OXYGEN

SYSTEM OVERVIEW

The oxygen system includes:

the crew system,

the passenger system,

the portable system.

Crew Oxygen System:

The flight crew oxygen system supplies oxygen to the flight crew.

It is used if there is a loss of cabin pressurization or smoke or dangerous gases in the cockpit.

The oxygen is supplied by a high-pressure oxygen cylinder (two segregated high-pressure oxygen cylinders for NEO) to quick-donning masks in the cockpit.

Passenger Oxygen System:

The passenger and cabin attendant oxygen system is supplied by chemical oxygen generator units (or as an option a Gaseous oxygen system) that are in the cabin, the cabin attendant stations, the lavatories and the galleys.

There are two types of chemical generators that supply oxygen for 15 minutes or 22 minutes.

Portable Oxygen System:

The portable oxygen system supplies oxygen to the passengers, the cabin attendants and the flight crew if an emergency occurs and for first aid treatment.

The Portable Breathing Equipment (PBE) supplies breathing means and eye protection to the flight crew members and the cabin attendants.

It lets them move freely to extinguish a fire.

The high-pressure portable cylinder includes continuous-flow type masks and supplies first aid oxygen to the passengers.


FLIGHT CREW
PASSENGER
OXYGEN SYSTEM
A320 AIRBUS
PORTABLE

FLIGHT CREW OXYGEN SYSTEM FOR NEO

The flight crew oxygen is supplied by two segregated high-pressure oxygen cylinders (77 cubic feet cylinder), that operate independently.

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.

Those cylinders can be isolated for maintenance by a manual ON/OFF valve.

A direct-reading pressure gage gives an indication of the cylinder pressure, independently of the open or closed position of the manual valve.

The cylinders are installed in cradles with two quick-release clamps in the L/H avionics compartment, between frames 11 and 12 for the first cylinder and between frames 16 and 17 for the second.

A pressure regulator transmitter assembly is directly connected to each cylinder.

It includes a high-pressure stage with an integrated pressure transducer for ECAM indication and a low-pressure stage.

The pressure regulator regulates the low pressure at 4.48 to 6.48 bar (65 to 94 psig).

A supply valve (one for each cylinder) opens or closes the crew oxygen supply.

The CREW SUPPLY P/B on the oxygen panel controls the supply valves.

High-pressure and low-pressure protection is done by safety devices that include a high-pressure safety outlet and a low-pressure safety outlet.

The high-pressure safety outlet is a frangible disk type.

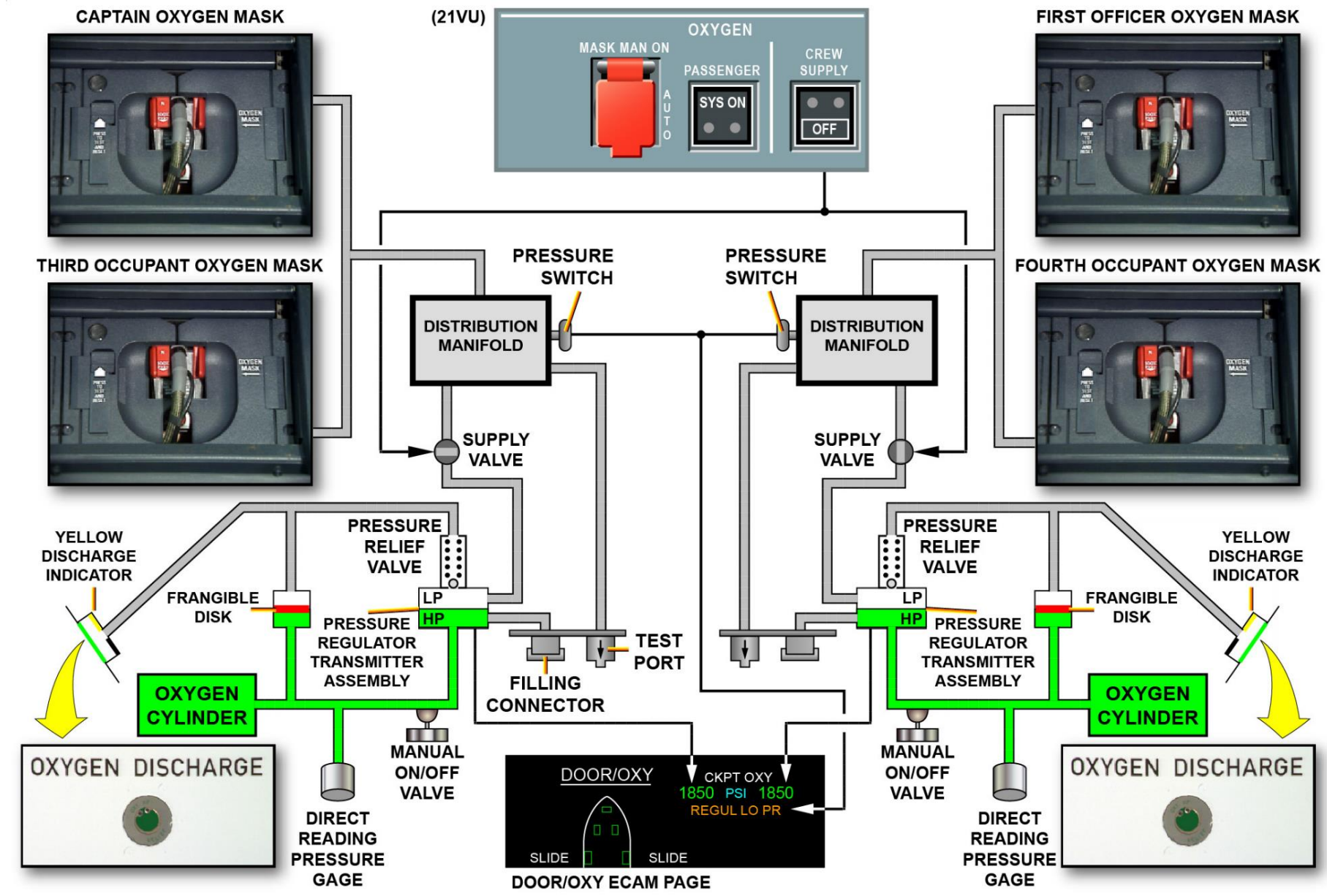
The low-pressure safety outlet is a pressure relief valve. Rupture of the frangible disk is set at a cylinder pressure of 2500 to 2775 psig.

