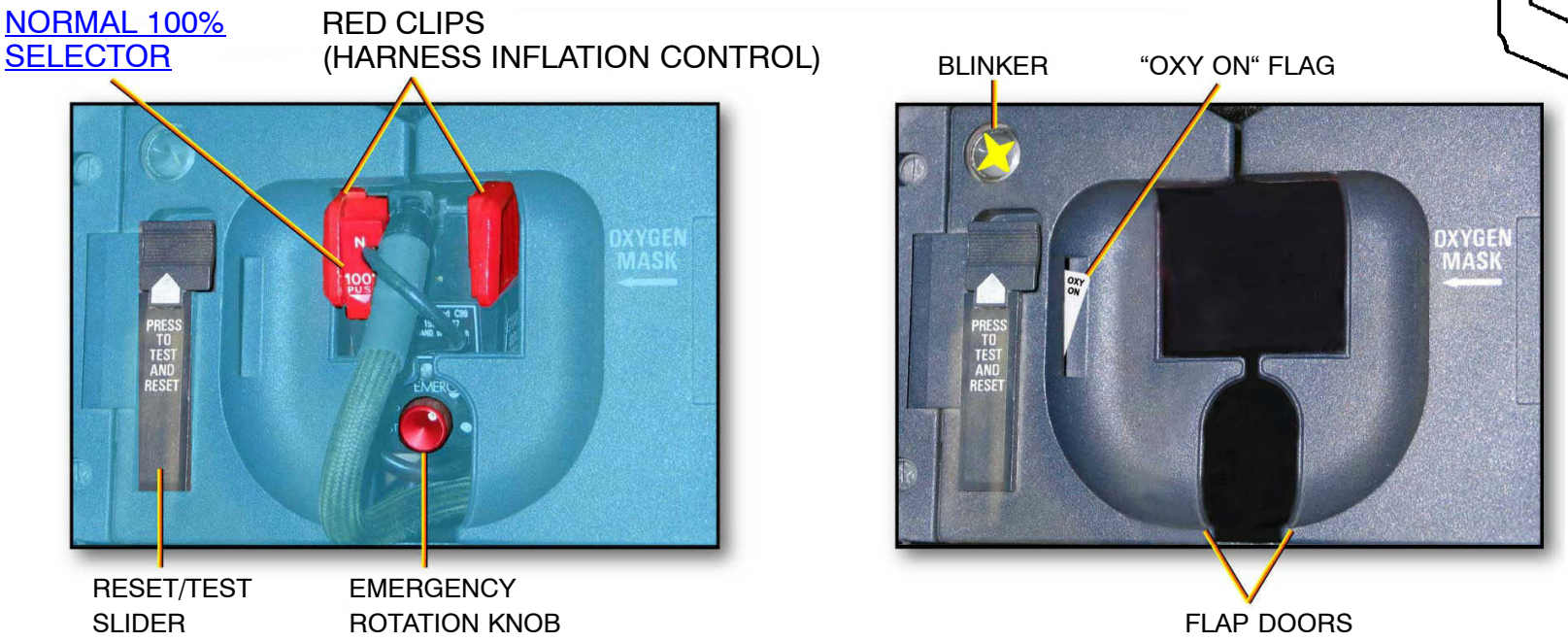


Figure 6 Stowage Box

SUPPLY VALVE & DEMAND REGULATOR OPERATION

Supply Valve

The oxygen supply valve in the stowage box is a sliding piston valve. The reset/test control slide, on the left door, will keep the piston in the closed position.

When the left door is opened the piston moves to the open position. This will permit oxygen to flow through the supply valve. Closing the left door makes the OXY ON flag show. Pressing the reset/test control slide in the direction of the arrow closes the supply valve and the OXY ON flag disappears.

Demand Regulator

The three supply functions are as follows:

- An air/oxygen supply is given with the Normal/100 % selector in the Normal position. Above 10600 m (34777.54 ft.), an aneroid capsule in the demand regulator automatically closes the air inlet to give a 100 % oxygen supply.
- A 100 % oxygen supply is available with the Normal/100 % selector in the 100 % position. The selector locks in the 100 % position when selected.
- A 100 % oxygen supply with overpressure is given with the Normal/100 % selector in the 100 % position and the emergency overpressure knob in the overpressure position. When the emergency overpressure knob is pushed, the overpressure is momentarily selected.

  Above 30.000ft an aneroid capsule gives a safety overpressure of approximately 3mbar independent of the overpressure knob position.

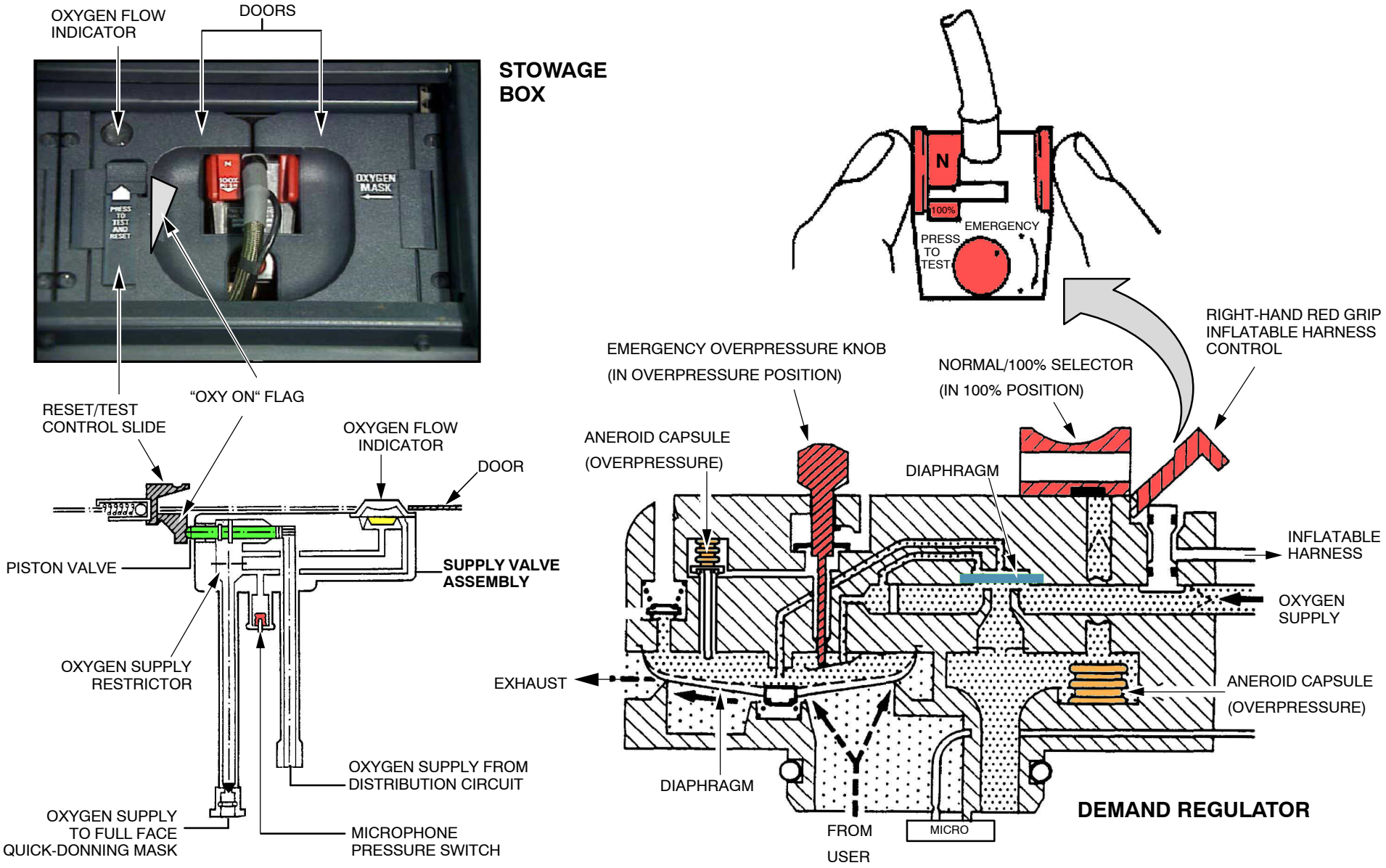


Figure 7 Stowage Box

OXYGEN SYSTEM COMPONENTS DESCRIPTION

OXYGEN CYLINDER

The flight crew oxygen is supplied from a high pressure oxygen cylinder with a pressure regulator / transmitter directly connected to the cylinder head. It is installed in a cradle with two quick release clamps between frames 11 and 13 in the avionics compartment. The installation can survive crash loads of 1OG's in all directions.

Oxygen Cylinder Description

The high pressure oxygen cylinder is made of composite material.

The cylinder has a capacity of 2183 ltr.

(77 cubic feet) at a pressure of 127.5 bar (1850 psig).

The cylinder head is a valve assembly which is made of these components:

- A manual slow opening ON/OFF valve with a metal seat and poppet, to reduce the explosion hazard. The valve is used during the replacement of the cylinder and to isolate the cylinder if there is a leak in the oxygen system.
- A direct reading pressure gage which gives an indication of the cylinder high–pressure, independent of the open or closed position of the manual valve.
- A high pressure safety outlet with a discharge indicator. The discharge indicator is a frangible disc that ruptures at a pressure of 172.5 to 191.5 bar (2500 to 2775 psig).

Safety Outlet

The high pressure safety outlet on the oxygen cylinder head and the low pressure safety outlet on the pressure regulator/transmitter are connected to a discharge indicator on the fuselage skin (near the access door 812).

The oxygen is discharged overboard.

FURTHER OXYGEN COMPONENTS

LP Oxygen-Supply Solenoid-valve

The Low–Pressure Oxygen-Supply Solenoid-Valve is installed between the pressure regulator/transmitter and the distribution manifold. A flexible hose connects the valve to the pressure regulator/transmitter.

Oxygen Low Pressure Switch

The Oxygen Low Pressure Switch normally sends a ground discrete to the SDACs. When the pressure drops below 50 psi, the amber message REGUL LO PR appears on the DOOR/OXY page below the oxygen parameter.

Pressure Regulator/Transmitter

The pressure regulator/transmitter is directly connected to the cylinder. The inlet connection of the pressure regulator/transmitter limits the high pressure from the oxygen cylinder to the pressure regulator/transmitter.

High Pressure Stage

The high pressure stage of the pressure regulator/transmitter has an integrated transducer installed. This sends an electrical signal of the oxygen pressure to the ECAM system in the cockpit.

Low Pressure Stage

The low pressure stage of the pressure regulator/transmitter supplies a pressure of 4.48 to 6.48 bar (65 to 94 psig) to the oxygen distribution system.

This pressure supplies an oxygen flow rate of 0 to 300 l/min (0 to 10.6 cubic feet/min) and at an oxygen cylinder pressure of 6.9 to 140 bar (100 to 2030 psig).

Safety Outlet

The low pressure safety outlet has an integrated relief valve. This limits the low pressure oxygen supply to a maximum of l2 bar (175 psig).

The oxygen released by the low pressure safety outlet is discharged overboard by a safety system.

