ACRONYM LIST

ALTI	Altitude
CAS	Crew Alerting System
CB	Circuit Breaker
ECS	Environmental Control System
EFCU	Electrical Flow Control Unit
HP	High Pressure
LP	Low Pressure
MDU	Multifunction Display Unit
NAV	Navigation
O2	Oxygen
O'RIDE	Override
PAX	Passenger
PSU	Passenger Supply Unit
SSPC	Solid State Power Controllers
QTY	Quantity

INTRODUCTION

The Falcon 7X is equipped with an oxygen system supplying oxygen to the passengers and the crew members in case of:

- Cabin depressurization,
- Smoke or noxious gas in the cabin,
- Need for first aid.

The oxygen system is designed for 2 crew members and 19 passengers (including potential third crew member).

Smoke protection is provided to the crew members thanks to detachable goggles attached to the oxygen masks.

A protective-breathing device fitted with an oxygen generator allows inspection of the cabin or the baggage compartment in case of fire or smoke.

The oxygen system includes following option:

- Second oxygen cylinder.

FLIGHT DECK OVERVIEW

CONTROLS

Crew control of the oxygen system is performed via:
- The PAX OXYGEN portion of the Overhead Panel,
- Controls on the mask stowage boxes for the three crew OXYGEN MASKS,
- Mask / Boom selector on Audio Panel,
- A comfort button on each crew mask.

INDICATIONS

Cockpit indications related to oxygen system are displayed:
- On the ECS synoptic page,
- On a blinker on the crew OXYGEN MASK storage box,
- On the ENG CAS window for CAS messages,
- On the STATus synoptic / FAULT MSGS Tab or fault messages.

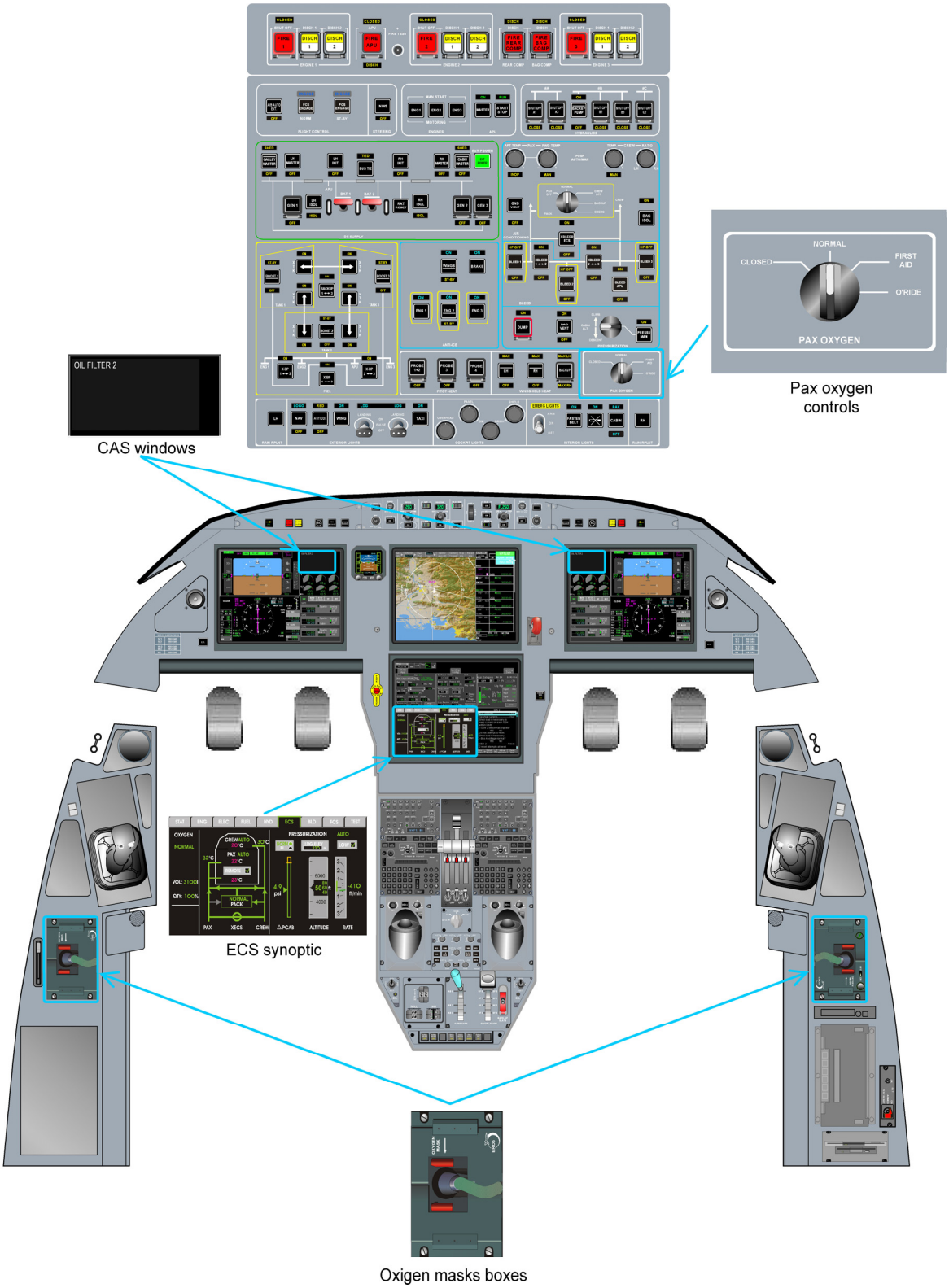


FIGURE 02-35-05-00 – FLIGHT DECK OVERVIEW

GENERAL

The airplane oxygen system is composed of:

- A cylinder providing high pressure oxygen storage and featuring a pressure reductor,
- The distribution system, delivering oxygen at a reduced pressure,
- Three crew members quick-donning oxygen masks,
- The Passengers oxygen masks (in drop out boxes),
- Two quick connectors in the PSU of the cabin for first aid masks connection and two first aid masks.

Additionally, two portable oxygen sources are available:

- One protective breathing equipment (smoke hood), with an oxygen generator,
- One portable oxygen bottle fitted with two passenger mask couplings.

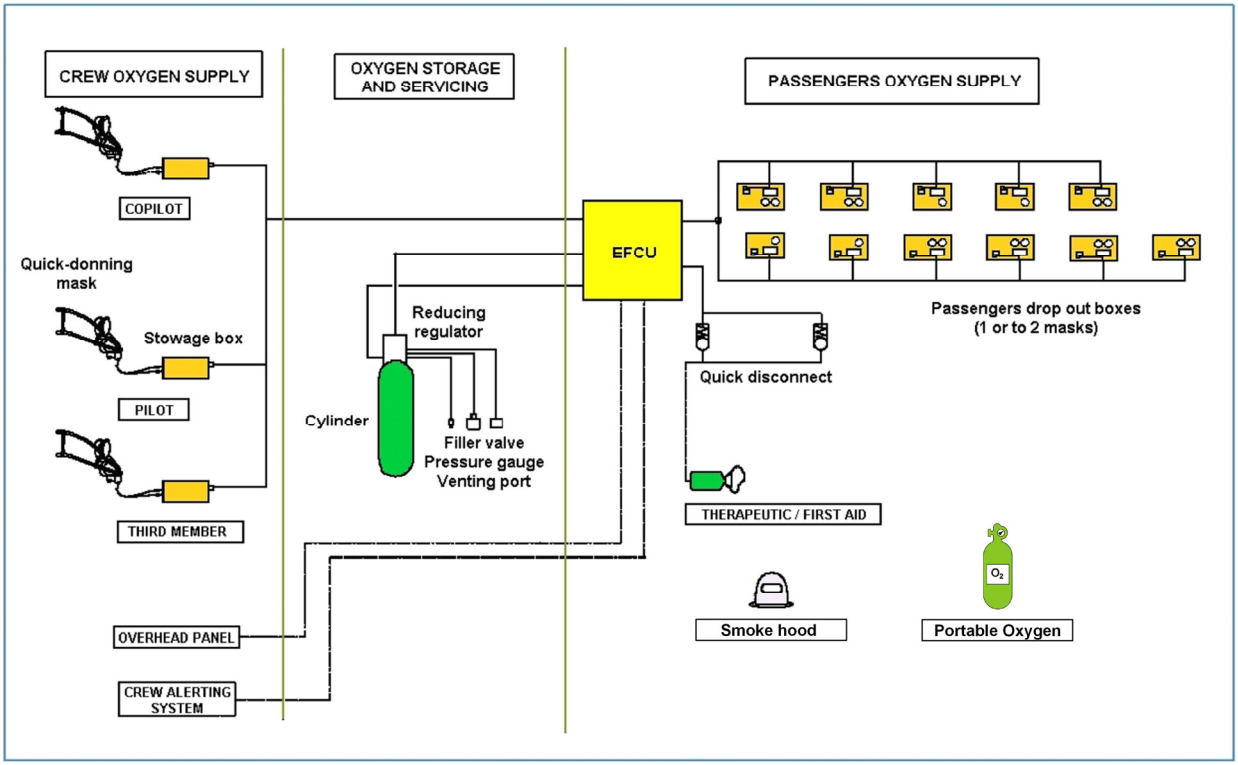


FIGURE 02-35-10-00 - OXYGEN DISTRIBUTION DIAGRAM

CYLINDER	- Single high pressure oxygen cylinder - Capacity of 3,100 l
PROTECTIVE BREATHING EQUIPMENT	- Protective breathing equipment fitted with an oxygen generator - Capacity 90 l - Oxygen supply time: 15 min regardless of work load
PORTABLE BOTTLE	- Portable oxygen bottle fitted with two flow outlets - Capacity 311 l

SYSTEM COMPONENTS

CYLINDER

The cylinder stores oxygen at high pressure.
It is fitted with a pressure reducing regulator.