The pressure relief valve sets the limit of the low-pressure oxygen supply to 175 psig.

An overboard green discharge indicator (one for each cylinder) is connected to the high-pressure safety outlet and to the low-pressure safety outlet.

If there is overpressure, the green disk blows out and a yellow indicator comes into view to show that the cylinder was discharged, or the pressure relief valve is open.

A pressure switch and a test port are connected to the distribution manifold (for each cylinder).


CAPTAIN OXYGEN MASK
(21VU)
OXYGEN
MASK MAN ON
AUTO
PASSENGER
SYS ON
CREW SUPPLY
OFF
FIRST OFFICER OXYGEN MASK
THIRD OCCUPANT OXYGEN MASK
FOURTH OCCUPANT OXYGEN MASK
PRESSURE SWITCH
PRESSURE SWITCH
DISTRIBUTION MANIFOLD
DISTRIBUTION MANIFOLD
SUPPLY VALVE
SUPPLY VALVE
YELLOW DISCHARGE INDICATOR
FRANGIBLE DISK
PRESSURE RELIEF VALVE
LP
HP
PRESSURE REGULATOR TRANSMITTER ASSEMBLY
TEST PORT
FILLING CONNECTOR
OXYGEN CYLINDER
MANUAL ON/OFF VALVE
DIRECT READING PRESSURE GAGE
OXYGEN DISCHARGE
DOOR/OXY
CKPT OXY
1850 PSI 1850
REGUL LO PR
SLIDE
SLIDE
DOOR/OXY ECAM PAGE

The pressure switch operates when the oxygen supply pressure decreases to 3.45 plus or minus 0.35 bar (50 plus or minus 5 psig) and transmits a warning signal REGUL LO PR to the ECAM/DOOR/OXY page.

The optional filling connector and oxygen filling indicator (for each cylinder) make it possible to fill the oxygen cylinder without removal of the cylinder from the aircraft.

On the lower ECAM DU, on the DOOR/OXY page, the oxygen pressure in a cylinder with a capacity of 77 cubic feet is shown as follows:

< 400 psig, in amber.

> 400 psig, in green.

The indication flashes in green when the pressure is less than 800 psig and the DOOR/OXY page comes into view automatically.

An amber half-frame comes into view when the oxygen pressure is
less than 1500 psig.

If the oxygen pressure decreases to less than 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 in amber on the DOOR/OXY page.

The mask assembly and the stowage box are installed adjacent to each crew member seat.

The stowage box contains the mask.

When the mask is pulled out of the box, a supply valve installed in the stowage box opens and lets oxygen flow to the mask.