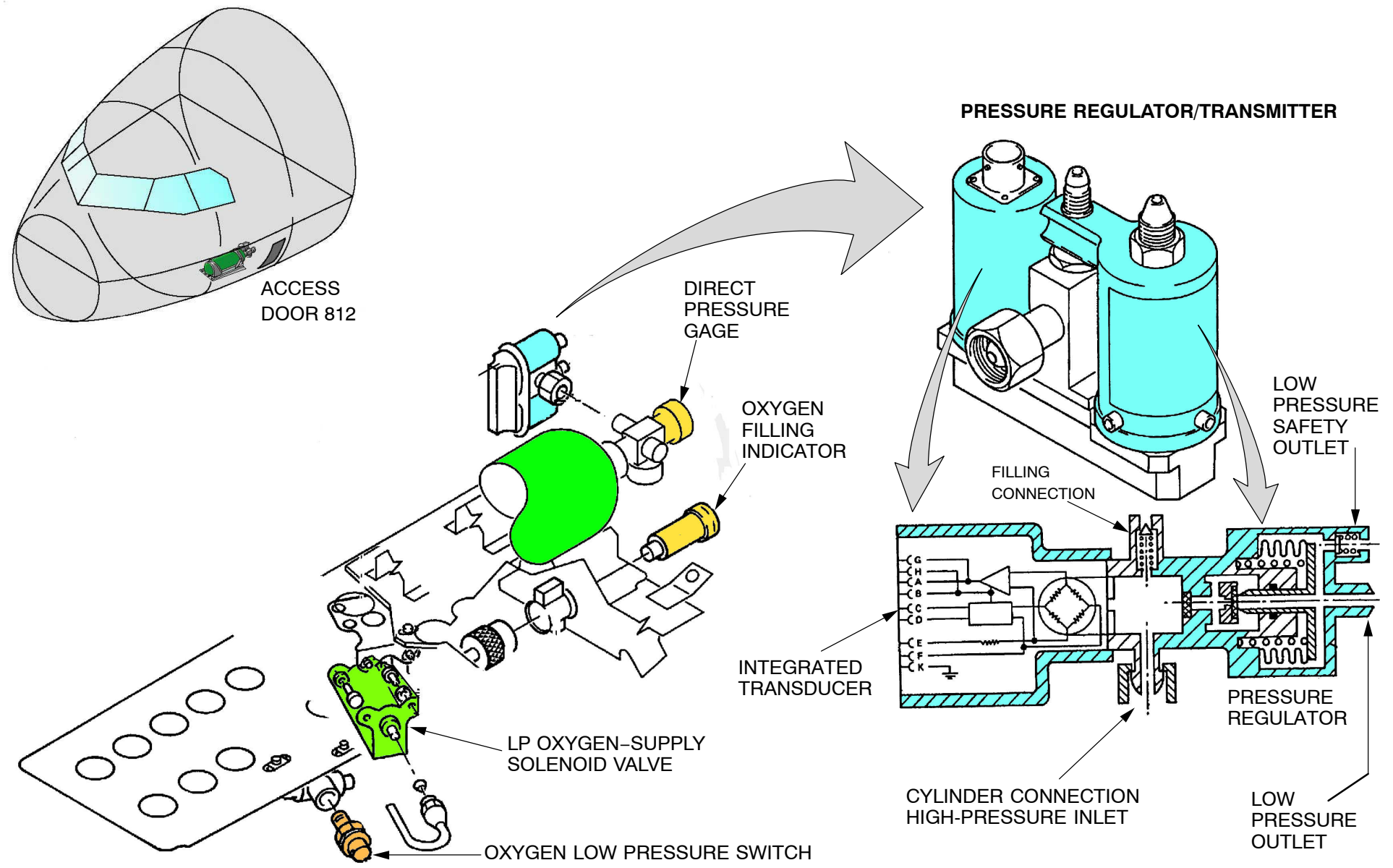


Figure 8 Oxygen Cylinder

DUAL CREW OXYGEN SYSTEM (OPTIONAL)

General

To fulfill local requirements a dual crew oxygen system may be installed after performance modification.

System Description

Two High Pressure (HP) oxygen cylinders supply oxygen to the flight crew.

The first HP oxygen cylinder is installed between frames 11 and 12 in the left part of the avionics compartment. The second HP oxygen cylinder is installed between frames 16 and 17 in the left part of the avionics compartment.

Each HP oxygen cylinder can be filled through its filling port. The filling port is connected to the filling connector installed on the pressure regulator/transmitter.

The head of each HP oxygen cylinder has a direct connection to a pressure regulator/transmitter. These pressure regulators/transmitters supply LP oxygen to the distribution circuit.

The system includes an overboard discharge system for safety, if an overpressure occurs in the HP and/or in the LP oxygen lines of the system.

Distribution

Each LP oxygen-distribution circuit includes:

- An electrical LP oxygen-supply solenoid-valve with a position switch
- A test port connected to the mechanical distribution manifold through a test line
- A mechanical distribution manifold with an oxygen low-pressure switch
- An LP supply distribution-line with stainless-steel rigid pipes and flexible hoses
- Two full-face/quick-donning oxygen masks and their related stowage boxes

Each crew oxygen-distribution system supplies Low Pressure (LP) oxygen to two crew oxygen stations.

One LP oxygen-supply solenoid-valve controls each LP crew oxygen-distribution.

The LP oxygen-supply solenoid-valve has an electrical shutoff function between the oxygen supply sub-system and the downstream crew-oxygen-distribution sub-system.

Each system is mechanically isolated from the other system. Thus, if there is a malfunction in one of the systems, this will not have an effect on the other system.

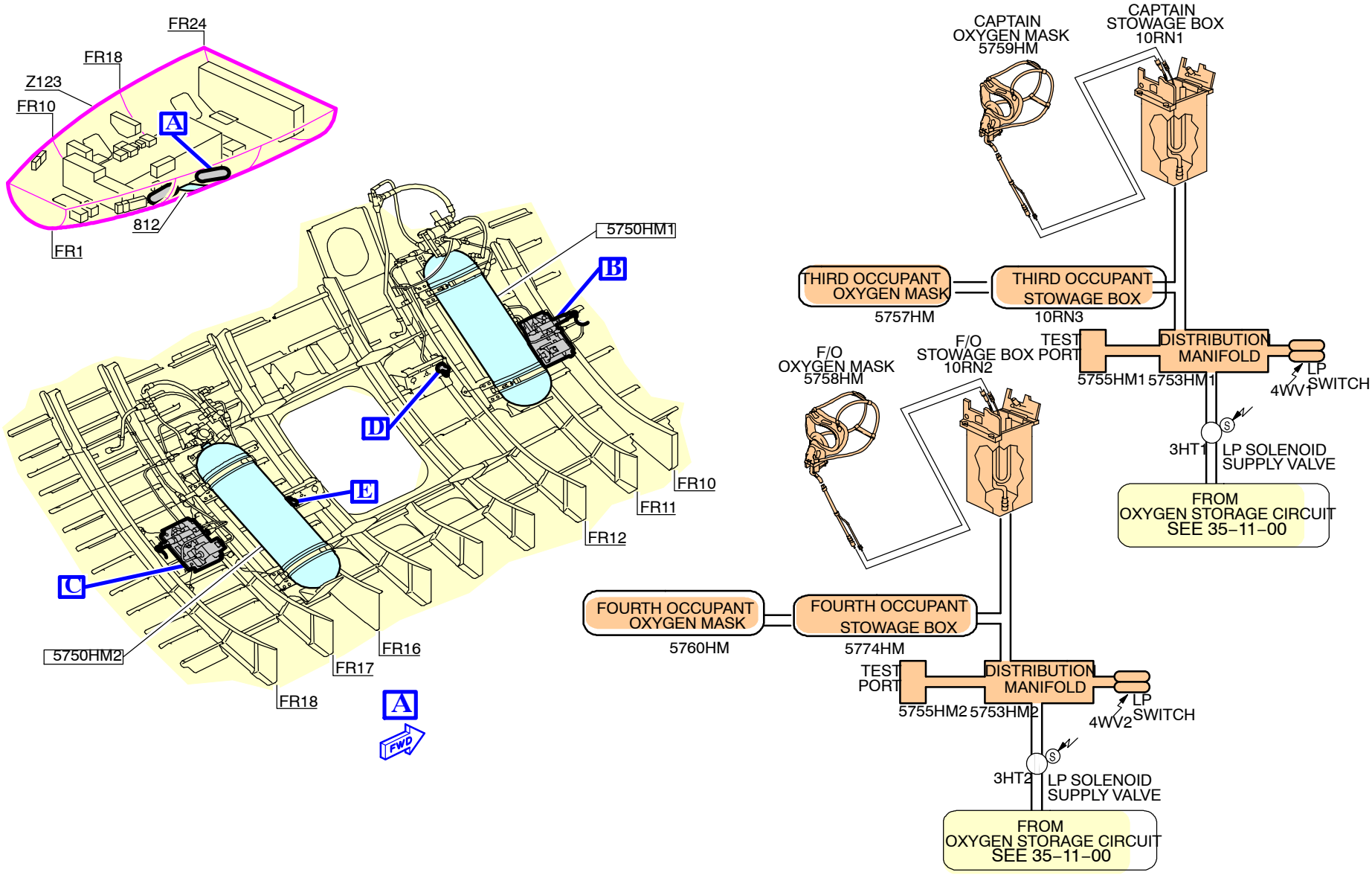


Figure 9 Crew Oxygen General

Control and Indicating

The indicating system controls and monitors the crew oxygen system.

The DOOR/OXY page on the ECAM DU displays two pressures, one for the Captain's oxygen cylinder, and the second for the First Officer's oxygen cylinder.

In the cockpit, on the OXYGEN section of the overhead control and indicating panel 21VU, there is one CREW SUPPLY pushbutton switch that activates the two LP solenoid supply-valves in each sub-systems.

An oxygen filling indicator is installed near each filling port to give the HP filling pressure.

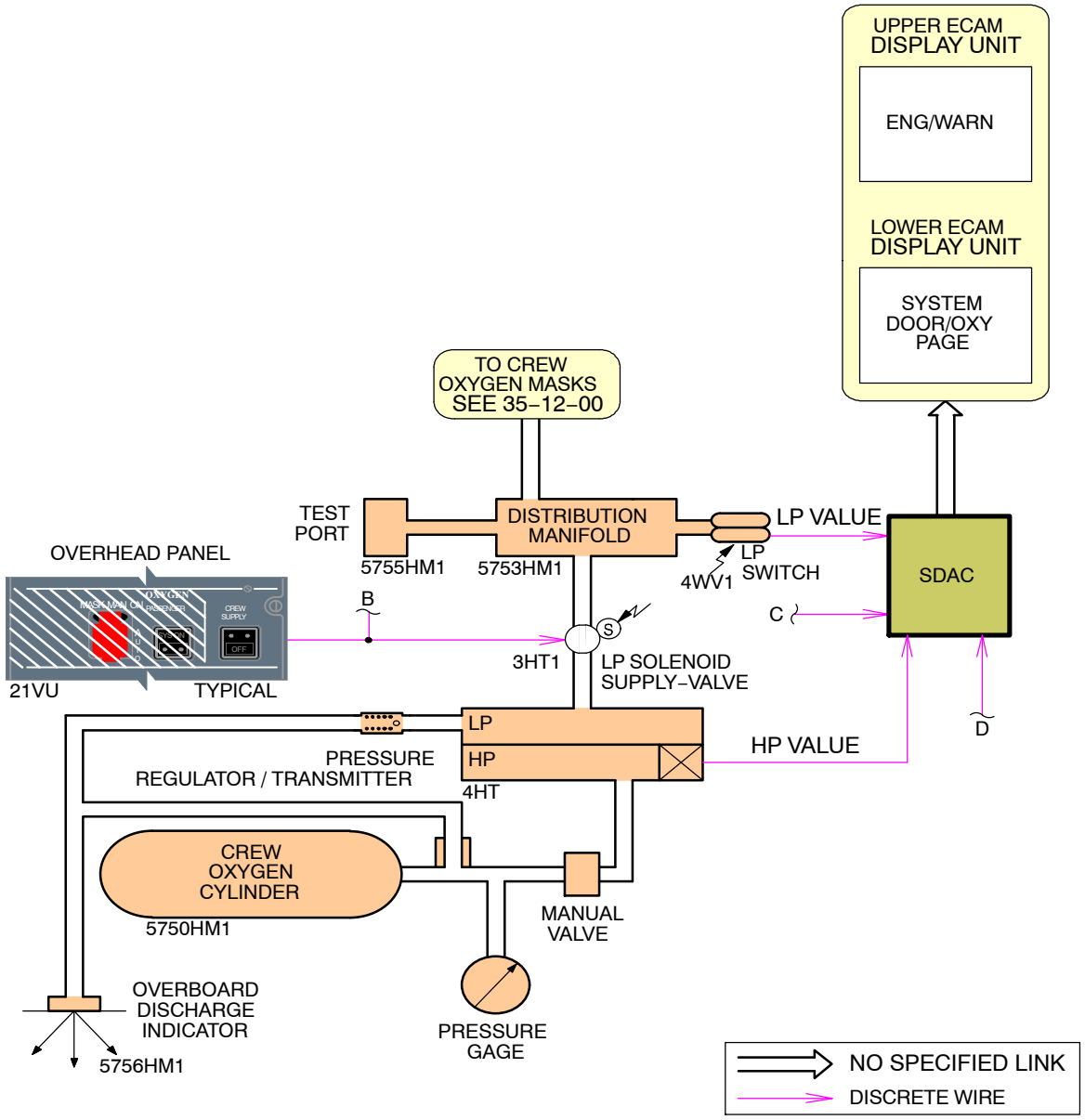


Figure 10 Crew Oxygen Control and Indicating

ATA 12 SERVICING

12–14 GAS

OXYGEN SERVICING PRESENTATION

General

When oxygen must be refilled, an External Filling Connection must be used.