ELECTRICAL FLOW CONTROL UNIT EFCU

The Electrical Flow Control Unit is supplied by reduced pressure from the oxygen cylinder.
The EFCU performs following functions:

- Supply reduced pressure oxygen directly into the crew circuit,
- Supply oxygen to the passengers drop out boxes and masks as well as to the therapeutic/first aid connectors, ensuring:
  - Control of the automatic drop-out of the passengers masks at 14,500 ft ±500ft,
  - Optimization of the passengers oxygen consumption,
- Monitor the system.

For the passenger oxygen delivery, the EFCU modes, set on the Overhead Panel are:

- CLOSED mode:
  - The passenger system is fully isolated from the oxygen source, (crew oxygen is still available),
- NORMAL mode:
  - Normal in-flight position for automatic deployment of the passenger oxygen masks in case of depressurization,
- FIRST AID mode:
  - This mode controls the delivery of oxygen to quick connectors for first-aid masks. (Automatic deployment of the passenger oxygen masks is still active),
- OVERRIDE mode:
  - This mode triggers the deployment of the passenger oxygen masks at any cabin altitude and the maximum oxygen pressure supply within the system.

➢ *Refer to DESCRIPTION SUPPLEMENTARY INFORMATION for additional information on EFCU modes.*

QUICK-DONNING OXYGEN SYSTEM

The three crew oxygen masks are quick-donning type.

Oxygen is provided directly from cylinder to the stowage boxes via Electrical Flow Control Unit and supplies the masks through low pressure lines.

Three modes of operation are available:

- Normal mode: provides automatic regulation of needed oxygen depending on cabin altitude, to reduce onboard oxygen consumption while providing protection at high cabin altitude. This function is ensured by an electronic card,
- 100% mode: provides 100 % of oxygen regardless of the cabin altitude. This mode is completely pneumatic,
- Emergency mode: provides pure oxygen. Emergency operation provides oxygen overpressure for protection against smoke and toxic gases, whatever the cabin altitude.

Main components of each mask are:

- An inflatable harness,
- An oro-nasal face piece including a comfortable face seal,
- Detachable smoke goggles ensuring smoke protection,
- A microphone for communication,
- A miniaturized regulator.

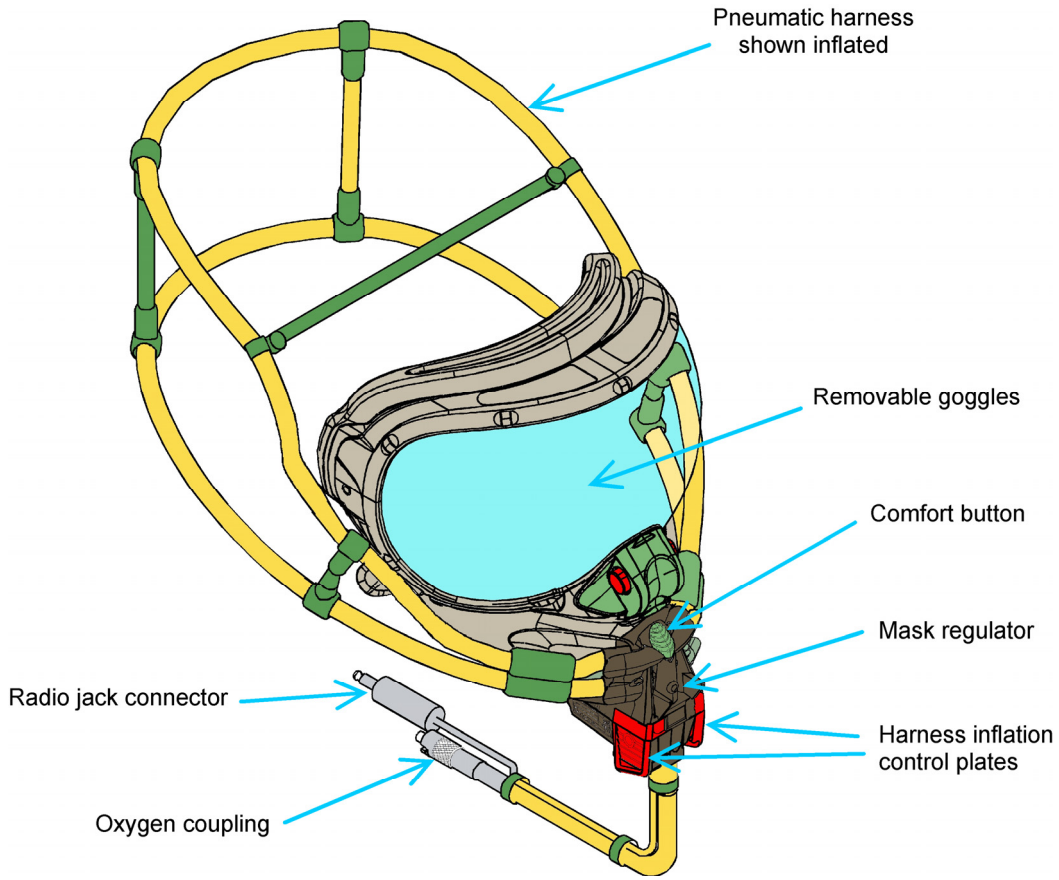


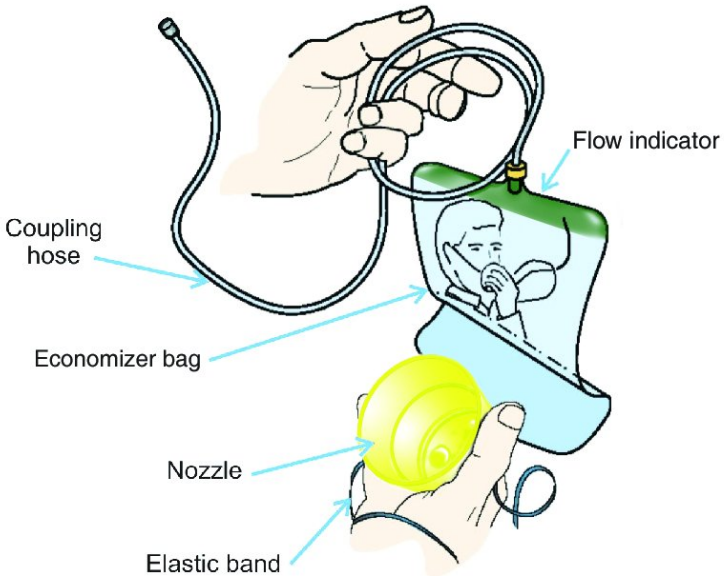
FIGURE 02-35-10-01 - OXYGEN MASK WITH SMOKE GOGGLES

➢ *Refer to DESCRIPTION SUPPLEMENTARY INFORMATION for additional information.*

PASSENGERS OXYGEN MASKS

Passenger O2 masks are continuous flow type (with 3 valves and an economizer bag).

Oxygen is distributed from EFCU to passenger's oxygen drop-out boxes via low-pressure lines.



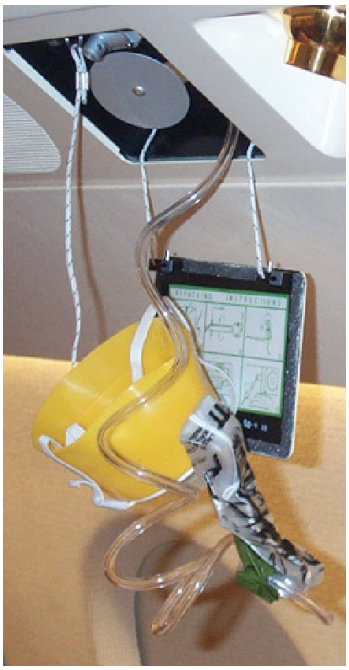


FIGURE 02-35-10-02 PASSENGER OXYGEN MASK

PROTECTIVE BREATHING EQUIPMENT

A protective-breathing device fitted with a smoke hood and an oxygen generator is provided to allow inspection of the cabin or the baggage compartment in case of fire or smoke.
It ensures 15 minutes of oxygen supply.

FIGURE 02-35-10-03 - PROTECTIVE BREATHING EQUIPMENT

➢ *Refer to DESCRIPTION SUPPLEMENTARY INFORMATION for additional information.*

FIRST AID / THERAPEUTIC MASKS

The two first aid masks are similar to the passenger masks.
They can be plugged in two quick connectors located in the PSU.
Selection of flow rate is available on the connecting tube.

PORTABLE OXYGEN BOTTLE

The oxygen bottle is fitted with two passenger mask coupling which can be used simultaneously.

Autonomy is 15 minutes.

FIGURE 02-35-10-04 - PORTABLE OXYGEN BOTTLE

OPERATION

The following operations are described in this chapter:

- Quick donning mask operation,
- Smoke goggles operation,
- Protective breathing equipment operation,
- Passenger mask operation.