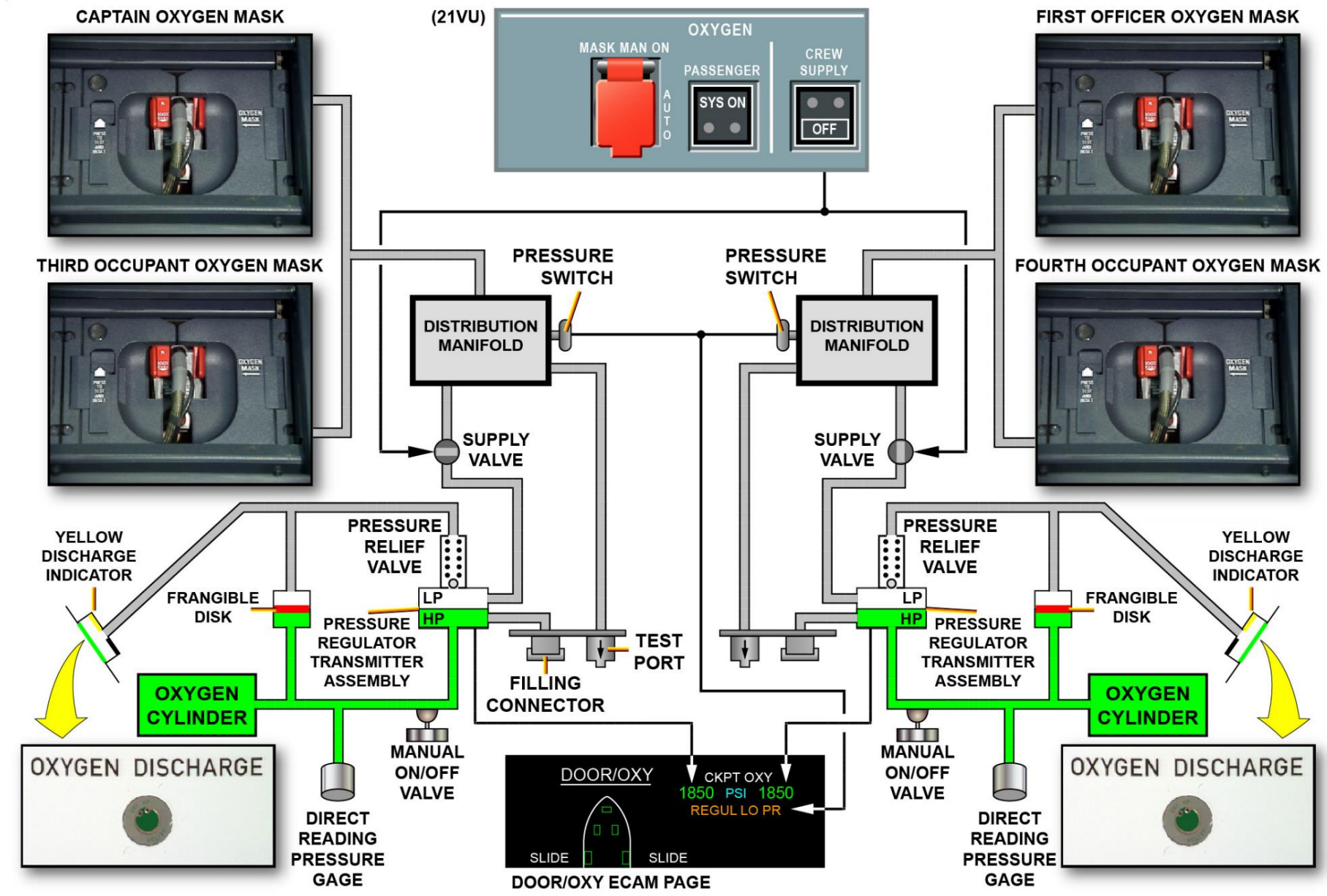
To use the mask, squeeze the red clips.

This will inflate the mask harness.

Bring the mask in position and release the red clips.

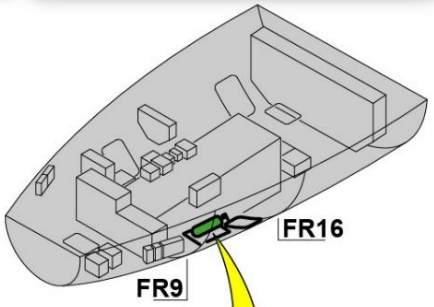
When the red clips are released, the oxygen flow to the harness stops and the oxygen that remains in the harness is released into the atmosphere.

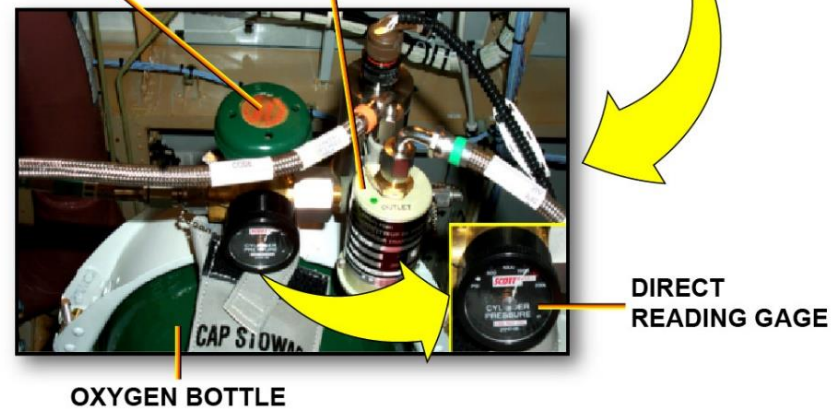
The mask is then ready to be used.


CAPTAIN OXYGEN MASK
(21VU)
OXYGEN
MASK MAN ON
AUTO
PASSENGER
SYS ON
CREW SUPPLY
OFF
FIRST OFFICER OXYGEN MASK
THIRD OCCUPANT OXYGEN MASK
FOURTH OCCUPANT OXYGEN MASK
PRESSURE SWITCH
PRESSURE SWITCH
DISTRIBUTION MANIFOLD
DISTRIBUTION MANIFOLD
SUPPLY VALVE
SUPPLY VALVE
YELLOW DISCHARGE INDICATOR
PRESSURE RELIEF VALVE
FRANGIBLE DISK
LP
HP
PRESSURE REGULATOR TRANSMITTER ASSEMBLY
TEST PORT
FILLING CONNECTOR
OXYGEN CYLINDER
OXYGEN DISCHARGE
MANUAL ON/OFF VALVE
DIRECT READING PRESSURE GAGE
DOOR/OXY
CKPT OXY
1850 PSI 1850
REGUL LO PR
SLIDE
SLIDE
DOOR/OXY ECAM PAGE