You find the task “Servicing of the Oxygen - Replenishing“ in AMM 12–14.

In this task, you must measure the outside Temperature and the cockpit temperature. With this parameters and a placard which is at the aircraft and illustrated in the AMM you find the filling pressure.

External Filling Connection

The external filling connection is installed in the aircraft between frames 11 and 13. It permits filling of the oxygen cylinder without removal of the cylinder from the aircraft.

The external filling connection is made of the components below:

- A filling connector with a filter. The filter prevents entrance of any moisture or dust into the oxygen system.
- A filling connector cap with a relief valve. The relief valve releases any oxygen pressure of more than 6.9 bar (100 psig) if there is a leak in the check valve of the pressure regulator/transmitter.
- A flexible hose connects the filling connection to the pressure regulator/ transmitter.
- A pressure gage to indicate the pressure inside the oxygen cylinder during filling. The pressure gage has a two–color scale with graduations:
  - 0 to 5.9 bar (0 to 85 psig) is red
  - 5.9 to 138 bar (85 to 2000 psig) is green.
- The operating pressure is 0 to 140 bar (0 to 2030 psig). The filling rate is 0 to 500 l/min (0 to 17.65 (cubic feet) /min).

WARNING: KEEP ALL HYDROCARBONS (FUELS, LUBRICANTS, ETC.) AWAY FROM ALL SOURCE OF OXYGEN. OXYGEN BECOMES EXPLOSIVE WHEN IT TOUCHES HYDROCARBONS.

WARNING: OBEY THESE SPECIAL PRECAUTIONS WHEN YOU DO THIS PROCEDURE:

– PREVENT ALL MAINTENANCE PROCEDURES NEARER THAN 5M (13.5 FT) TO THE WORKING AREA OF THE AIRCRAFT.

– STOP ALL REFUELING, ALL REPAIRS ON FUEL AND HYDRAULIC SYSTEMS, AND ALL PROCEDURES THAT USE FLAMMABLE MATERIALS SUCH AS CLEANING AND DE–ICING MATERIALS. MAKE SURE THAT NO PERSONS CONNECT/DISCONNECT THE GROUND POWER CONNECTOR. – MAKE SURE THAT NO PERSONS SMOKE, AND THAT THERE ARE NO FLAMES, IN A RADIUS OF 15M (50 FT) OF THE REPLENISHING EQUIPMENT.

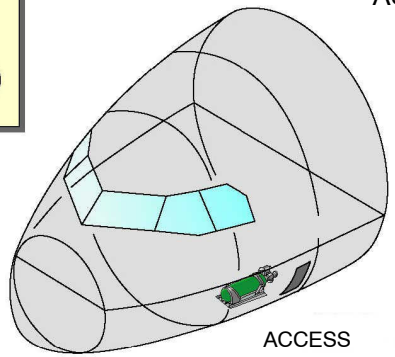
– USE ONLY TOOLS/GROUND SERVICING EQUIPMENT MADE SPECIALLY FOR OXYGEN SYSTEMS.

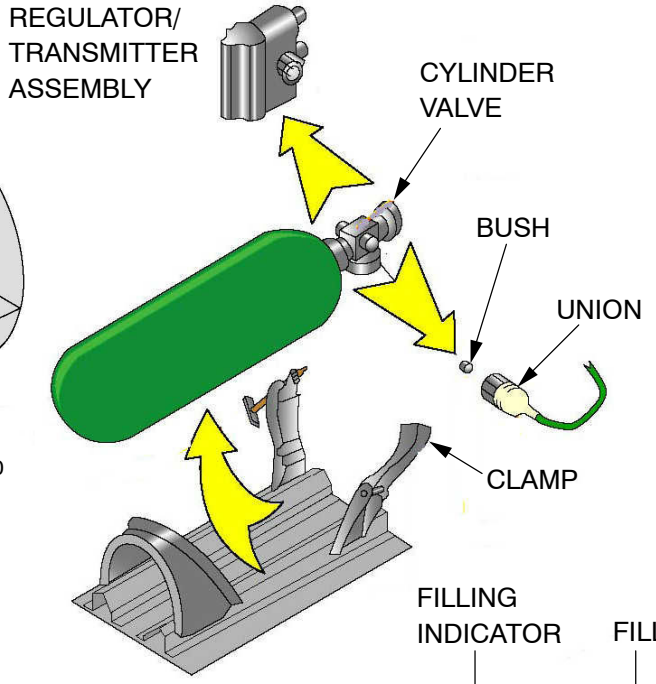
– MAKE SURE THAT YOUR HANDS AND ALL THE TOOLS/GROUND SERVICING EQUIPMENT ARE CLEAN. THIS WILL PREVENT CONTAMINATION OF THE OXYGEN SYSTEM.

– CAREFULLY OBEY THE REPLENISHING INSTRUCTIONS. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE A FIRE OR AN EXPLOSION.

– MAKE SURE THAT THERE IS A GOOD FLOW OF AIR THROUGH THE WORK AREA TO PREVENT A CONCENTRATION OF OXYGEN.

– DURING THIS PROCEDURE, MAKE SURE THAT THERE ARE NOT PASSENGERS IN THE AIRCRAFT.





REF TEMPERATURE*		°C	-10	0	10	20	30	40	50
		°F	14	32	50	68	86	104	122
MIN** BOTTLE PRESS (PSI)	2 CREW MEMBERS		656	681	706	731	756	781	806
	2 CREW MEMBERS + 1 OBS		861	893	926	959	992	1024	1057
	2 CREW MEMBERS + 2 OBS		1090	1132	1173	1215	1256	1298	1339

MINIMUM FLIGHT CREW OXYGEN PRESSURE

***REF TEMPERATURE:**

-ON GROUND: (OAT + CAB TEMP) / 2

-IN FLIGHT: CAB TEMP(° C) -10° C

OR CAB TEMP(° F) -18° F

****MINIMUM BOTTLE PRESSURE TO COVER:**

-PREFLIGHT CHECKS

-USAGE OF OXYGEN WHEN ONLY ONE PILOT IS IN THE COCKPIT

-UNUSABLE QUANTITY (TO ENSURE REGULATOR FUNCTIONING MIN PRESSURE)

-NORMAL SYSTEM LEAKAGE

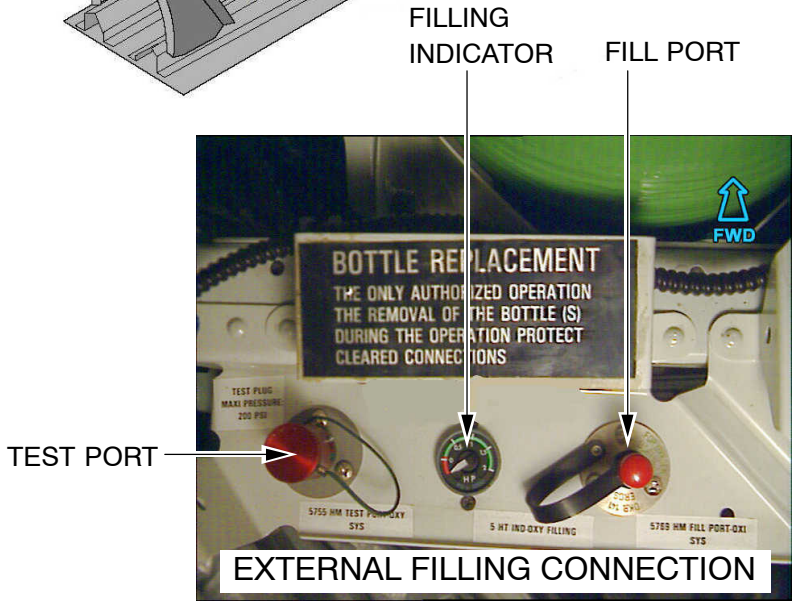


Figure 11 Servicing

ATA 35 OXYGEN

35–20 PASSENGER OXYGEN

GENERAL DESCRIPTION

Purpose

The masks are presented automatically when the cabin altitude is higher than 14000 feet or manually on crew action through the MASK MANUAL ON P/BSW.

The passenger ”SYS ON” indicator light comes on white when the Passenger Oxygen System is electrically operated.

A reset is available to re–arm the electrical system after mask restoring.

Components

The main components are as follows:

- Emergency Oxygen Containers with masks and oxygen generators
- Control switches and relay circuit.

Special Tools

A release tool allows mechanical opening of the door in case of the container door opening system.

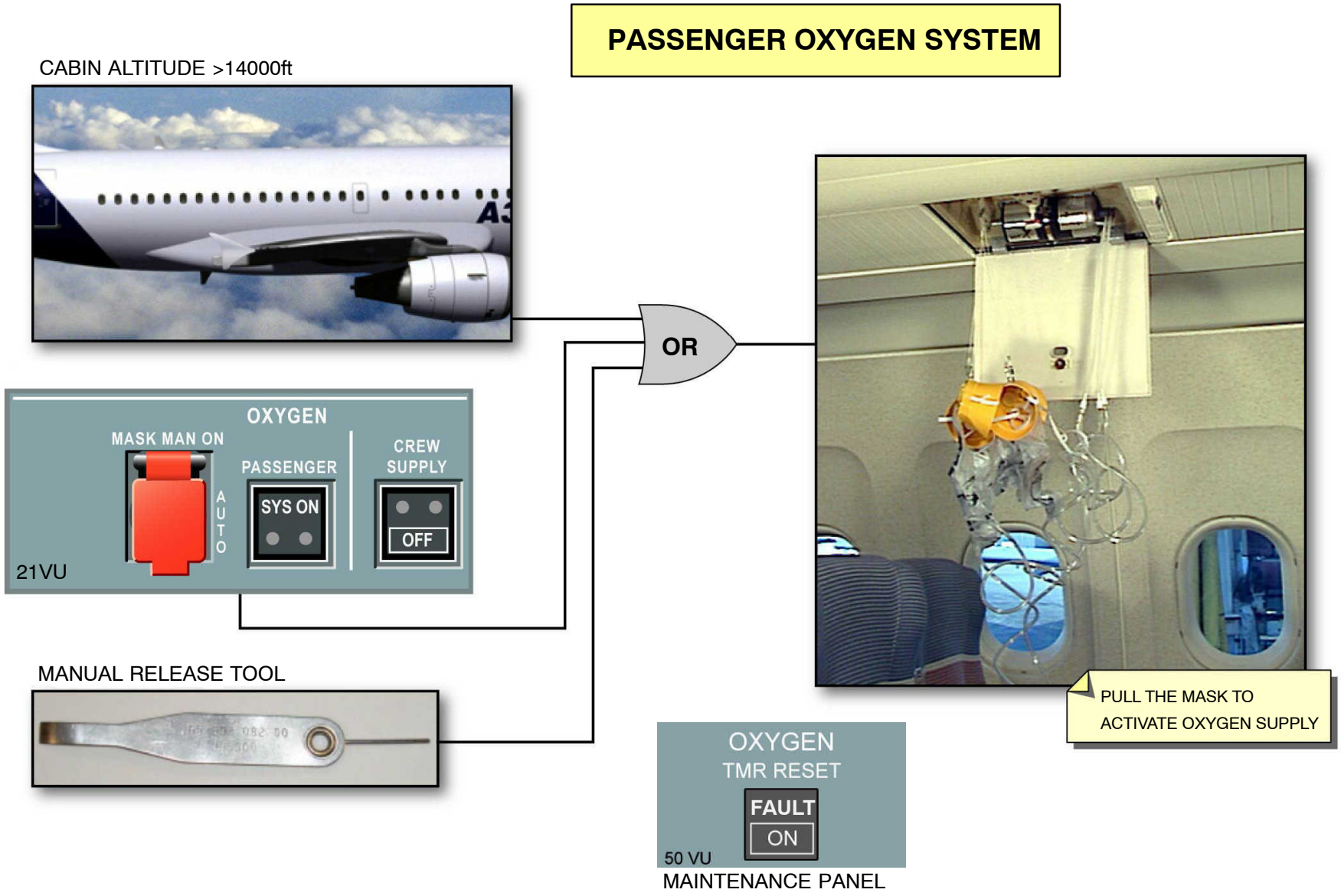


Figure 12 Passenger Oxygen System Presentation

PASSENGER OXYGEN ARCHITECTURE

General

If there is a sudden loss of cabin pressure, chemical oxygen units supply emergency oxygen to the passengers and to cabin attendants. Each chemical oxygen unit is made up of a solid–state chemical oxygen generator and two or more continuous–flow oxygen masks. Flexible supply hoses connect the masks to the chemical oxygen generators.