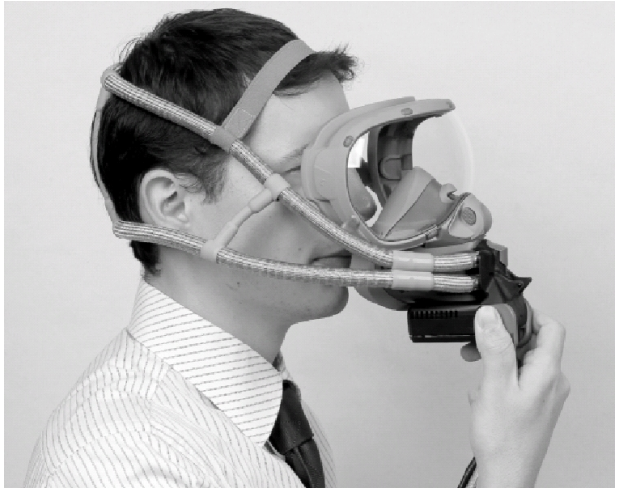
QUICK DONNING MASK OPERATION

With the mask stowed in the box,
firmly grab the red tabs.

Pull the mask completely out
of the stowage box.

Depress the inflation control valve (red tabs) with thumb and forefinger to inflate the harness. Keep control depressed.

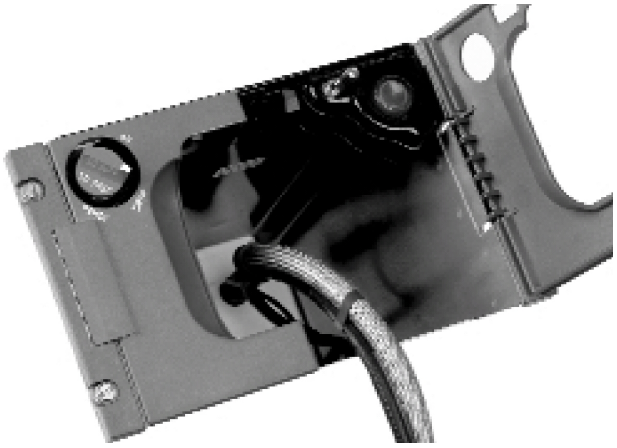
Position the harness over the head. Lower the mask with a wide arc from the brow to the chin.



With the mask firmly secured in the hand away from the face, release thumb and forefinger from inflation control valve (red tabs), which deflates the harness, and guide the mask assembly to the face.

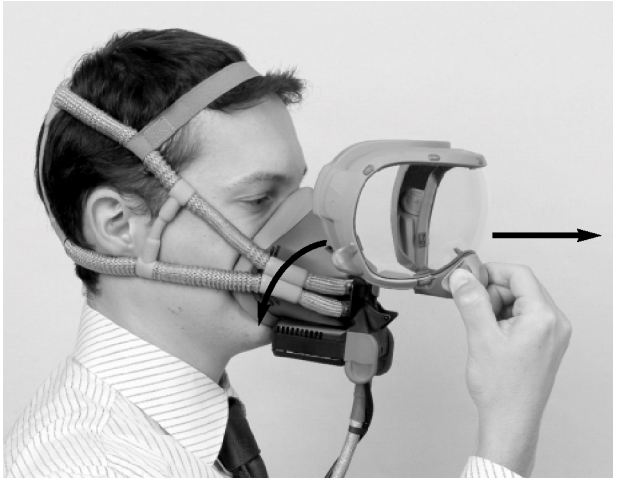
If necessary, position the upper tube of the inflatable harness above the guides located on each side of the smoke goggles.

Once the mask is on the head, it is advised to keep at least the LH box door closed for easier blinker visibility and access to PRESS TO TEST control.



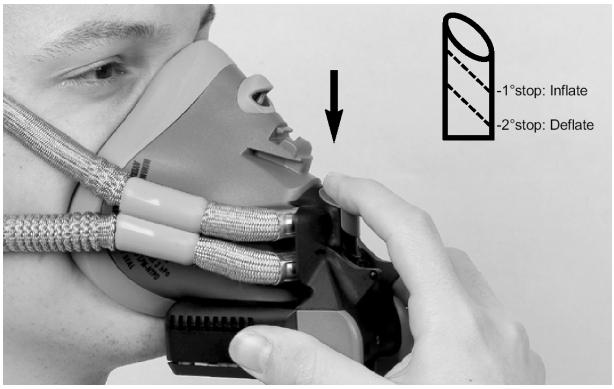
When the mask regulator is worn preventively for protection against potential depressurization, smoke goggles can be detached from the mask regulator to increase comfort:

- Remove the upper tubes of the pneumatic harness from the guides on the smoke goggles,
- Firmly grasp the smoke goggles by the locking mechanism tabs on each side of the grey interface piece. Depress the tabs to unlock and pull the smoke goggles,
- Stow the smoke goggles in a place where they are protected against mechanical stresses, contamination and scratches.



Operation with the adjustable comfort harness:

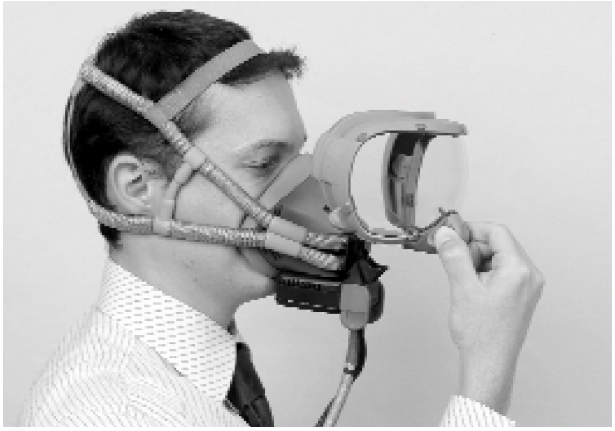
- Depress the comfort control to the 1st stop. Release the comfort control when feeling comfortable,
- When the harness needs to be tighter, depress the comfort control one step further (2nd stop).



SMOKE GOGGLES OPERATION

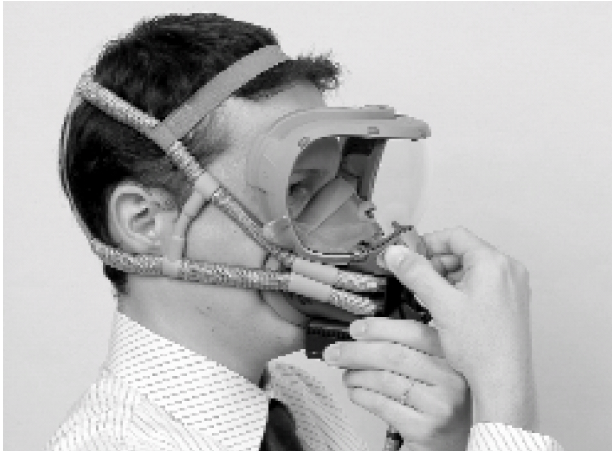
The protection against smoke and harmful gases may be obtained by using smoke goggles.

Place the smoke goggles (locking mechanism) in front of the receptacle on the mask.



Push the smoke goggles in the receptacle until it clicks and it is locked.

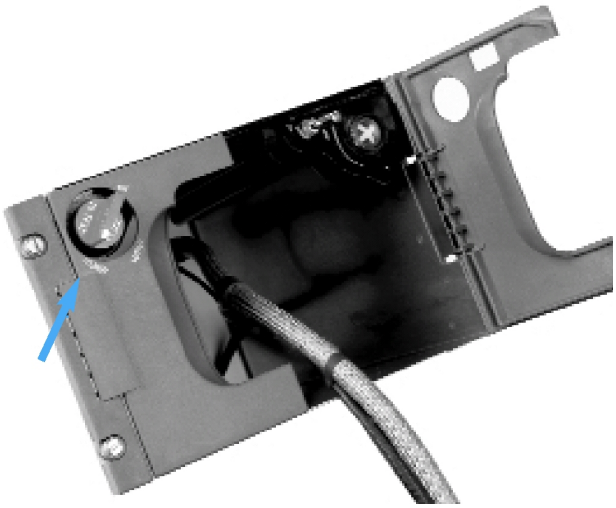
Installation can be helped by keeping the mask to counter balance the movement initiated by the smoke goggles.



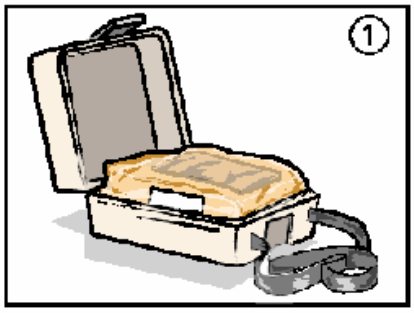
Installation can also be helped by inflating the harness while keeping the mask on the face.

This action moves the tubes apart and allows them to be directly in right position once the harness is deflated.

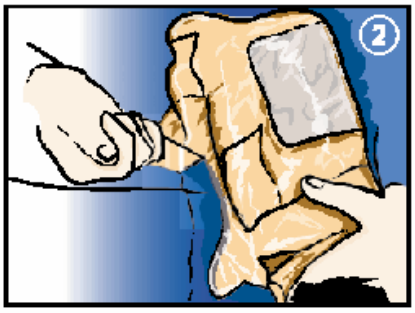
Rotate the PRESS TO TEST pushbutton of the stowage box in the EMGY (emergency) position.