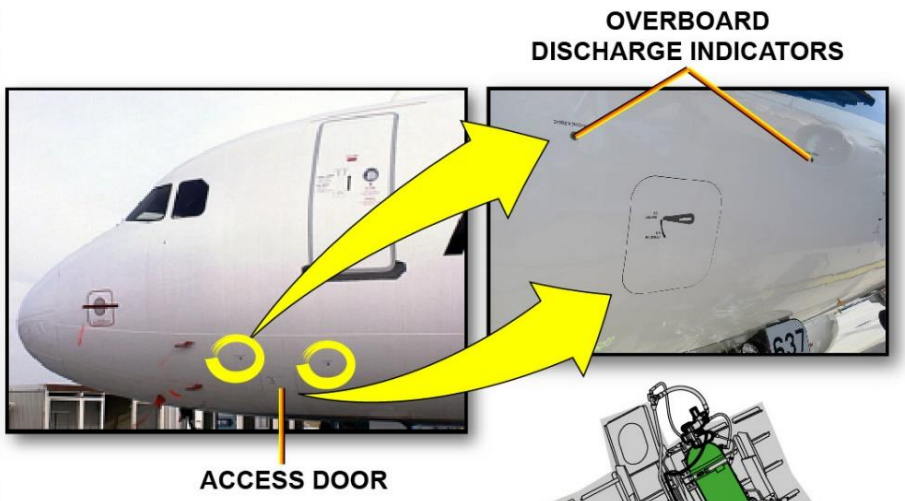
COMPONENT LOCATION

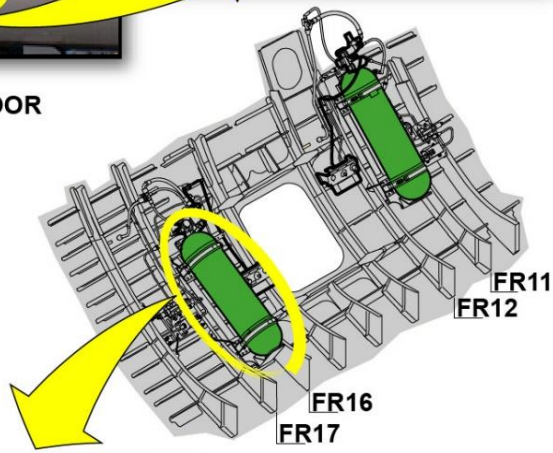
The cockpit crew oxygen cylinder(s) is (are) located in the L/H avionics compartment.





OXYGEN CYLINDER (CEO)





OXYGEN CYLINDER (NEO)

PASSENGER OXYGEN SYSTEM

The masks fall automatically when the cabin altitude is higher than 14,000 feet or manually when a crew member pushes the MASK MANual ON pushbutton.

A taped message is transmitted on the passenger address system.

The passenger SYStem ON indicator light comes on white when the passenger oxygen system is electrically supplied.

A reset is available to rearm the electrical system after mask re-stowage.

The door can be opened manually with a release tool if there is a failure of the container door opening system.

When the TiMeR RESET pushbutton is pushed, the ON white light of the TMR RESET pushbutton comes on.

The indicator light SYS ON goes off and the taped announcement stops.