The Emergency Oxygen Containers are installed:

- above the passenger seats,
- in the lavatories,
- at the cabin attendants stations,
- at the cabin attendants working areas.

Most Containers have four masks, some have three masks. The number of masks depends on location.

To show the passengers how to use the emergency oxygen, demonstration masks are used. The demonstration masks do not operate and are not connected to the system.

Chemical Oxygen Generator

The chemical oxygen generator is a sodium–chlorate core installed in a stainless–steel housing.

The actuator of the chemical generator is a spring–loaded striker and a percussion cap installed at one end of the housing. A release pin holds the striker away from the cap. A lanyard connects the release pin to the oxygen mask.

CAUTION: YOU MUST INSTALL THE SAFETY RINGS OR THE SAFETY PINS IF YOU:

– MOVE THE GENERATORS TO A DIFFERENT LOCATION, OR

– PUT THEM INTO STORAGE.

IF YOU DO NOT, THE GENERATORS CAN OPERATE AND CAUSE DAMAGE.

Altitude Pressure Switch

When the actual cabin pressure decreases to a pressure equivalent of 4260 + 0 –150 m (14000 +0 –500 ft.), the Altitude Pressure Switch 16WR will close. This action operates the emergency oxygen system automatically.

Optional an additional Pressure Switch (16000ft) may be installed and activated by a separate P/BSW in the cockpit (HI ALTITUDE LANDING).

Manual Override Pushbutton

If the altitude pressure switch fails, you can operate the system with the MAN OVRD P/BSW switch 14WR. This switch is installed in the cockpit overhead panel 21VU.

Sequence of Operation

The doors of the emergency oxygen containers open and the masks drop out for the passenger's and the cabin attendant's use. A taped message is transmitted on the passenger address system and the SYS ON indicator light 12WR comes on. The indicator light is installed on the cockpit overhead panel 21VU. The emergency oxygen flows when you pull the oxygen mask towards your face. This starts the chemical oxygen generator which gives approximately 13 minutes supply of oxygen.

After Operation

30 seconds after the altitude pressure switch 16WR has closed, the time delay relays 8WR and 9WR operate. These switch off the supply to the oxygen power relay 10WR.

To reset the system, you press the TMR RESET P/BSW 13WR on the maintenance panel 50VU. The SYS ON indicator light 12WR goes off.

Pre-recorded Announcements

When the system is activated, pre recorded announcements will start automatically.

When you push the PRE REC ANN. STOP P/BSW on the FAP (**F**light **A**ttendant **P**anel) 120RH the announcements stop.

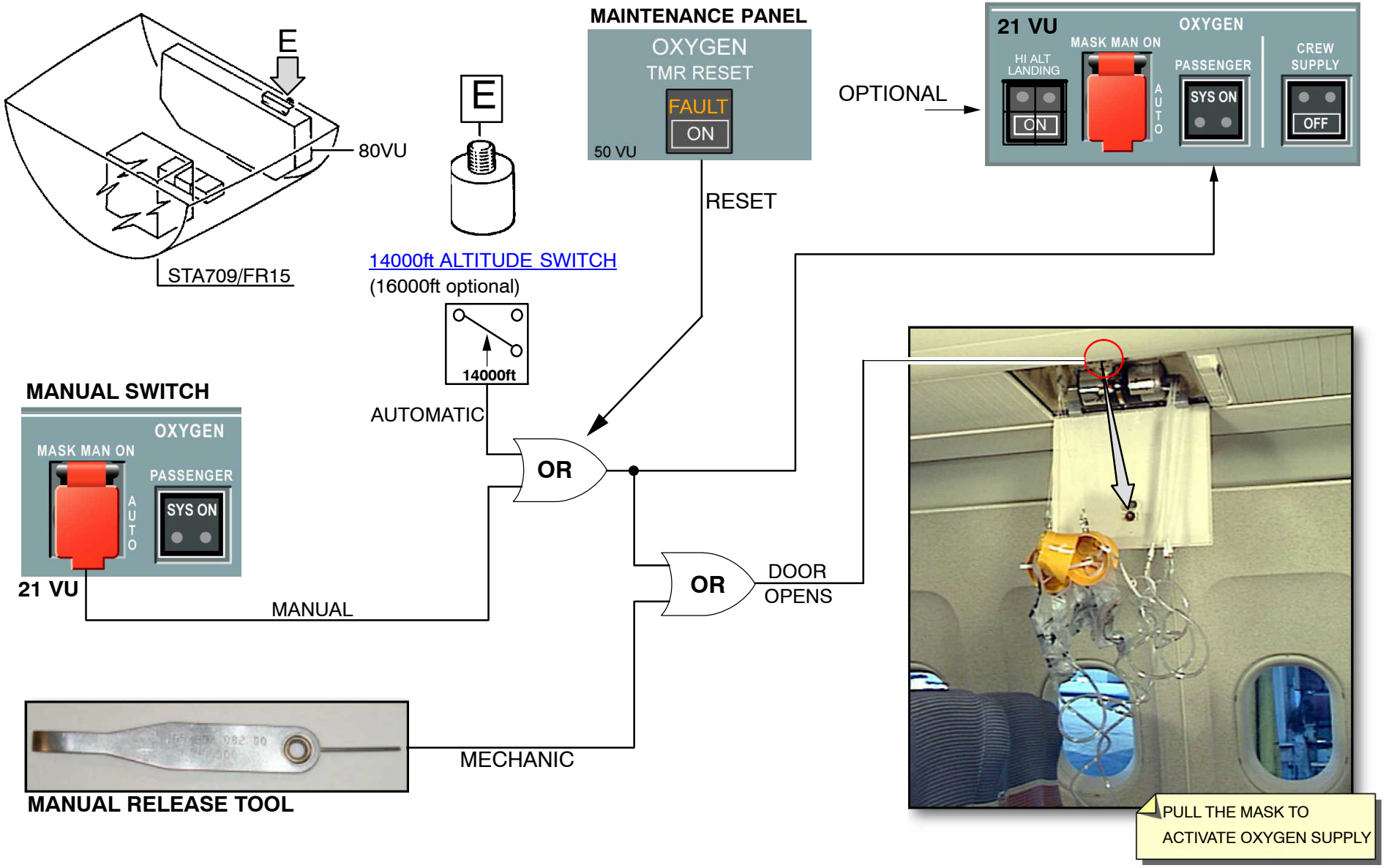


Figure 13 Passenger Oxygen System Architecture

PASSENGER OXYGEN CONTROL

General

The passenger oxygen control and indicating system controls the operation of the passenger oxygen system.

The manual controls and indications for the passenger oxygen system are on the overhead panel 21VU and on the maintenance panel 50VU.

Mask Manual ON Switch

The MASK MAN ON Pushbutton Switch will activate the passenger emergency oxygen system. A safety guard is installed over the P/BSW. It is used as a back-up activation of the system when the altitude pressure switch fails.

This P/BSW will override the altitude pressure switch.

Timer Reset Switch

TMR RESET P/BSW will reset the control circuit after operation. It is located on the maintenance panel.

Chemical Oxygen Generator

When the system is activated, the masks drop down. When a passenger pulls one of these masks, the release pin is removed. The spring loaded striker will activate the Generator.

PASSENGER OXYGEN INDICATION

System ON Indicator Light

The SYS ON indicator light comes on when the emergency oxygen system is operated. It is located on the overhead panel.

Fault Light

The FAULT indicator light on the TMR RESET P/BSW comes on if the 30 second relays (8WR and 9WR) fail. If both time delay relays do not operate 30 seconds after the start of the system operation, the light comes on.

Reset ON Light

The Reset ON Light illuminates when the Timer Reset Switch is pressed.

Flow Indicator

A flow indicator is installed in the flexible hose which is connected to the oxygen mask. The flow indicator will show a green color when there is an oxygen flow.

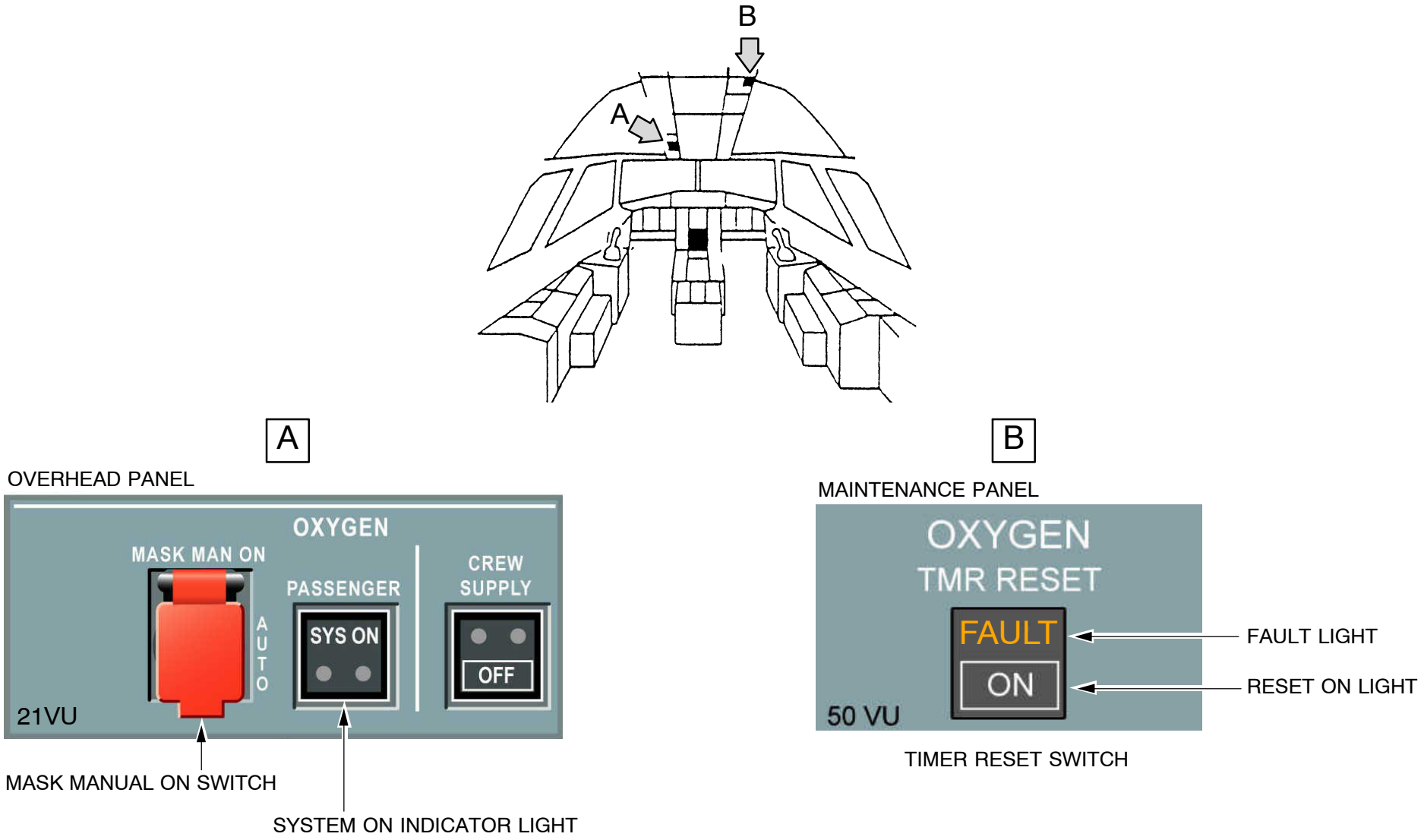


Figure 14 Panel Description

OXYGEN MASK DESCRIPTION

Continuous Flow Oxygen Mask

The oxygen mask is a face cone with a reservoir bag attached to it. The inhale, exhale and diluter valves are installed in the face cone.

A flow indicator is installed in the flexible hose which is connected to the oxygen mask. The flow indicator will show a green color when there is an oxygen flow.

Door and Latch Assembly

The electrical latch assembly holds the door of the emergency oxygen container closed. Spring pressure will open the door when the electrical latch assembly is electrically released. A door stop is installed in the emergency oxygen container to let you do an inspection and a test of the emergency oxygen container. The door stop is turned through 90 degrees to let the door open a few degrees. The oxygen masks will not fall out.

To open the door manually, you can release the electrical latch assembly with a manual release tool.