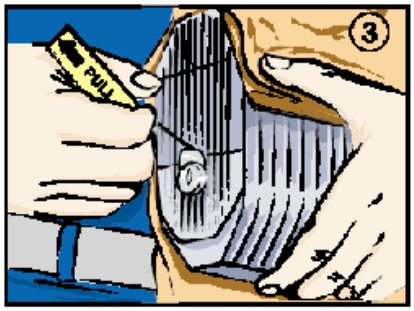
PROTECTIVE BREATHING EQUIPMENT OPERATION



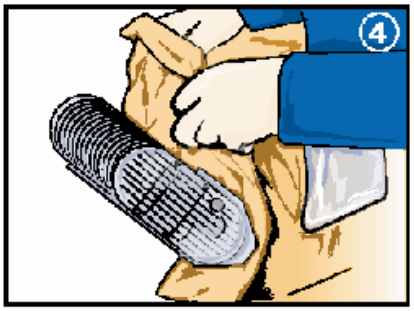
REMOVE UNIT FROM STORAGE CONTAINER



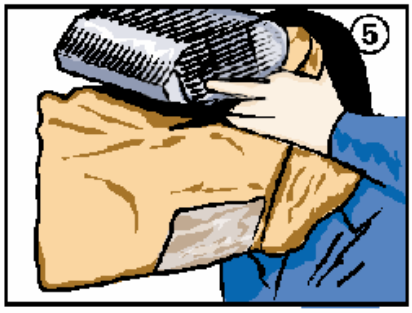
TEAR OFF RED PULL STRIP AND REMOVE UNIT FROM PLASTIC PROTECTIVE WRAPPER



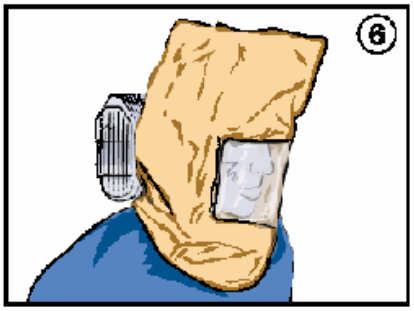
PULL ACTUATION RING IN THE DIRECTION INDICATED



HOLD THE DEVICE BY THE OPEN END OF THE HOOD WITH THE LIFE SUPPORT PACK AWAY HAND FROM THE USER

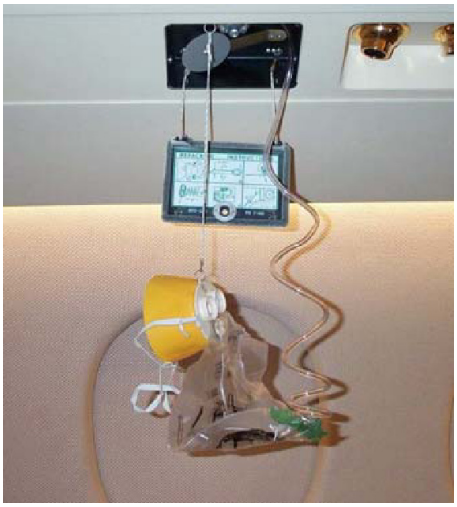


BEND OVER AND GRASP HOOD OPENING WITH THUMB AND PULL HOOD OVER HEAD

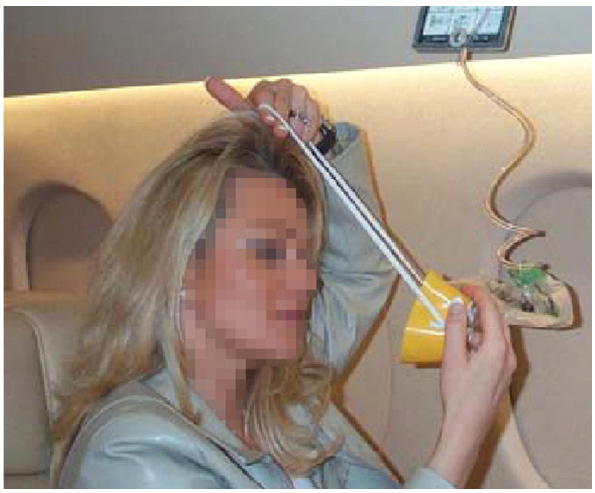


THE SOLID STATE OXYGEN GENERATOR ENSURES A MINIMUM FLOW FOR15 MN

PASSENGER OXYGEN MASK OPERATION



1. MASK DROPS AUTOMATICALLY



2. PULL ON THE MASK TO RELEASE THE OXYGEN, PUT STRAP OVER HEAD

3. FIT MASK OVER NOSE AND MOUTH, TIGHTEN STRAP AND BREATHE NORMALLY

DESIGN PRINCIPLE

The oxygen system was designed considering the following design principles:

- With regard to safety :
  - Crew mask are quick donning type,
  - Crew oxygen supply and passenger supply are isolated (segregated),
  - Crew oxygen system is permanently monitored,
  - Dual Electrical power source is provided for redundancy for passenger supply,
  - Equipment location are out of engine / APU rotor burst areas,
  - Fire hazard risk is minimized by ventilation in the cabin compartments and oxygen piping routing isolated from hydraulic piping and electrical cable,
- With regard to efficiency :
  - The EFCU optimizes the passenger oxygen consumption,
  - Crew oxygen consumtion is electronically controlled for optimization,
- With regard to comfort:
  - Goggles with large clear window allowing crew member to keep corrective or sun glasses,
  - Crew mask are fitted with a comfort mode allowing to modulate harness tension thus increasing crew comfort.