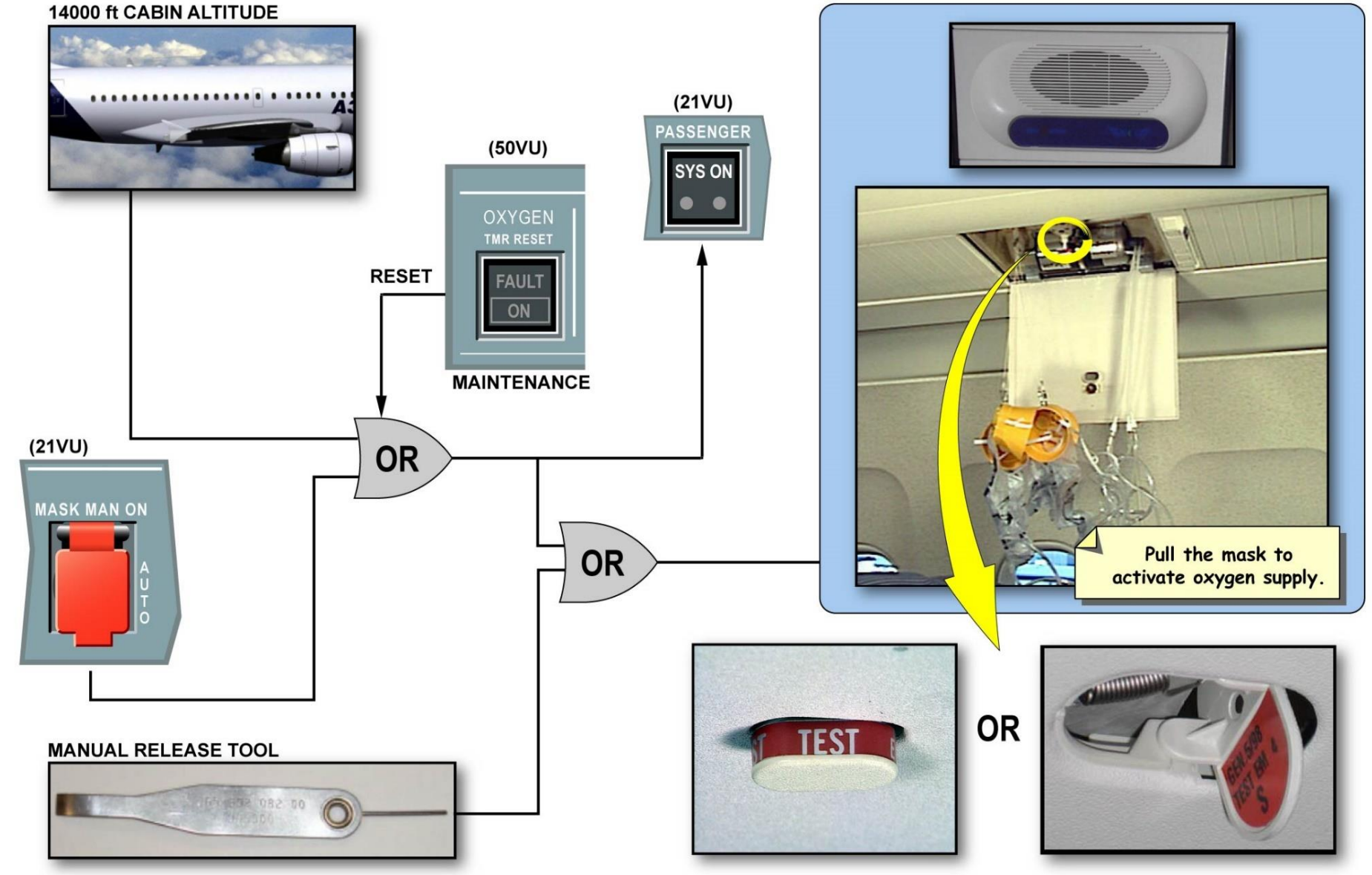
On the ground, used chemical oxygen units must be replaced and all masks must be re-stowed.

The system is reset when the TMR RESET pushbutton is pushed momentarily on the maintenance panel.

Manually operated door stops are installed on the container doors.

These stops are used to do an operational test of the mask release system.

In the test position, because of the stops, the doors will not open fully, and the masks will not fall out of the container.


14000 ft CABIN ALTITUDE
(50VU)
OXYGEN
TMR RESET
FAULT
ON
MAINTENANCE
RESET
(21VU)
PASSENGER
SYS ON
(21VU)
MASK MAN ON
AUTO
OR
OR
Pull the mask to activate oxygen supply.
MANUAL RELEASE TOOL
TEST
OR

PASSENGER GASEOUS OXYGEN SYSTEM (OPTION)

The passenger gaseous oxygen system supplies oxygen to each oxygen container in case of an emergency.

The rate of the oxygen flow depends on the altitude.

The oxygen supply starts automatically at a cabin pressure equivalent to an altitude exceeding 14.000 ft (4.265 m) and stops when the cabin pressure drops below a pressure equivalent to 10.000 ft (3.050 m).

The system can then be re-started if the aircraft has to climb to clear another obstacle.

The gaseous oxygen system has no characteristic flight profile.

Since the flow is greater with the altitude, the lower the flight is done the longer the oxygen supply lasts.

High-pressure oxygen is stored in oxygen cylinder assemblies installed behind sidewall linings RH in the bulk cargo compartment.

The standard system has 6 oxygen cylinders.

Up to 8 oxygen cylinders can be installed on airline request.

When the system is operated, low-pressure oxygen from the pressure regulators is supplied to the two Main Distribution Lines (MDLs).

One line is installed below the cabin floor along the LH side of the aircraft.