Operation

When the door latch gets an electrical signal from the oxygen control and actuation circuit the doors of the emergency oxygen containers will open. The oxygen masks will fall out and hang on lanyards near to the person who will use it.

A flow indicator (located in the supply hose) will show a green color when the oxygen flows through it.

The chemical oxygen generators will supply a flow of low pressure oxygen for a minimum time of 13 minutes.

Ground Test

To make sure that the doors of the emergency oxygen containers will open, a periodic ground test is done. To check that the electrical latches operate correctly, you press the MASK MAN ON P/BSW 14WR. So that the oxygen masks do not fall out, the door stops on the emergency containers are pulled down with the fingers and turned 90 degrees to the test position. This will let the doors open a few degrees when the ground test is carried out.

After the test, the doors have to be closed and the door stops turned 90 degrees to the normal position.

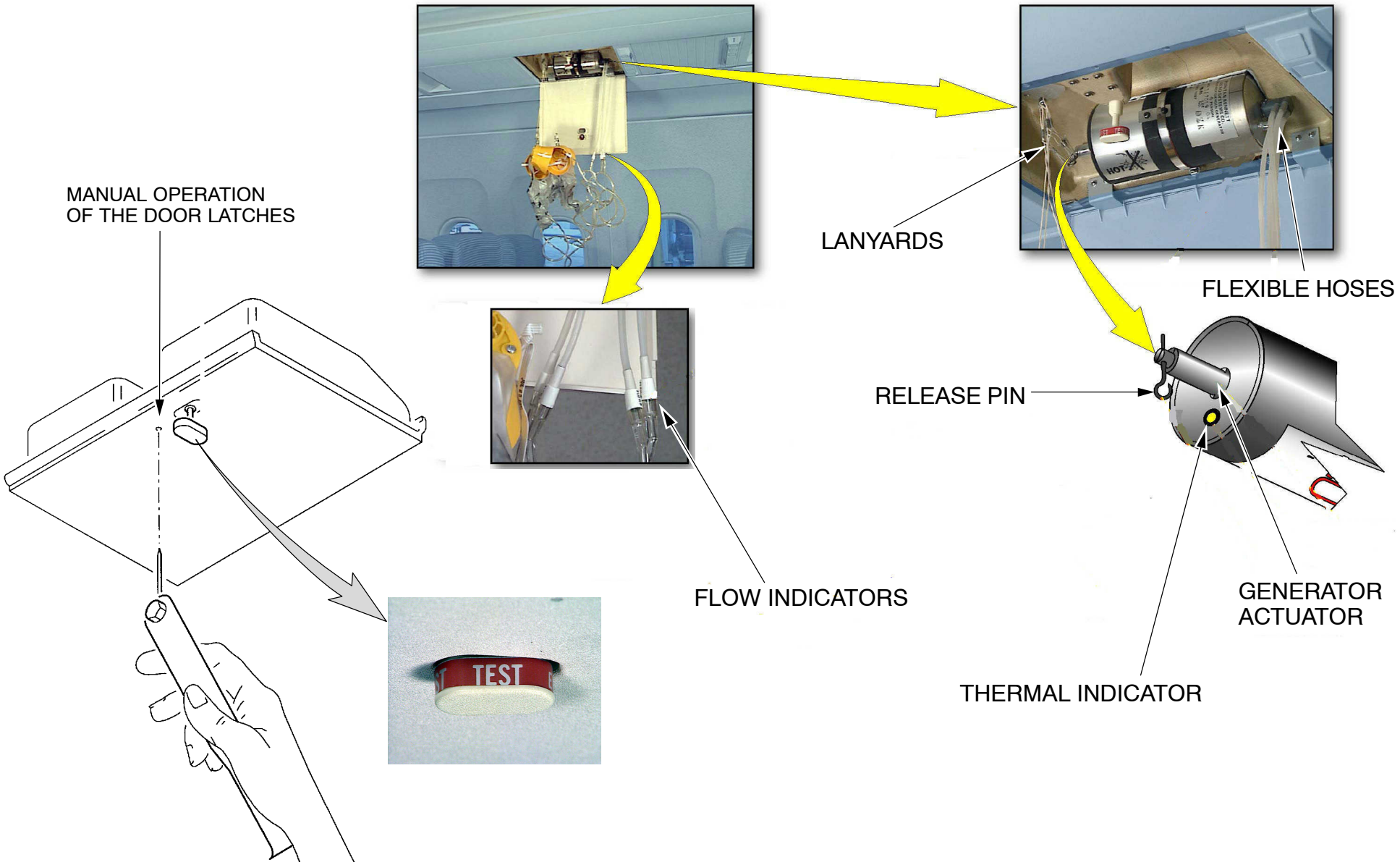


Figure 15 Emergency Oxygen Container

PASSENGER OXYGEN SYSTEM OPERATION

General

The passenger oxygen control and indicating system controls the operation of the passenger oxygen system.

Electrical Schematic

The manual controls and indications for the passenger oxygen system are on the overhead panel 21VU and on the maintenance panel 50VU. The altitude pressure switch 16WR (installed in the avionics compartment) starts the automatic operation of the passenger oxygen system. If the altitude pressure switch does not work, you can press the MASK MAN ON P/BSW 14WR. The TMR RESET P/BSW 13WR lets the pilot reset the controls after the operation of the system. When the system starts to operate, the SYS ON indicator light 12WR comes on and a taped announcement starts. The two time–delay relays 8WR and 9WR de–energize the power relay 10WR after 30 s. If both time delay relays do not operate 30 s. after the start of the system operation, the FAULT indicator light (located on the TMR RESET P/BSW 13WR) comes on.

Reset

When the TMR RESET P/BSW is pushed, the SYS ON indicator light will go off. The ON indicator light (located on the TMR RESET B/BSW) will come on while the TMR RESET P/BSW is pushed.

Pre Recorded Announcement

When you push the PRE REC ANN STOP membrane switch on the FAP 120RH the taped announcements will stop.