EQUIPMENT LOCATION

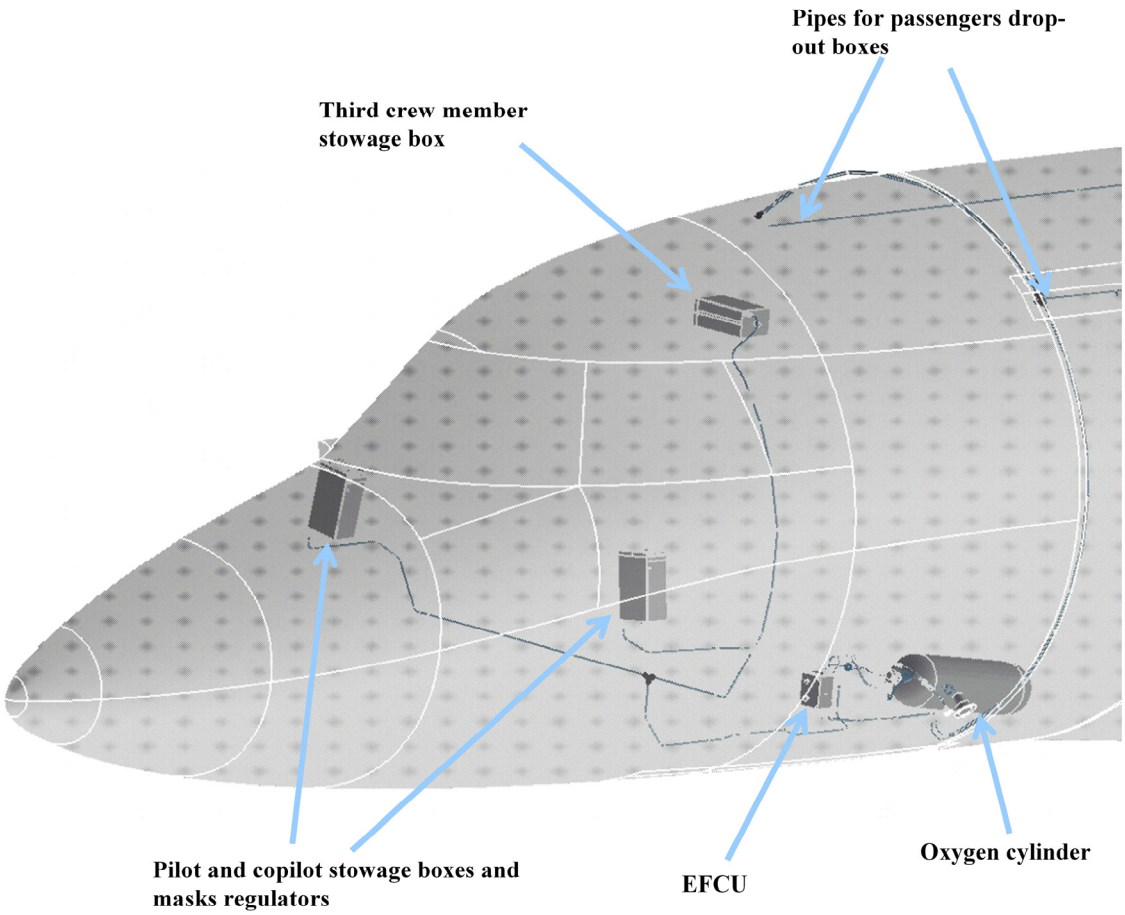


FIGURE 02-35-15-00 - OXYGEN EQUIPMENT LOCATION

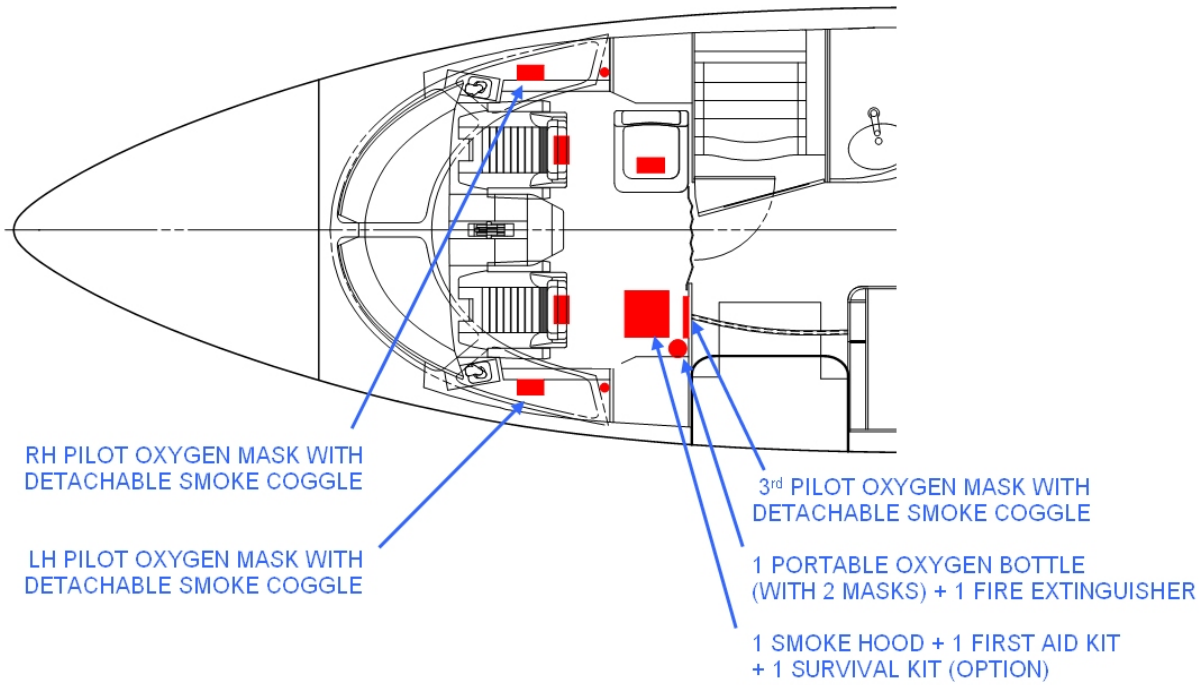


FIGURE 02-35-15-01 - COCKPIT OXYGEN EQUIPMENT

ELECTRICAL POWER SOURCE

Following paragraph describes the power supply of the different equipment of the oxygen system.

Electrical protection is provided:

- Either by Solid State Power Controllers (SSPC) ,
- Or by Circuit Breakers (CB).

➢ *Refer to ATA 24 – ELECTRICAL POWER for additional information.*

EQUIPMENT	POWER SUPPLY	TYPE OF PROTECTION
Pilot Mask stowage box	LH Essential Bus	CB
Copilot Mask stowage box	RH Essential Bus	CB
Third crew menber stowage box	LH Essential Bus	CB
EFCU (Normal & First Aid Mode)	LH Essential Bus	CB
EFCU (Override Mode)	RH Essential Bus	CB

COMPONENTS - DETAILED DESCRIPTION

CYLINDER

The cylinder stores oxygen at high pressure (1850 psi - 128 bar at 20 °C).

A reducing regulator mounted directly on cylinder top reduces high pressure to a lower suitable pressure (73 PSI) for the users. The pressure regulator is manually operated through an ON / OFF slider.

ELECTRICAL FLOW CONTROL UNIT MODES

This paragraph provides additional information on EFCU modes for oxygen passenger delivery:

- CLOSED mode,
- NORMAL mode,
- FIRST AID mode,
- OVERRIDE (O'RIDE) mode.

CLOSED mode

The passenger's oxygen sub-system is fully isolated from the oxygen source.

When the knob is on the CLOSED position, the electrical signal allows EFCU to shut off the passenger oxygen circuit.

Crew and passengers circuits are totally separated and the crew oxygen supply is not affected by the EFCU regardless of its operation mode, electrically powered or not.

Although, it requires electrical power to ensure the passengers oxygen supply, it does not need to be electrically powered to ensure the crew circuit oxygen supply.

NORMAL mode

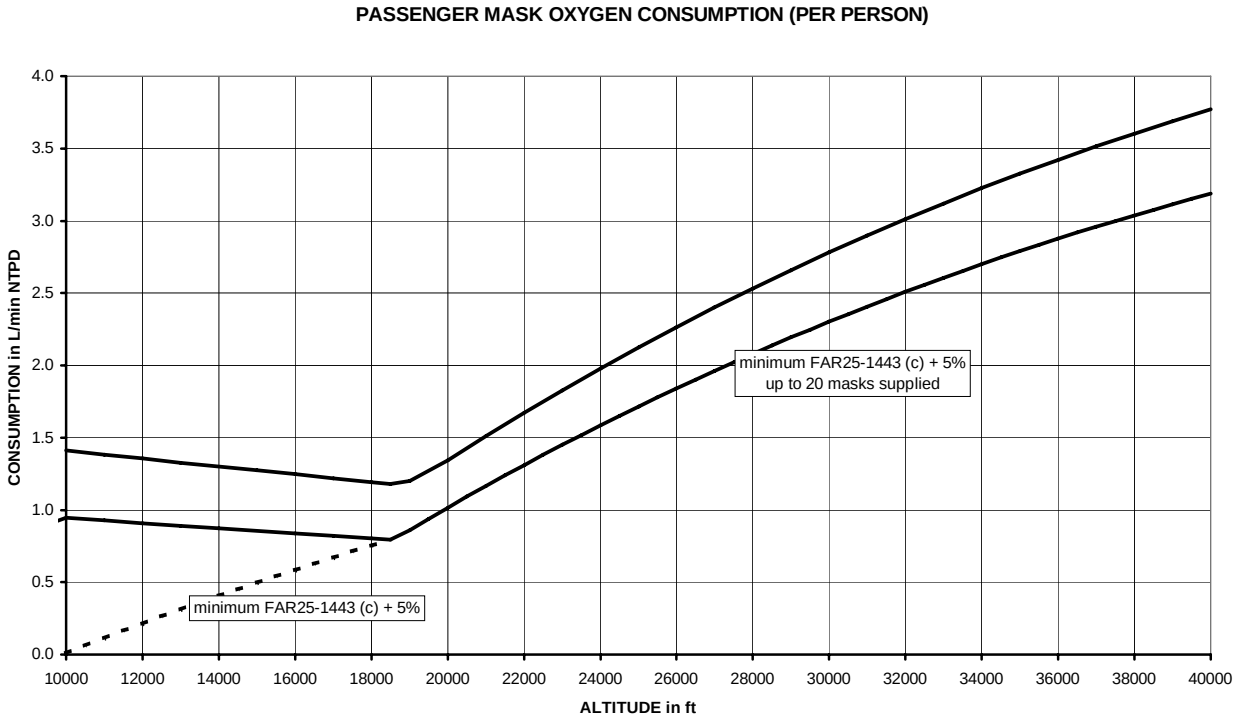
The EFCU controls the automatic drop-out of the passengers masks and supplies oxygen to the passengers. Pressure is delivered to the drop-out boxes according to the increasing cabin pressure altitude threshold of 14,500 ± 500 ft.

In order to ensure the automatic drop-out boxes actuation, the supply pressure delivered by the oxygen cylinder is directly applied to the drop-out boxes for 5 seconds (minimum).

After this delay, the outlet pressure is regulated by the pressure regulator according to the cabin altitude, in order to supply, an optimized oxygen flow to each passenger.

The automatic closing of the valve occurs when the cabin altitude drops below 9,000 ± 1,000 ft.

In NORMAL or FIRST AID modes, a CAS message **90 PRESS: CABIN ALT TOO HI** is triggered if oxygen pressure is sensed in the passenger oxygen lines.



FIRST AID mode

This mode controls the delivery of oxygen to first aid masks when connected to first aid quick disconnects on first aid circuit. In this configuration, the NORMAL mode remains active for the supply of passengers in case of depressurization.

In this first aid mode the electrical printed circuit provides a signal to the First Aid ON / OFF valve and provides the supply pressure level into the First Aid circuit.

When first aid mode is deactivated, the first aid circuit under pressure is then purged to avoid maintaining the circuit under pressure.

OVERRIDE (O'RIDE) mode

This mode controls the deployment of the passenger masks and supplies oxygen to the drop-out boxes at any cabin altitude. It is used in case of NORMAL mode failure.

In this mode the outlet pressure does not take into account the variation of cabin altitude and allows to provide the maximum oxygen supply pressure to the passengers circuit.

QUICK DONNING MASK

In normal mode:

- Pure oxygen is provided above 20,000ft cabin altitude,
- Oxygen overpressure is provided at 34,000ft cabin altitude.

PROTECTIVE BREATHING EQUIPMENT

The protective breathing equipment is composed of:

- A hood, airtight at the neck: it can be used by persons wearing glasses or having a beard or long hair,
- A solid state oxygen generator fitted with a pressure reducing valve,
- A chemical scrubber (CO2 and water vapor) fitted with a filter,
- A venturi pumping device ensuring air re-circulation.

It ensures 15 minutes of oxygen.