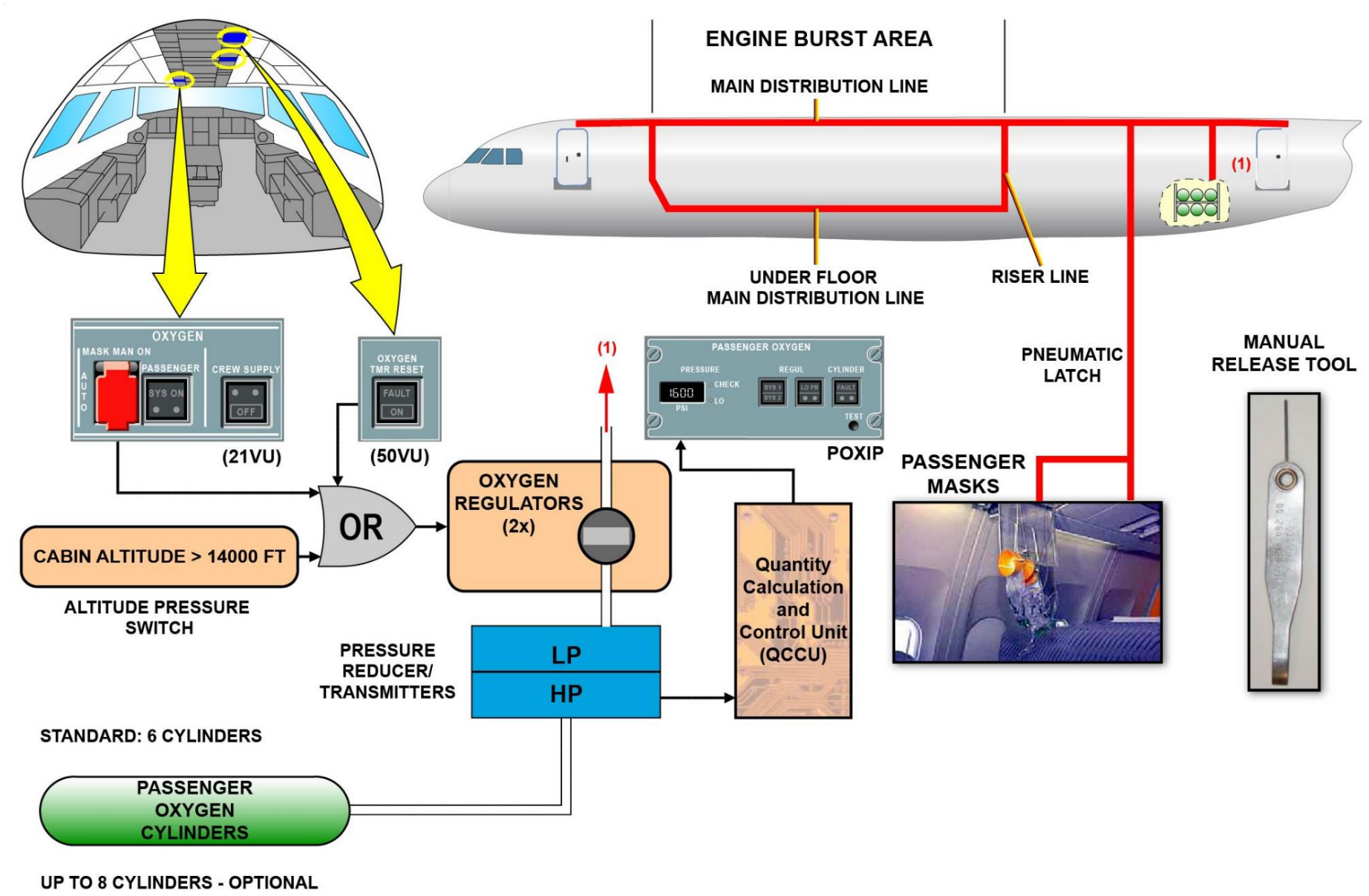
The other line is installed above the cabin ceiling. Riser Lines (RLs) are connected to the MDLs to supply oxygen to the hat rack lines.

The hat rack lines supply oxygen to the oxygen containers.

The low-pressure oxygen is supplied to the two MDL's. One line is installed below the cabin floor along the LH side of the aircraft and the other line is installed above the cabin ceiling.

The two MDL's are joined again.

The area where MDL's are doubled is the engine burst area.


ENGINE BURST AREA
MAIN DISTRIBUTION LINE
UNDER FLOOR
MAIN DISTRIBUTION LINE
RISER LINE
(1)
OXYGEN
MASK MAN ON
AUTO
PASSENGER
SYS ON
CREW SUPPLY
OFF
(21VU)
OXYGEN
TMR RESET
FAULT
ON
(50VU)
(1)
PASSENGER OXYGEN
PRESSURE
REGUL
CYLINDER
CHECK
LO
PSI
TEST
POXIP
PNEUMATIC
LATCH
MANUAL
RELEASE TOOL
PASSENGER
MASKS
OR
OXYGEN
REGULATORS
(2x)
CABIN ALTITUDE > 14000 FT
ALTITUDE PRESSURE
SWITCH
PRESSURE
REDUCER/
TRANSMITTERS
LP
HP
Quantity
Calculation
and
Control Unit
(QCCU)
STANDARD: 6 CYLINDERS
PASSENGER
OXYGEN
CYLINDERS
UP TO 8 CYLINDERS - OPTIONAL

PASSENGER GASEOUS OXYGEN SYSTEM CONTROLS AND INDICATING (OPTION)

GENERAL

Altitude Pressure Switch

The altitude switch, which is installed in the avionics compartment, starts the automatic operation of the passenger oxygen system.

It sends a signal to open the oxygen regulators, which supply low-pressure oxygen to the oxygen distribution system.

In case of high altitude airfield operation option, the altitude switch has two settings:

- the first setting closes, if the pressure falls to a value equivalent to 14000 +250/ -750 ft. (4267.12 +76,2/ -228,6 m),
- the second setting closes, if the pressure falls to a value equivalent to 16000 +250/ -750 ft. (4876.71 +76,2/ -228,6 m).

NOTE: If high altitude airfield operation is required, the system can be adapted by using a dual altitude pressure switch and by adapting the activation circuit.

Oxygen Control Panel

On the oxygen control panel, the MASK MAN ON P/BSW allows the crew to activate the oxygen system as a backup and override the altitude pressure switch.