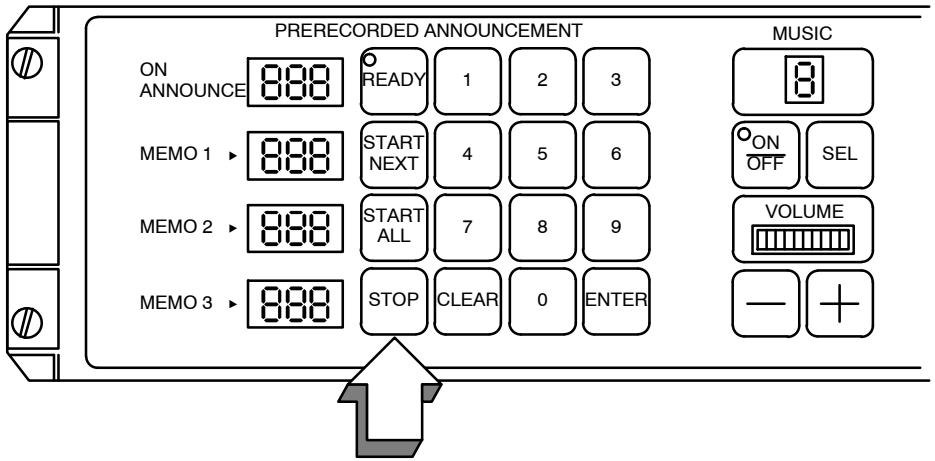


Figure 16 FAP - Pre Recorded Announcement

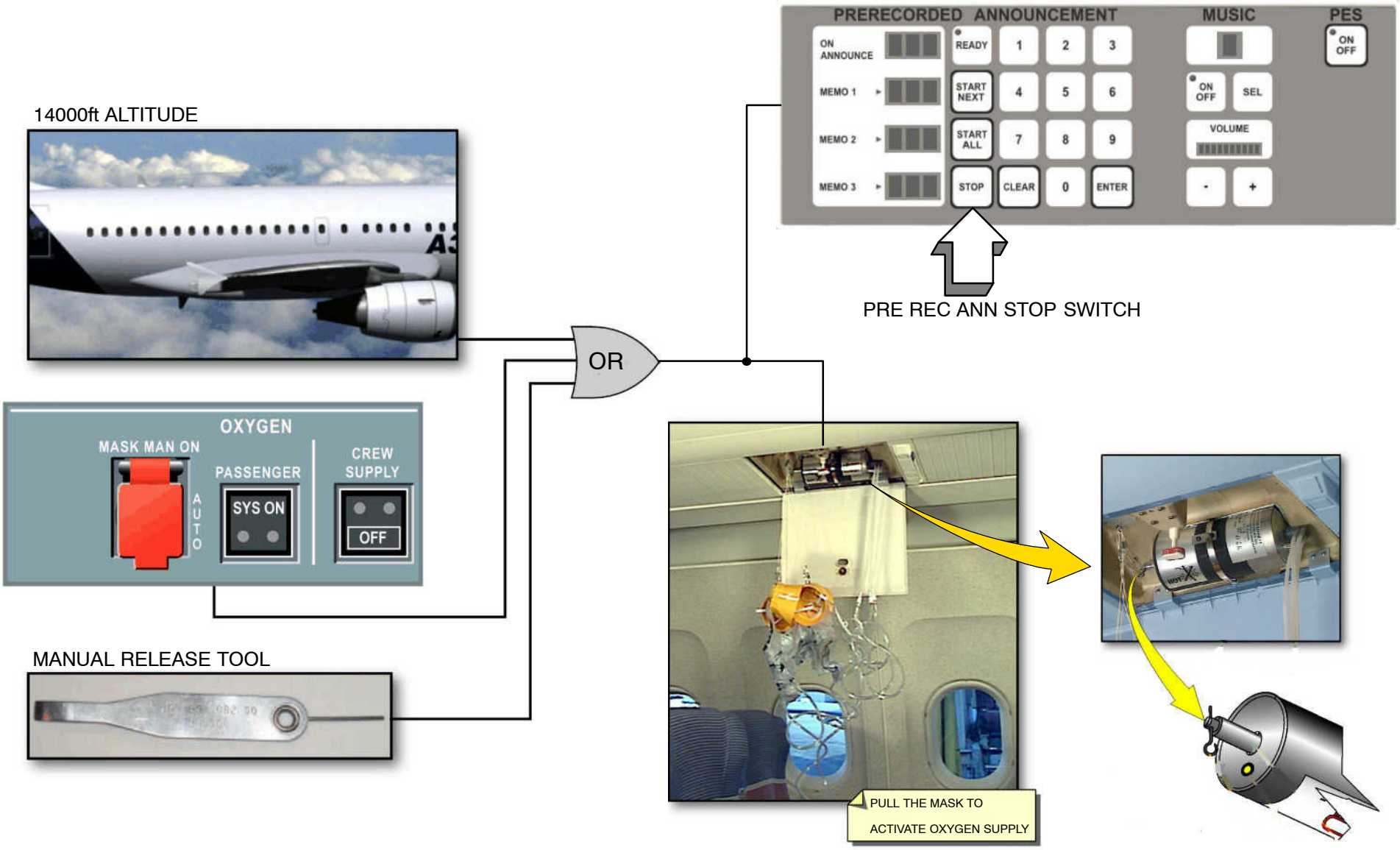


Figure 17 Operation Overview

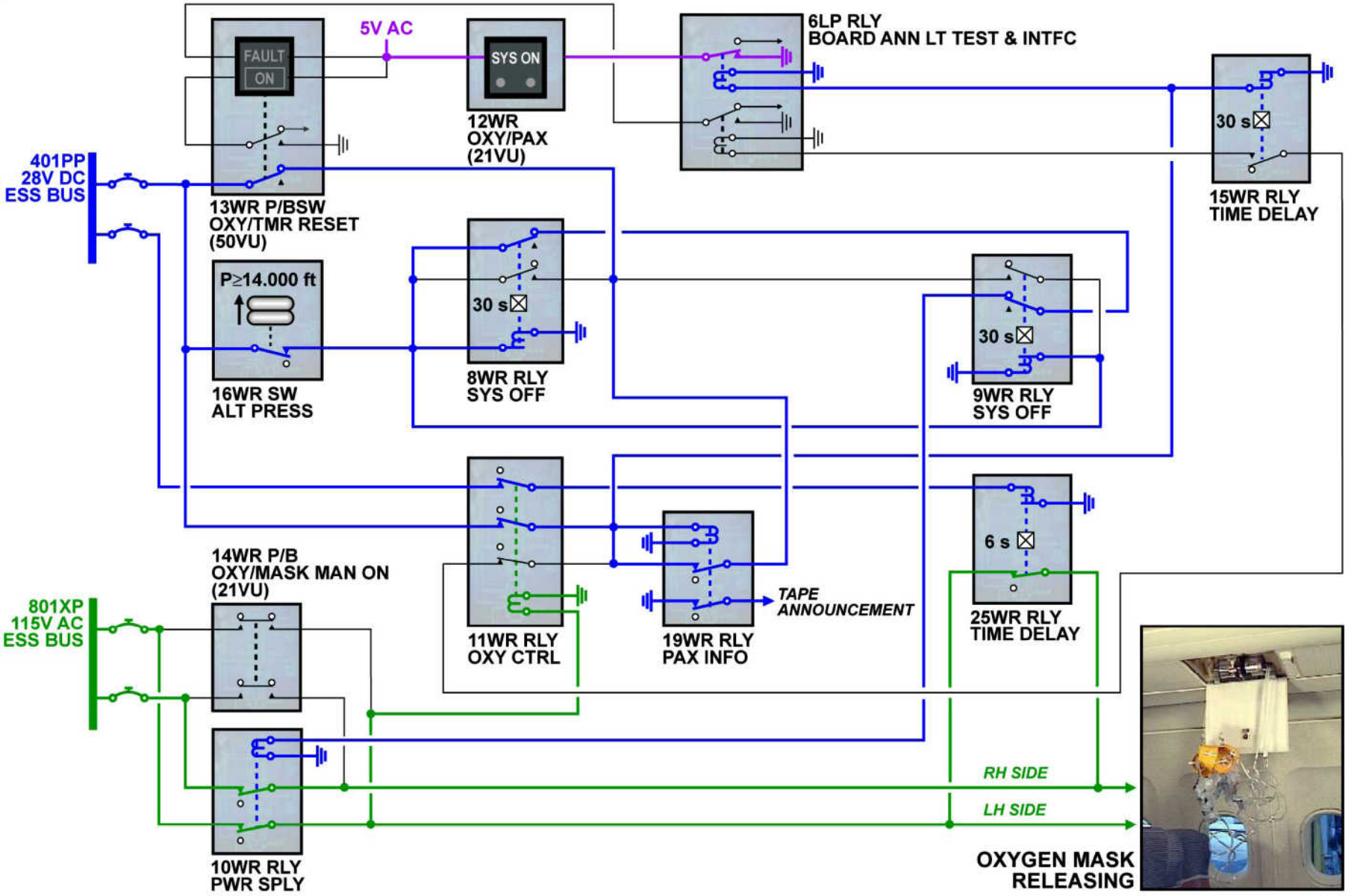


Figure 18 Passenger Oxygen System Automatic Operation

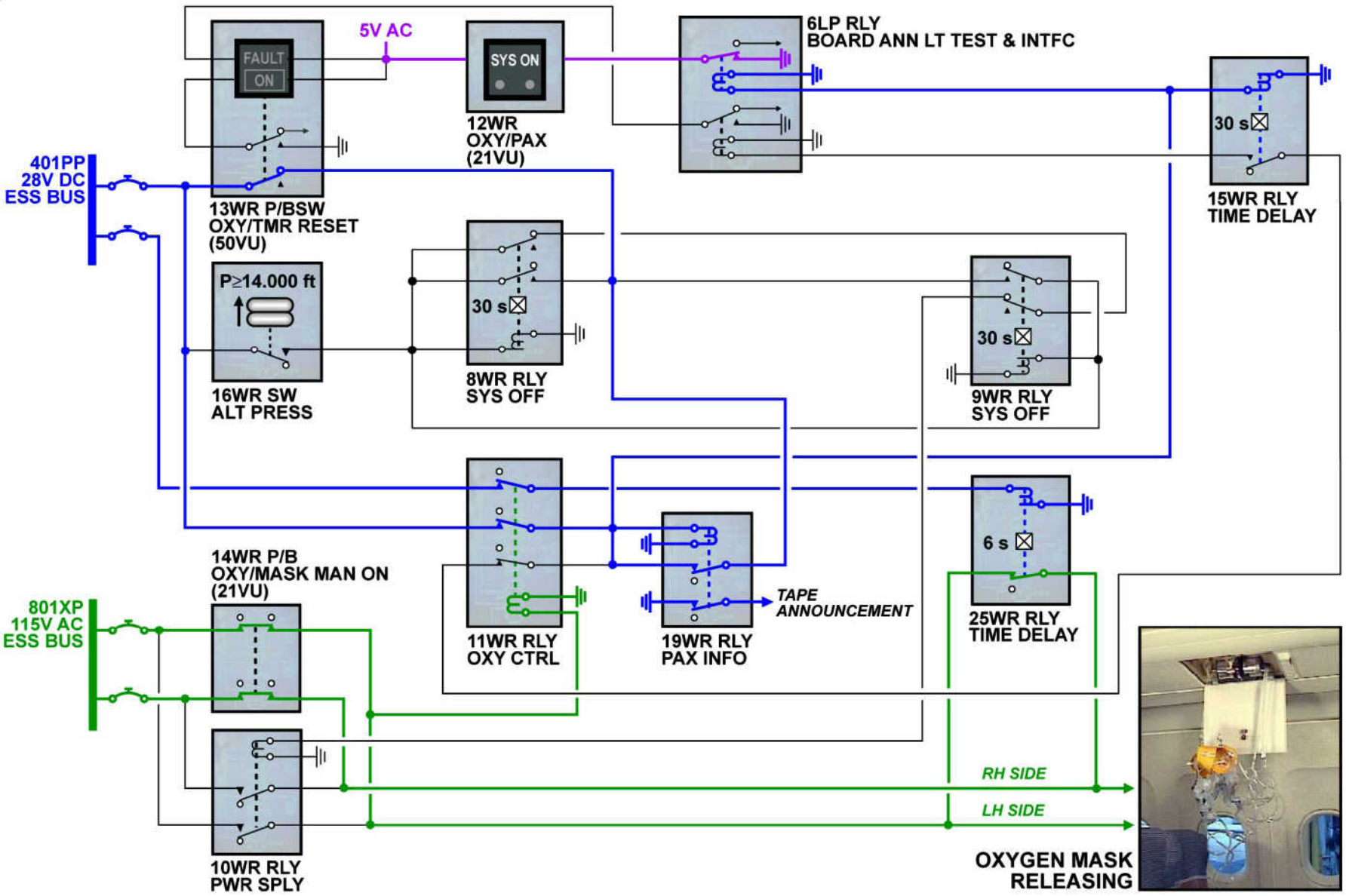


Figure 19 Passenger Oxygen System Manual Operation

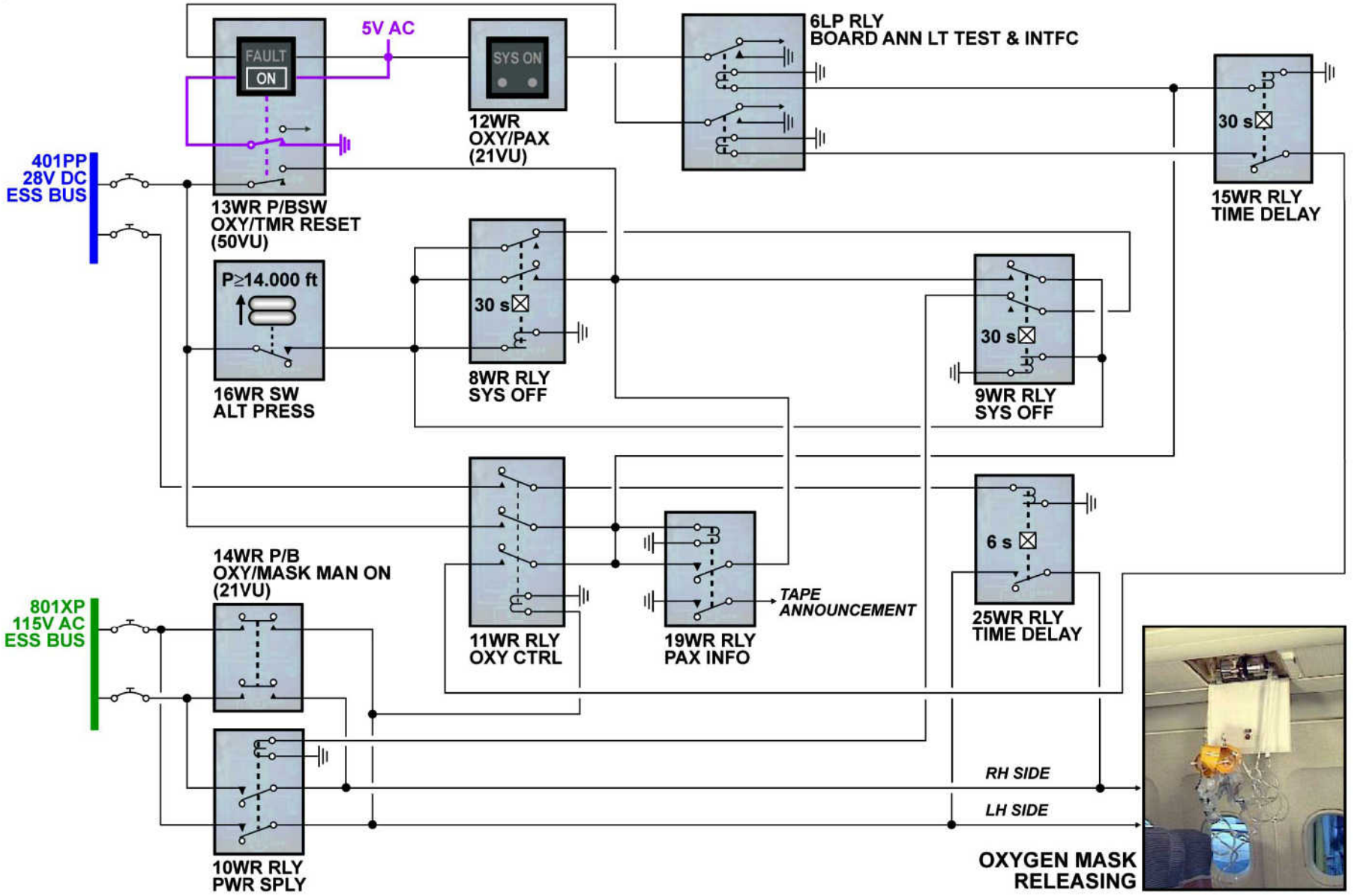


Figure 20 Passenger Oxygen System Reset

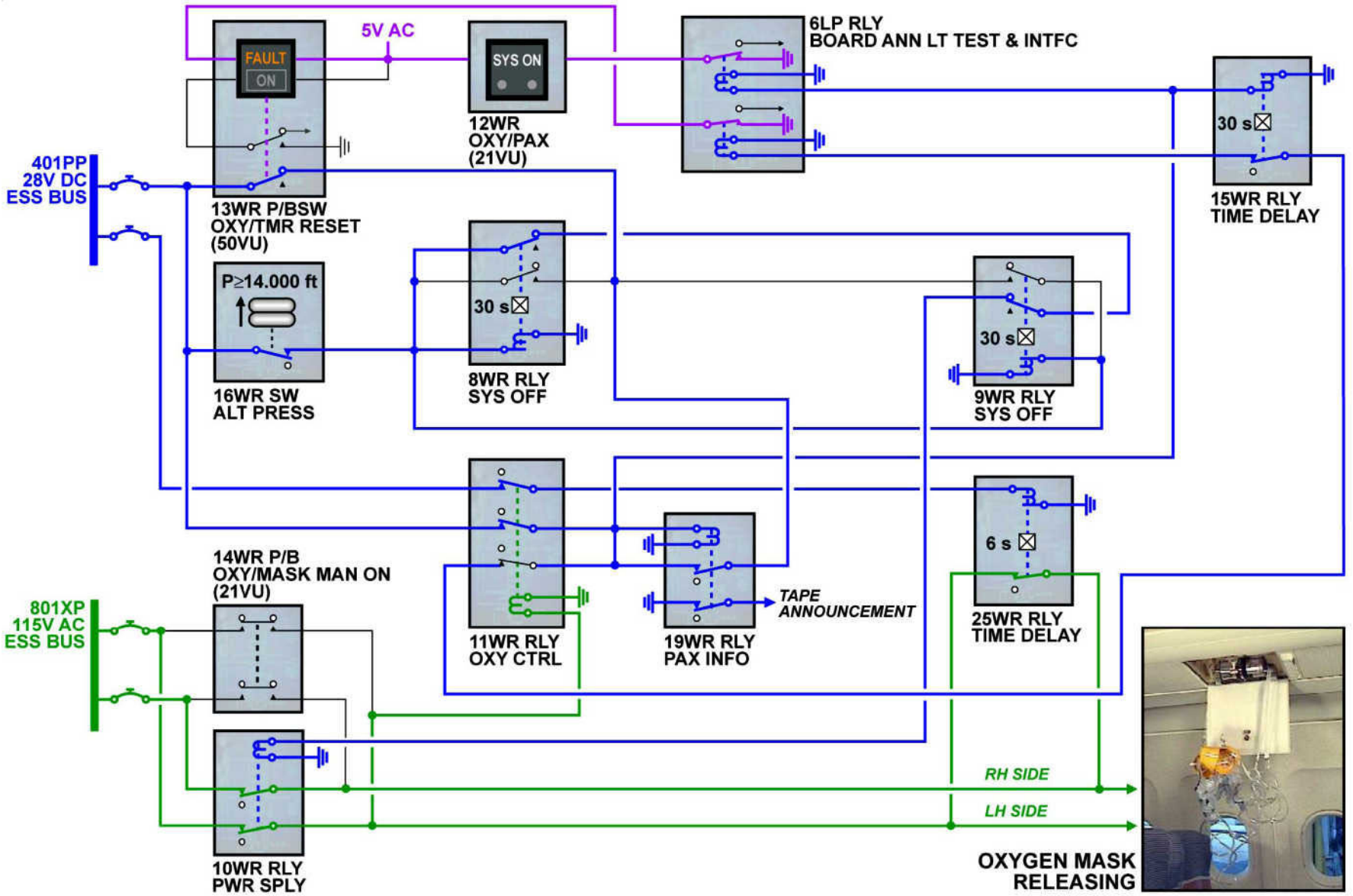


Figure 21 Passenger Oxygen System Fault Operation

EMERGENCY OXYGEN CONTAINER OPERATION

General

The passenger oxygen is supplied from chemical oxygen generators that are installed in emergency oxygen containers.

A container has the following components:

- Oxygen Masks
- Chemical Oxygen Generator.

Location

The emergency oxygen containers are installed:

- above the passenger seats
- at the cabin attendant stations
- in the lavatories
- at the cabin attendant working areas.

Chemical Oxygen Generator

The chemical oxygen generator is a sodium–chlorate core installed in a stainless–steel housing. A thermal insulating material is used between the core and the housing. The actuator of the chemical generator is a spring–loaded striker and a percussion cap installed at one end of the housing. A release pin holds the striker away from the cap. A lanyard connects the release pin to the oxygen mask.

When a person pulls the oxygen mask (in the lavatories there is a red pull flag attached to the lanyard) to their face, this action makes the lanyard pull a release pin from the striker assembly of the chemical oxygen generator. The striker assembly hits the percussion cap and starts the supply of oxygen. The oxygen will flow through the flexible supply hoses to the oxygen mask.

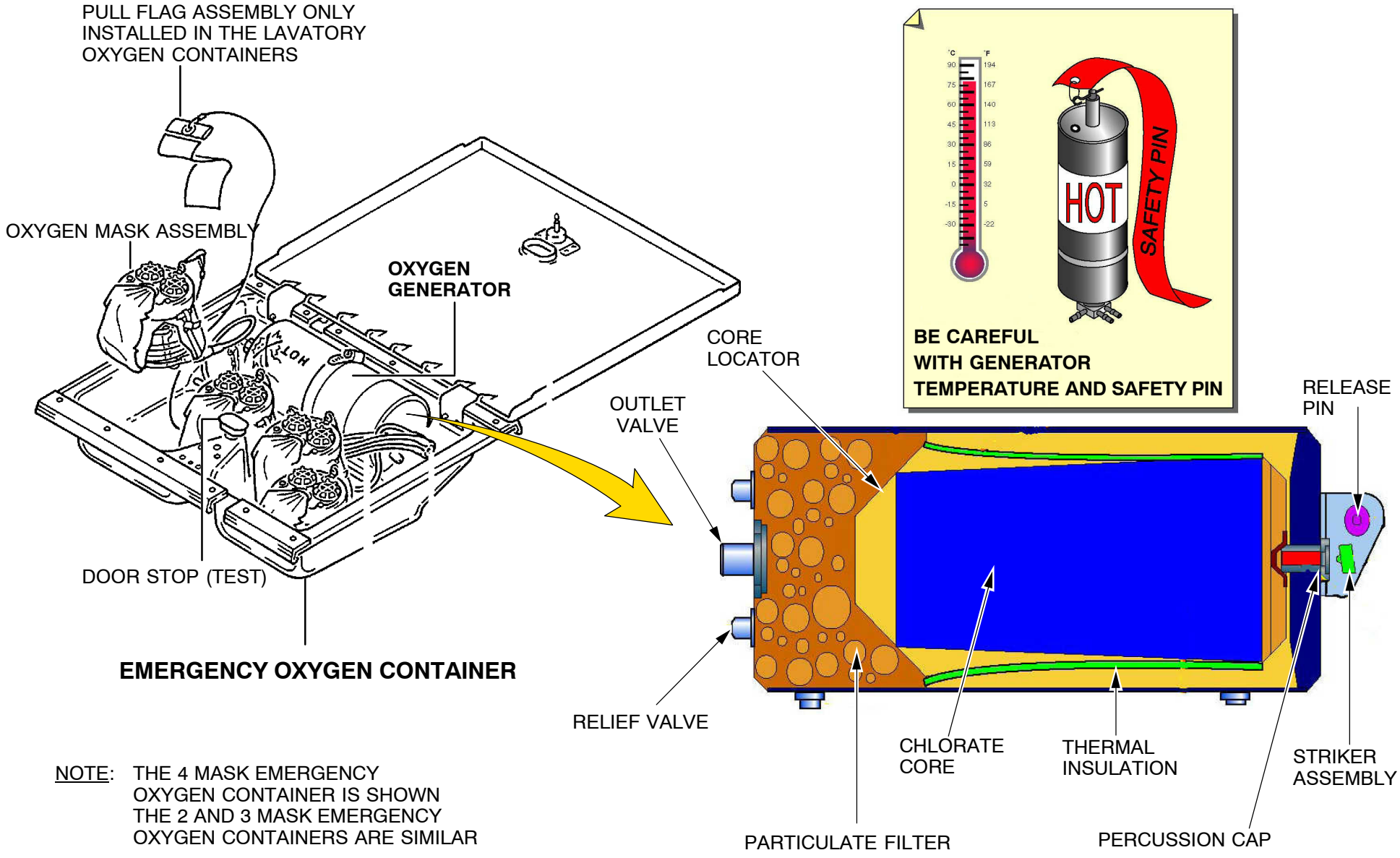
A relief valve is installed at the outlet end of the housing. This will prevent a high–pressure build–up, if a failure of the outlet valve occurs.

A filter assembly is installed in the outlet end of the housing to prevent the contamination of the oxygen supply.