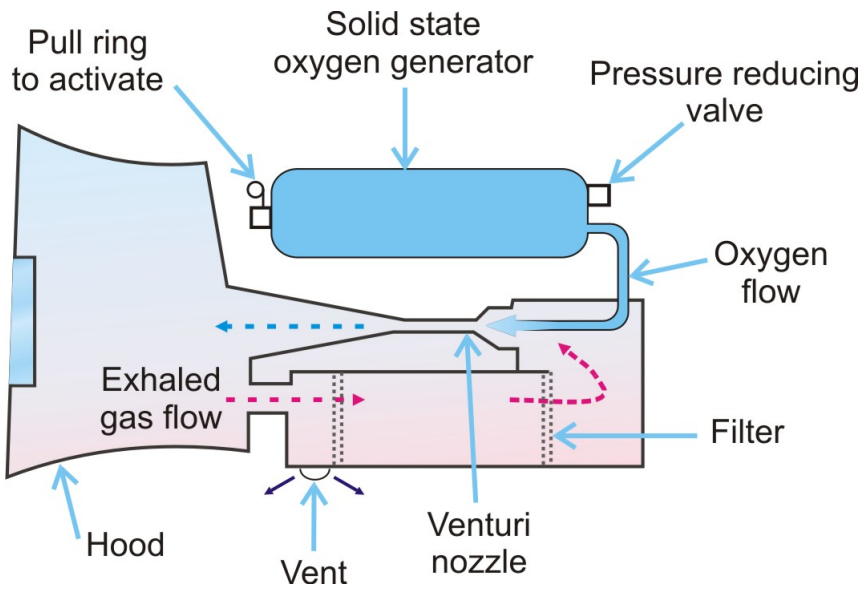


FIGURE 02-35-15-02 - PROTECTIVE BREATHING EQUIPMENT

FIRST AID / THERAPEUTIC MASKS

Oxygen is distributed by EFCU at a flow rate of 2 to 4 liters / minutes.

CONTROLS

Crew Control of O2 distribution for passenger is performed from:
- Passenger PAX OXYGEN panel located in the cockpit Overhead Panel.

Crew Control of O2 distribution for crew is performed from:
- Each individual mask stowage box,
- A comfort button on the crew mask.

PASSENGER OXYGEN CONTROL PANEL

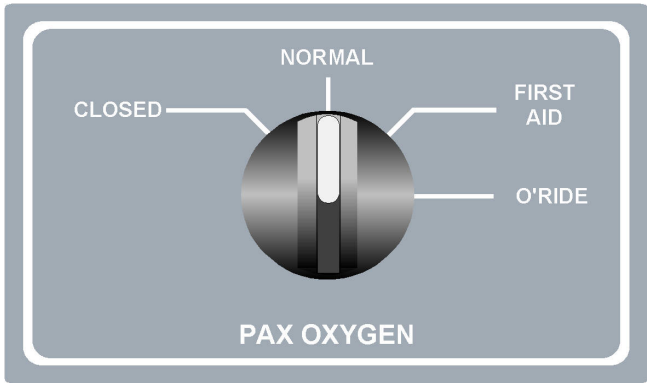


FIGURE 02-35-20-00 - PASSENGER OXYGEN CONTROL PANEL WITH ROTATING SELECTOR

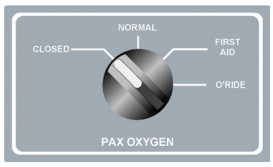
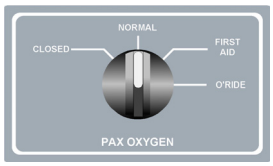
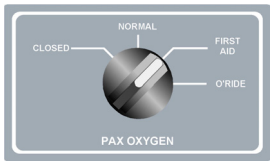
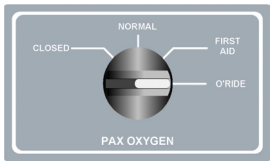
CONTROL	FUNCTION	SYNOPTIC
	CLOSED: the passenger system is fully isolated from the oxygen source.	
	NORMAL: normal in-flight position for automatic deployment of the passenger oxygen masks.	
	FIRST AID: this mode controls the delivery of oxygen to first-aid masks.	
	O'RIDE: this mode controls deployment of the passenger oxygen masks at any cabin altitude and the maximum oxygen pressure supply within the system	

FIGURE 02-35-20-01 - SYNTHETIC TABLE ROTATING SELECTOR MODES

QUICK-DONNING OXYGEN MASK STOWAGE BOX

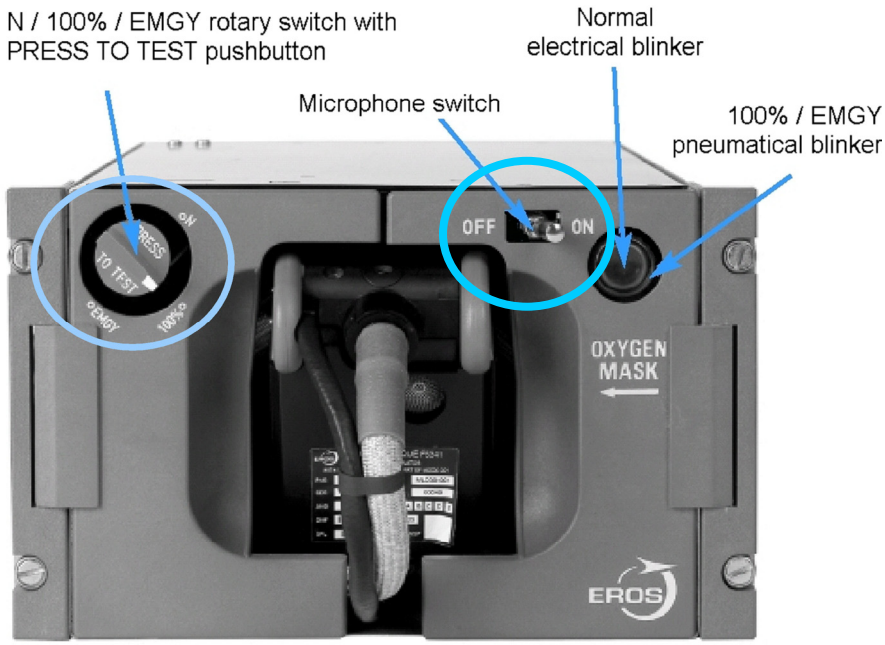


FIGURE 02-35-20-02 - OXYGEN MASK REGULATOR CONTROLS

Modes and test switch

The Modes and test switch located on the crew OXYGEN MASK storage box features following selections:

- N: sets the crew oxygen supply in Normal (N) mode: provides diluted oxygen depending on altitude,
- 100%: sets the crew oxygen supply in 100% mode: provides pure oxygen regardless of altitude,
- EMGY: sets the crew oxygen supply in EMerGencY mode: provides overpressure for protection against smoke or toxic gases.
- PRESS TO TEST pushbutton: allows verifying the good operation for each of the three oxygen regulation modes, and the opening of the oxygen cylinder.

Microphone ON/OFF switch

When the crew mask is stored in the stowage box, the crew member can use the microphone from the headset.

When the mask is out of the box, the mask microphone is available as soon as the microphone switch is manually set to the ON position. If the mask is out of the stowage box, the headset microphone can be re-activated by putting the microphone switch on the OFF position.

QUICK DONNING MASK

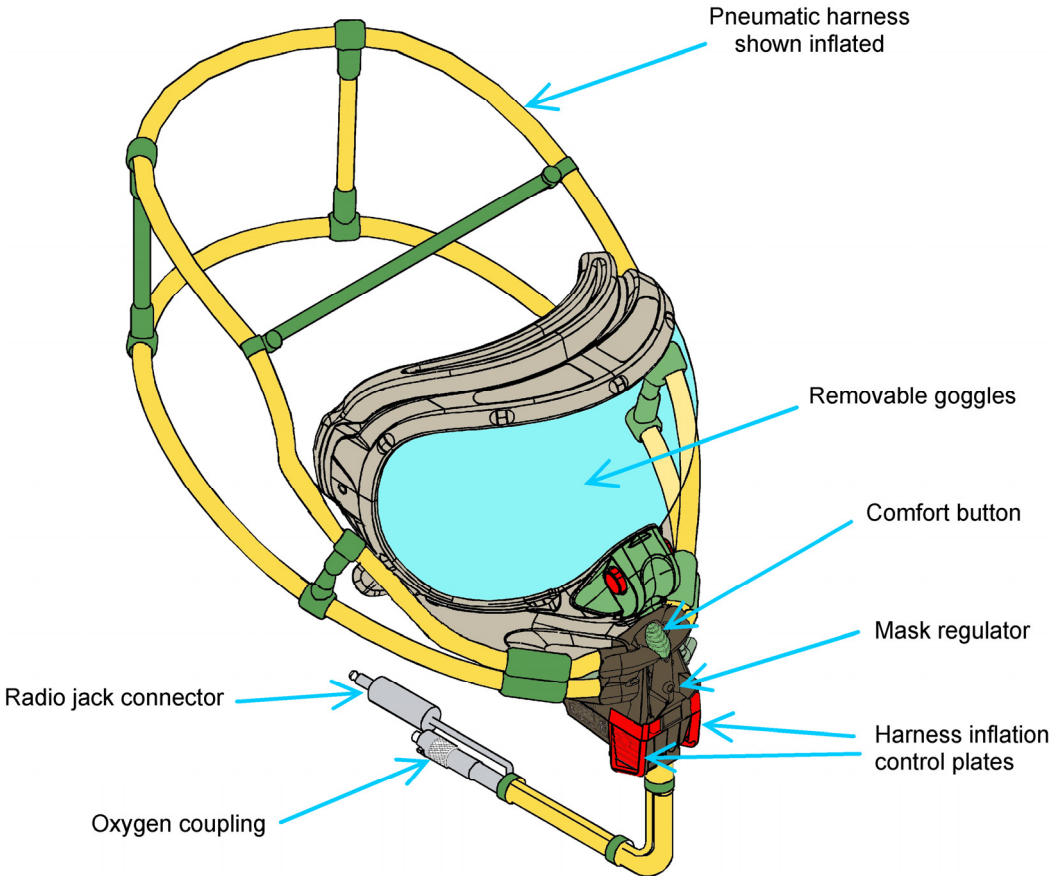


FIGURE 02-35-20-03 - OXYGEN MASK WITH SMOKE GOGGLES

The comfort button allows the pilot to regulate the harness pressure at his convenience to decrease the mask tightness on his face and increase comfort.