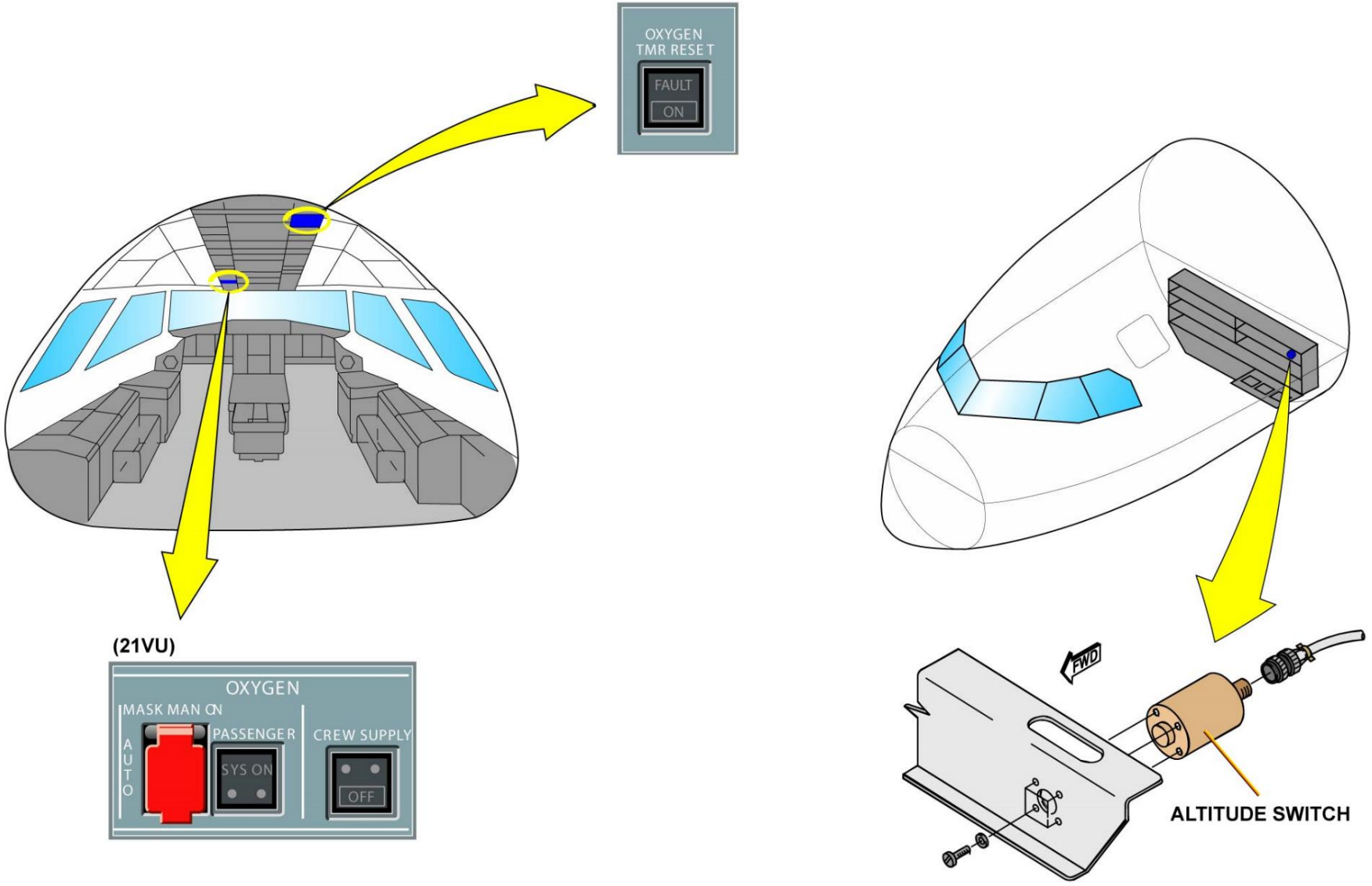
The oxygen regulators stay open even if the MASK MAN ON P/BSW is released.

When the OPEN relays do not operate, it is necessary to hold the MASK MAN ON P/BSW for 1 second to open the oxygen regulators.

A safety guard is installed over the MASK MAN ON P/BSW to prevent accidental operation of the system.

The SYS ON indicator light on the overhead panel comes on when at least one pressure oxygen regulator is open.

When the pressure in the system decreases the SYS ON indicator light goes off.


OXYGEN
TMR RESET
FAULT
ON
(21VU)
OXYGEN
MASK MAN ON
AUTO
PASSENGER
SYS ON
CREW SUPPLY
OFF
FWD
ALTITUDE SWITCH

TMR RESET P/B

The TMR RESET P/BSW is installed on the maintenance panel and is used to reset the controls after the system operation.