An indicator on the housing will change color (from yellow to black when the chemical oxygen generator is used and the generator is not more usable.

Tubing

A flexible hose connects the oxygen mask to the outlet manifold and the outlet valve supplies oxygen to the oxygen mask. The outlet is installed on the housing.



NOTE: THE 4 MASK EMERGENCY OXYGEN CONTAINER IS SHOWN THE 2 AND 3 MASK EMERGENCY OXYGEN CONTAINERS ARE SIMILAR

Figure 22 Emergency Oxygen Container

35–30 PORTABLE OXYGEN

GENERAL DESCRIPTION

Purpose

The portable oxygen system supplies oxygen to the cabin attendants, the passengers and the crew in an emergency. The portable oxygen system has these subsystems:

- the flight–crew portable device,
- the cabin–attendants portable devices. The flight crew portable device is installed in the console at the RH side of the cockpit. The cabin attendants portable breathing–equipment is installed in several places in the cabin area.

The possible positions are:

- in the galley areas,
- in the attendants seat areas,
- in the overhead stowages,
- in the cabin stowages/doghouses.

Flight Crew Portable Devices

The flight crew portable oxygen will supply one crew member with protected breathing oxygen. It is used when fighting a fire and against the emission of smoke and noxious gas. It will also supply one crew member with emergency oxygen if a failure of the fixed oxygen system occurs when there has been a loss of cabin pressurization.

The oxygen source is a high–pressure oxygen cylinder installed in the cockpit next to panel 702VU. It is held in place by quick–release clamps. The oxygen cylinder will give a 15 min supply of oxygen at 20 l/min.

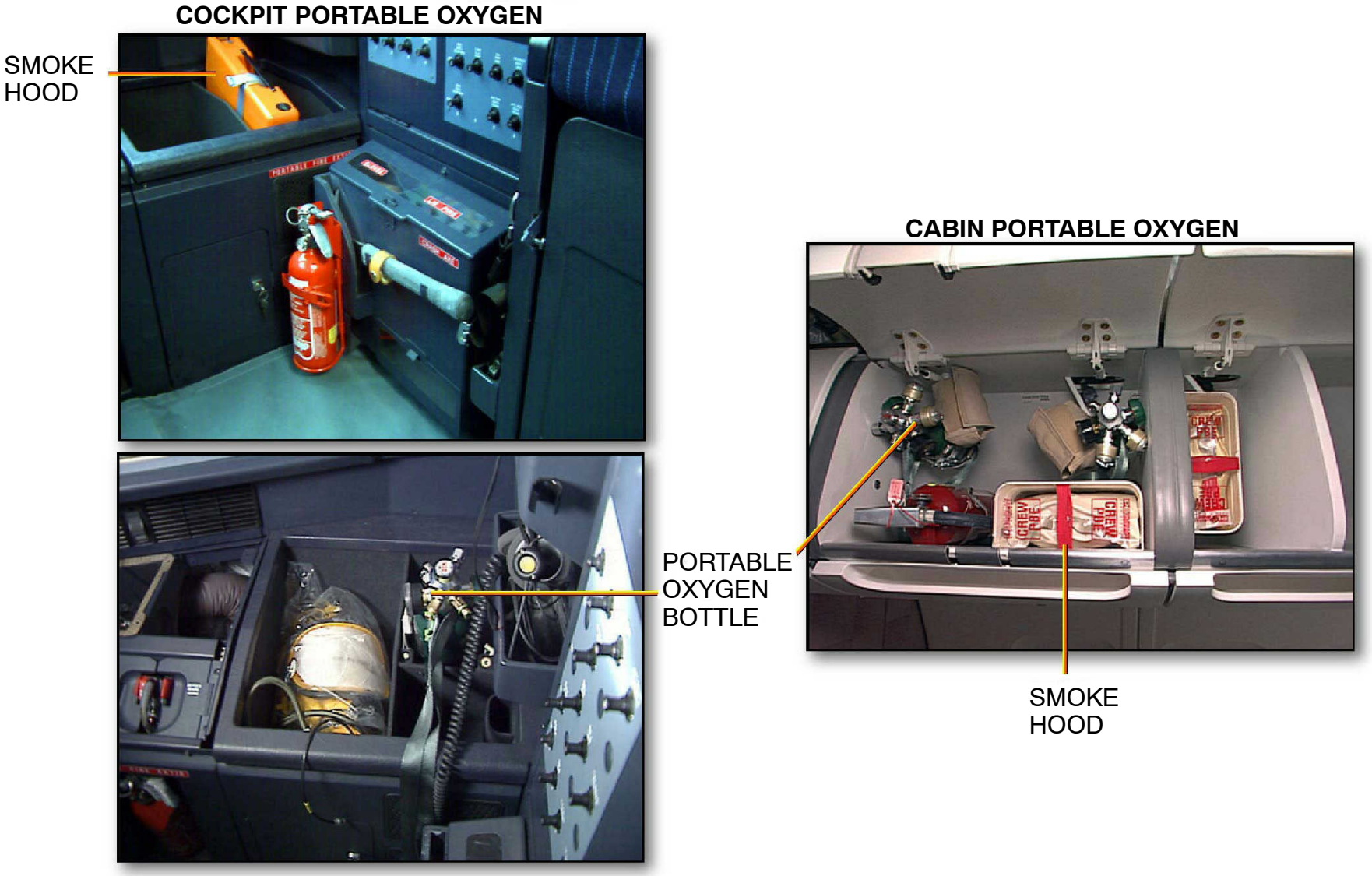


Figure 23 Quick Donning Mask with Portable Oxy. Cylinder

PORTABLE OXYGEN CYLINDER & MASK DESCRIPTION

PORTABLE OXYGEN CYLINDER

General

The oxygen source is a high–pressure oxygen cylinder installed in the cockpit next to panel 702VU. It is held in place by quick release clamps. The oxygen cylinder has a capacity of 311.5 l (11 cubic feet at a pressure of 124 bar (1800 psig). This will give a 15 min supply of oxygen at 20 l/min (7 cubic feet) at 2400 m (8000 ft.).