INDICATIONS

Cockpit indications related to oxygen system are displayed:

- On the LH side of the ECS synoptic page,
- On a blinker on the crew OXYGEN MASK storage box,
- On the ENG CAS window for CAS messages,
- On the STATus synoptic / FAULT tab for fault messages.

NOTE

When O2 pressure is detected in the passenger distribution system: the  sign illuminates in cabin

ECS SYNOPTIC

The LH side of the ECS synoptic page provides:

- The EFCU functional mode (Normal, First aid, Override , Closed),
- The oxygen capacity in liters and % of the total capacity of the cylinder,
- **PAX ON** indication as soon as oxygen pressure is detected in the passenger system.

NOTE

The oxygen capacity is displayed even if the cylinder is closed.

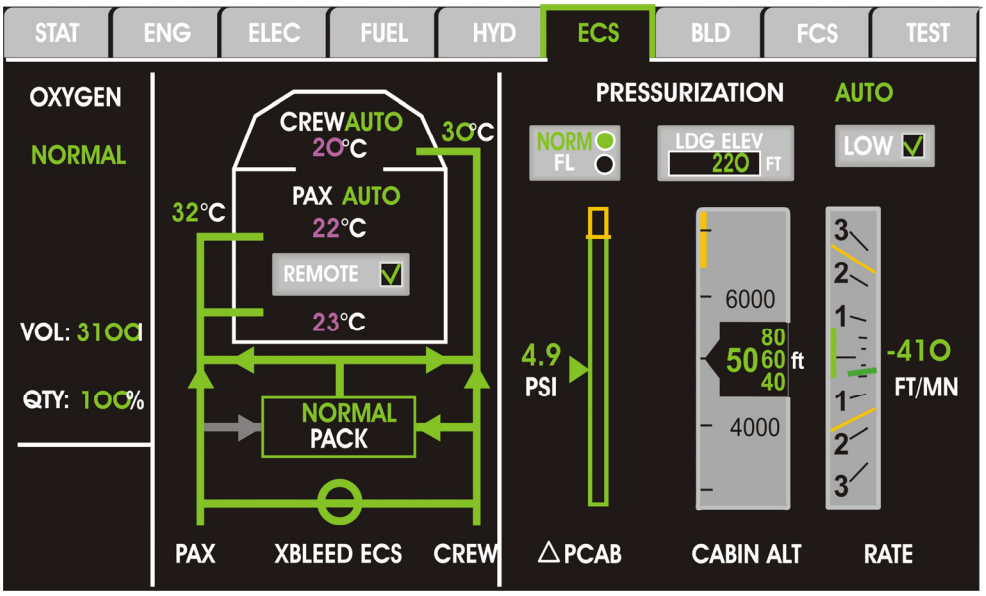


FIGURE 02-35-20-04 - OXYGEN INDICATION IN ECS SYNOPTIC

CREW OXYGEN MASK MODE

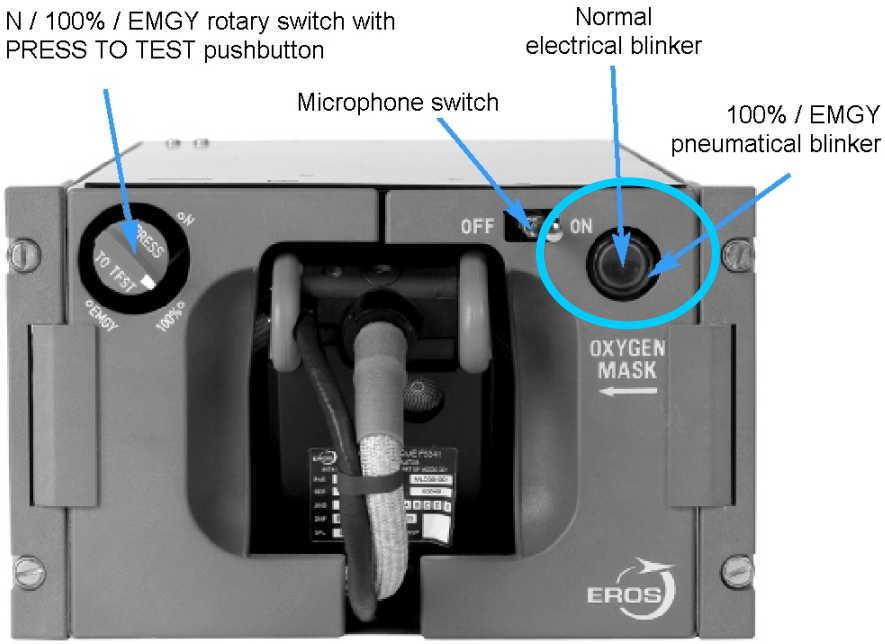


FIGURE 02-35-20-05 - OXYGEN MASK STOWAGE BOX

Oxygen flow is monitored by a blinker each time the crew member is breathing:

- In NORMAL mode: an electrical blinker (white LED) blinks,
- In 100% or EMERGENCY modes: a pneumatical blinker (yellow cross) appears.

No supplementary information to be provided on Controls and Indications at present time.

SYSTEM MONITORING

The oxygen system provides monitoring of following parameters:

- Oxygen low level (700 l),
- Oxygen supply failure,
- Quick donning system malfunction.

➢ *Refer to CODDE 2 for a complete list of CAS messages and to the "Controls and Indications" section for information related to the indications.*

ACTIVE PROTECTIONS

Active protections are incorporated to the oxygen cylinder regulator (pressure reducing regulator).

- In case of oxygen overpressure, the HP safety valve bursts if the pressure reaches a predetermined value.
- In the low-pressure system, a rated safety valve prevents the system from overpressure.

No supplementary information to be provided on system protection at present time.

OXYGEN CYLINDER SERVICING

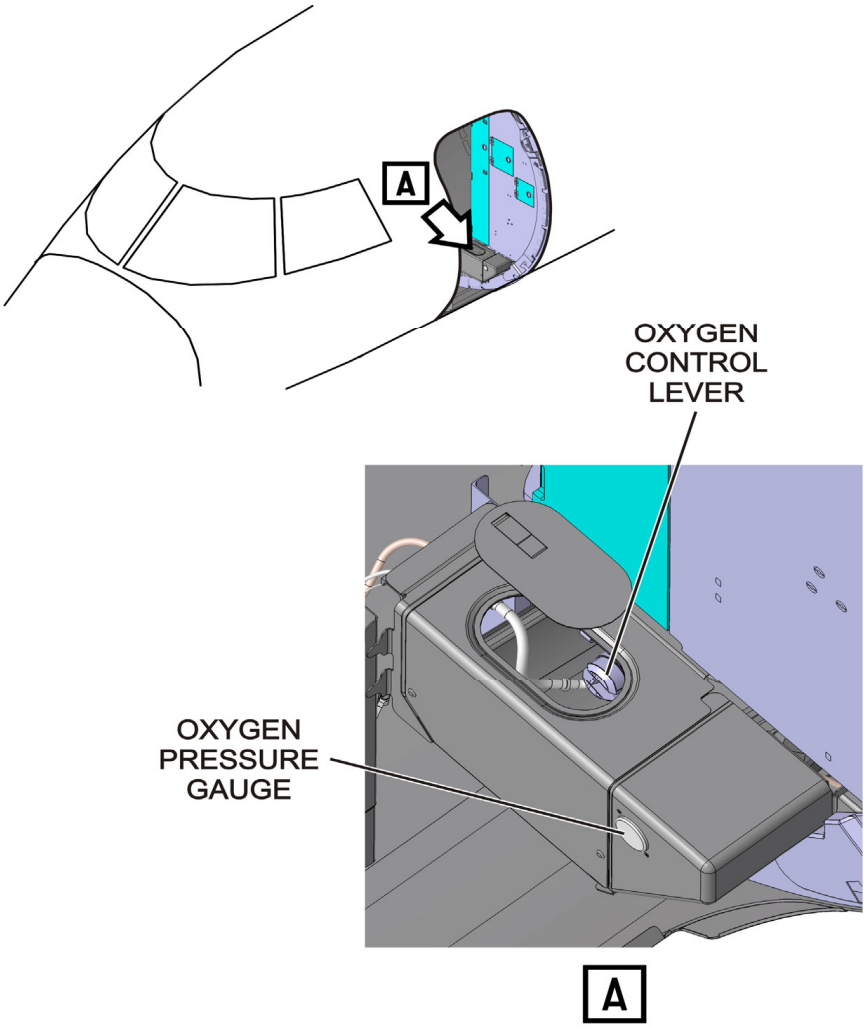


FIGURE 02-35-40-00 - OXYGEN CYLINDER SERVICING

The cylinder is refilled by the filler valve.

One pneumatic pressure gauge is installed close to the filler valve to display the oxygen cylinder pressure for refilling.

A temperature correction table is available near the pressure gauge to provide the correct pressure of filling according to the ambient temperature.