Components

The oxygen cylinder has a head that is made up of the following components:

- A direct–reading pressure gage to show the cylinder pressure.
- A high–pressure relief valve with a rupture disc. The disc will rupture at a pressure of 186.2 to 206.8 bar (2700 to 3000 psig). This pressure would be the result of an unusual rise in the temperature.
- A rotary ON/OFF valve controls the oxygen flow into the high pressure chamber of the pressure regulator.
- A filling valve is directly connected to the high–pressure chamber of the pressure regulator. This valve permits the filling of the oxygen cylinder at a controlled flow. The filling speed must not be more than 20.7 bar / min (300 psi/min).
- A pressure regulator to give a low–pressure of 4.4 bar (64 psig).
- A low–pressure relief valve which will operate at a pressure of 6.2 to 9.3 bar (90 to 135 psig).

OXYGEN MASK

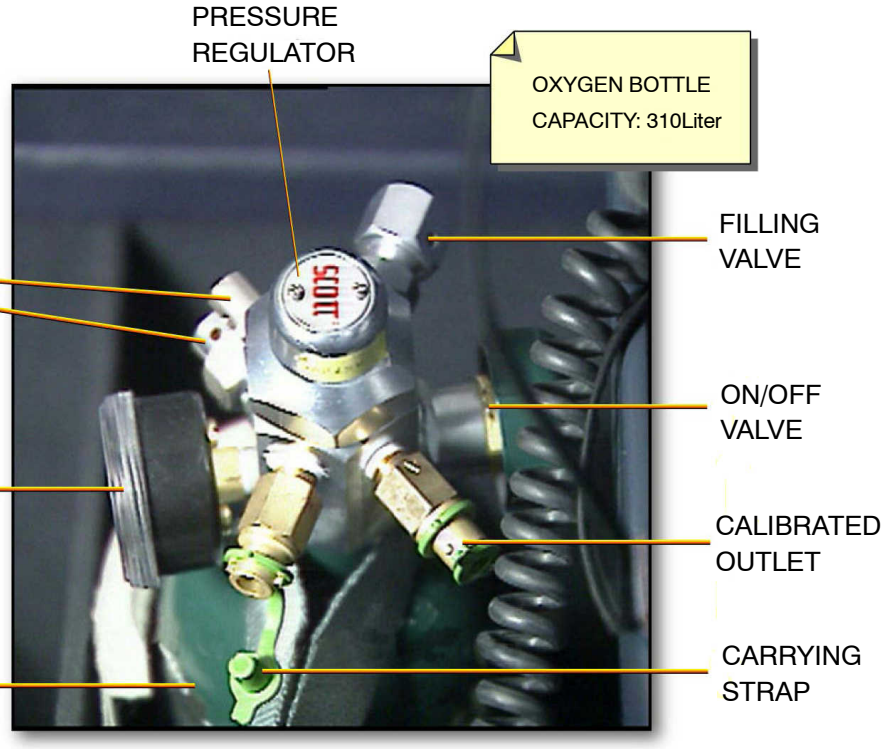
Full Face Mask

A full–face mask of the demand type is connected to the oxygen cylinder which will give protection against smoke and noxious gas. The mask will supply 100% oxygen through the demand regulator installed in the mask. The demand regulator has an aneroid capsule which gives a safety overpressure of approximately 3 mbar from 30,000 ft on.

If the portable full face mask has a failure, a flight crew member can connect his own full face quick donning mask. The quick–donning mask has to be set to 100% oxygen.

Communication

A flight crew member can communicate with the other crew members through the microphone and communication cable installed in the mask.



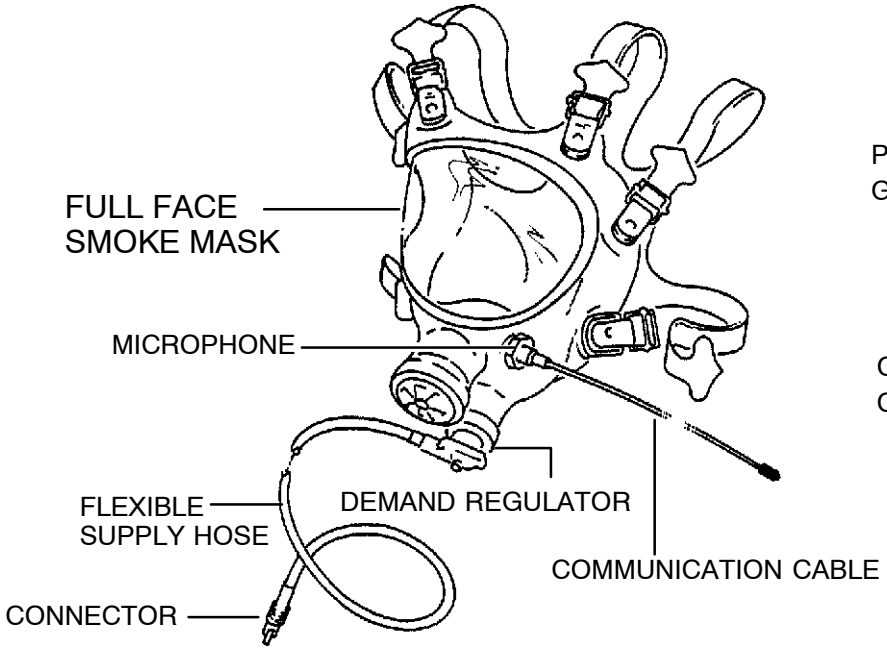


Figure 24 Oxygen Cylinder and Oxygen Mask

FLIGHT CREW BREATHING HOOD SYSTEM DESCRIPTION

General

The flight crew emergency breathing hood system provides protection to the eyes and respiratory system for crew members. It is used when fighting a fire, against the emission of smoke and noxious gas. The breathing hood makes sure that the crew has an air supply of more than 20 minutes.

Breathing Hood Container

The breathing hood container is installed in the cockpit in the Raft Console 702VU. The container is provided with a good–condition indicator and tamper seal used for the preflight inspection.

Storage

The complete hood is vacuum–packed in a transport/storage container. The breathing hood is stored under vacuum in a specially designed sachet. The sachet is mounted inside a box in such a way that, after opening the box, the hood is removed and the vacuum protection is automatically opened with a single movement.

Box Description

This box made of a polycarbonate is composed of two parts (cover and container) equipped with:

- a good–condition indicator on the lid (operational color: yellow)
- a handle
- a hinge for jointing the container and the cover
- a pictogram which describes the utilization procedure
- an identification plate, located at the back of the container which gives the date of its manufacture. To gain access to the aluminized bag it is necessary to break the lead seal and open the box cover.

Breathing Hood

The hood is provided with:

- the collar seal at the level of the neck.
- the straps attached to the hood maintains the oronasal (or inner) mask around the back of the user head.
- a relief valve in the hood which keeps the overpressure in the hood at a comfortable level.

Oronasal (or inner) Mask

The oronasal mask is provided with:

- an anti–suffocation valve, operated by a higher breathing resistance. The user can inhale through this valve from the volume between head and hood. In case of empty breathing bag, however this makes it possible to inhale from the outside closed–loop breathing system without lifting the mask or doffing the hood.
- a speech transmitter located in front of the oronasal mask.

KO2 Cartridge.

This cartridge is provided with:

- An attached breathing bag equipped with a volume–controlled relief valve. This valve keeps the breathing resistance for exhalation on the low level even in case of a filled breathing bag.
- A starter activated by a lanyard.
- A fold tube (or breathing hose) for the liaison with the oronasal mask.
- A belt which holds the cartridge on the hood.

The technical characteristics are:

- Duration: more than 20 minutes.
- Bag capacity: 6 l
- Operational temperature: –10°C to +50°C.

Operation/Control

The protective breathing hood works with a closed breathing circuit. The expired air will be regenerated, enriched with oxygen, and inhaled again.

The oxygen is generated in exothermic chemical reaction between the potassium peroxide (KO2), the humidity, and the carbon dioxide (CO2) in the expired air. This reaction releases heat.

Indicating

If the yellow indicator inside the box shows the serviceability of the breathing hood, in addition the tamper seal indicates that the container has not been opened. If the yellow indicator is not apparent or if the tamper seal is broken the protective breathing equipment must be replaced.

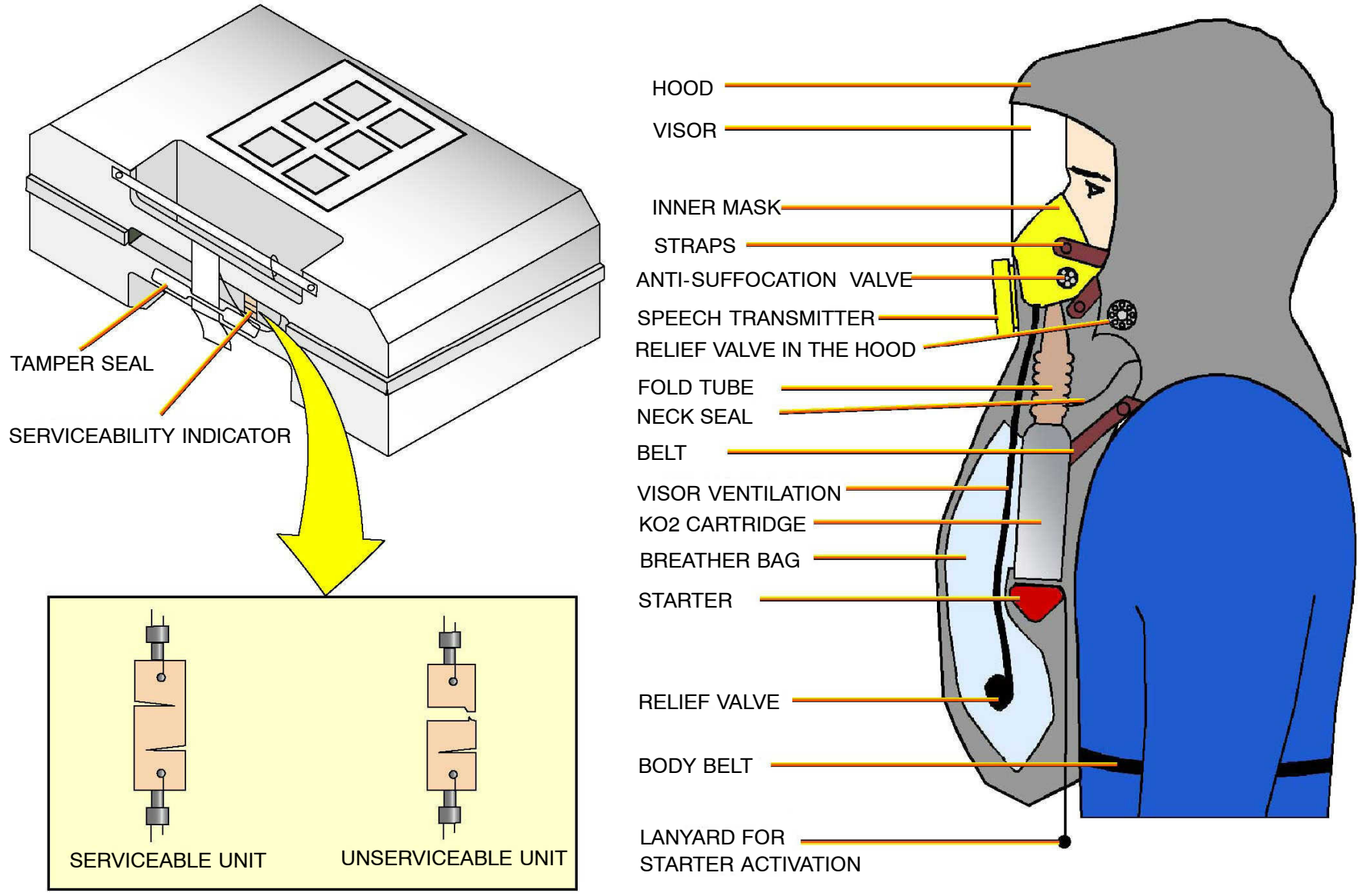


Figure 25 Breathing Hood and Container

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