FIGURE 02-35-40-01 - OXYGEN REFILLING PRESSURE

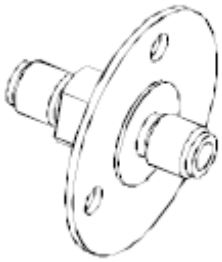


FIGURE 02-35-40-02 - FILLER VALVE

An overboard discharge venting port allows cylinder overboard venting.

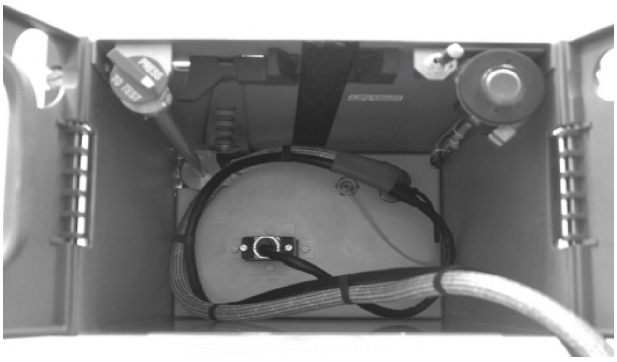
- *Refer to GROUND SERVICING manual.*

QUICK DONNING MASK STOWAGE

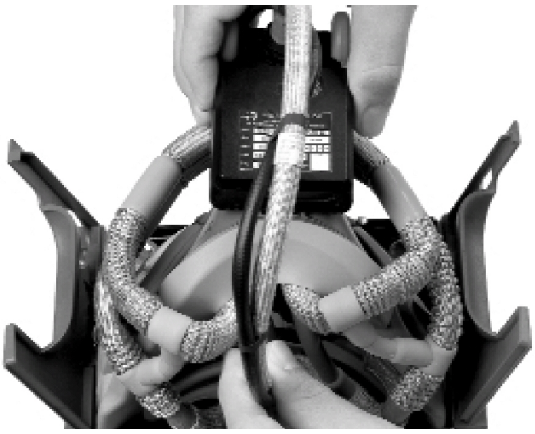
Open the stowage box doors.

Make sure that pneumatic and electrical connectors of the mask-regulator are properly connected with mating connectors of the stowage box.

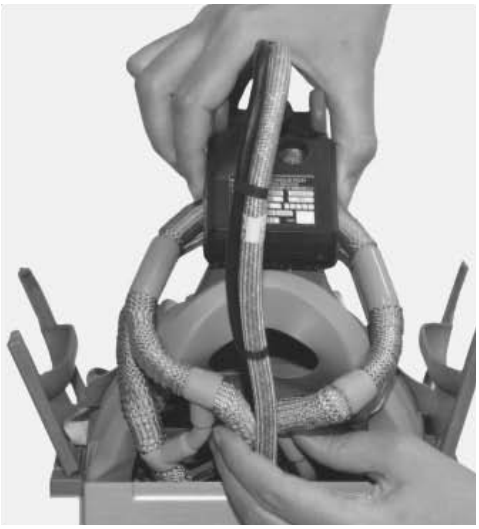
The PRESS TO TEST button of the stowage box must be in the 100% position, position at which the mask regulator must be stored.



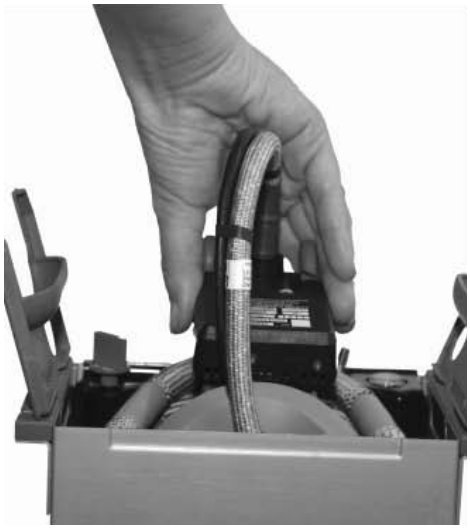
Coil the hose and position it on the bottom of the stowage box. Position the harness behind the face piece



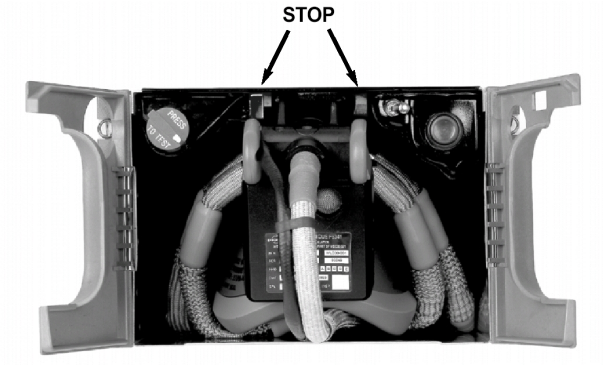
Engage the mask regulator assembly to the stowage box beginning with the harness. Position the hose in the middle to ensure proper alignment when doors are closed.



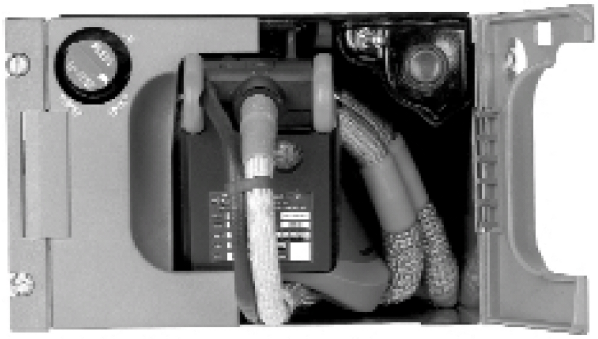
Install the mask regulator in the stowage box



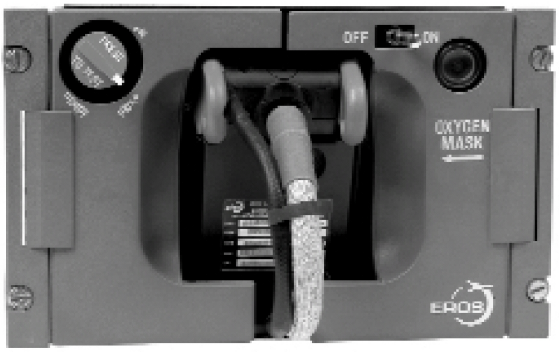
Make sure the mask regulator is fully seated against the stop in the stowage box.



Shut the LH door.

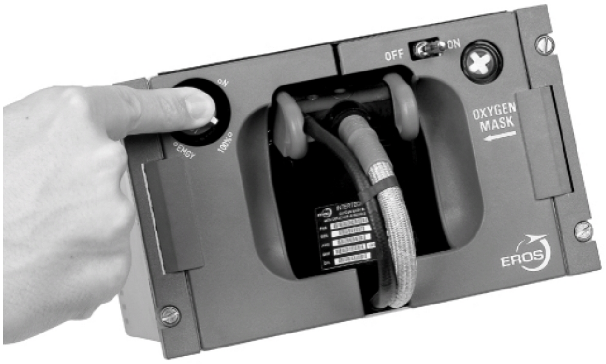


Close the RH door. Make sure that the hose or the harness is not pinched in the doors.



Turn the PRESS TO TEST pushbutton into the 100% position.

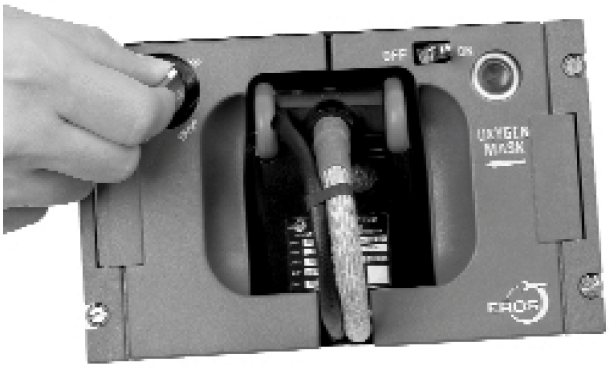
Push the PRESS TO TEST pushbutton: oxygen is now supplied to the mask regulator assembly.
The blinker must be yellow.



Push the PRESS TO TEST pushbutton and turn it into the N position.

Leave the button for 3 sec. (time for the test to be completed) into the N position.

The light of the blinker is on only at the end of the 3 sec. test.



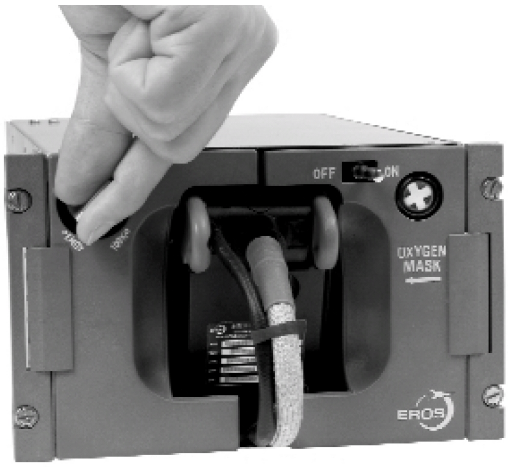
Push and turn the PRESS TO TEST pushbutton into the EMGY position.

Make sure that the yellow diaphragm of the blinker appears.

Go back to the 100% position.

NOTE

The 100% position is the storage position.



➢ *Refer to GROUND SERVICING manual.*