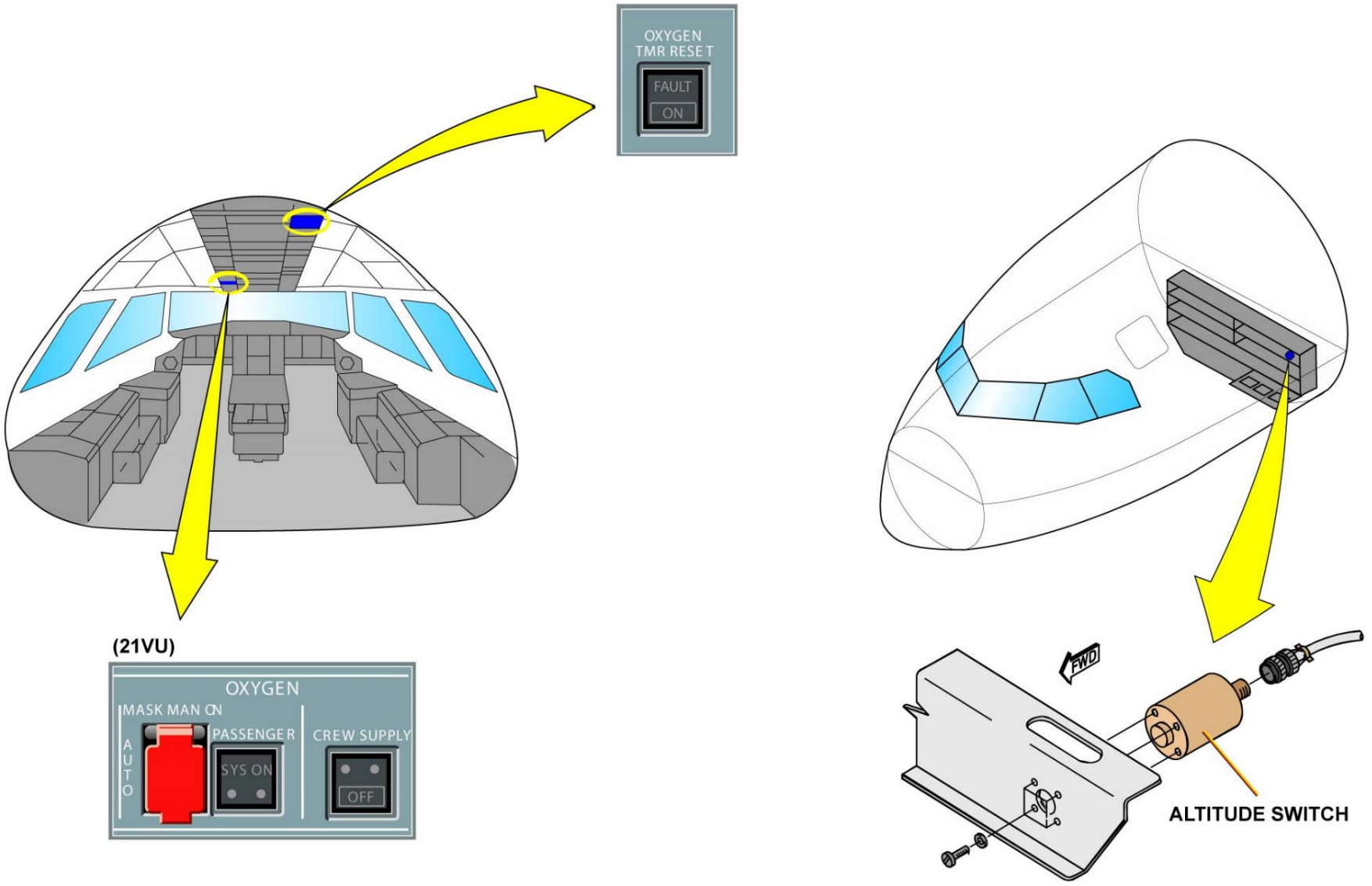
When the TMR RESET P/BSW is pushed:

the electrical circuit is set to the normal condition,

the oxygen regulators close.

In this case the ON light comes on and stays on for 5 seconds.

It does not go off if the electrical circuit for the oxygen system does not reset to the correct condition.


OXYGEN
TMR RESET
FAULT
ON
(21VU)
OXYGEN
MASK MAN ON
AUTO
PASSENGER
SYS ON
CREW SUPPLY
OFF
FWD
ALTITUDE SWITCH

PASSENGER OXYGEN INDICATION PANEL

The monitoring of the gaseous oxygen system has indications and warnings, which are displayed to the cockpit crew on the Passenger Oxygen Indication Panel (POXIP) and by a white PASSENGER SYS ON light.

As additional attention getters, separate lights are placed next to the cylinder pressure display.

These lights will be switched on, in case the cylinder pressure decreases below some values.

Maintenance messages cannot be recorded automatically, since no maintenance computer will be installed.

Failures requiring maintenance activity will have to be noted by the flight crew, some failure messages will be displayed on the Quantity Calculation and Control Unit (QCCU) itself.

Indication of Failures

QCCU, Pressure and Temperature Transducer Failure of QCCU and/or Pressure Transducer and/or Temperature transducer.

Pressure value indication are replaced by "--" in BLACK / WHITE.

Indication by a light on the QCCU itself.

The crew must refer to the MMEL to determine the procedures and actions to accomplish when operating with the pressure indication inoperative.

In this case, the oxygen pressure has to be checked by direct reading before each flight.

Hand Valves on Oxygen Cylinder

One or more hand valves of the passenger oxygen cylinders are closed.

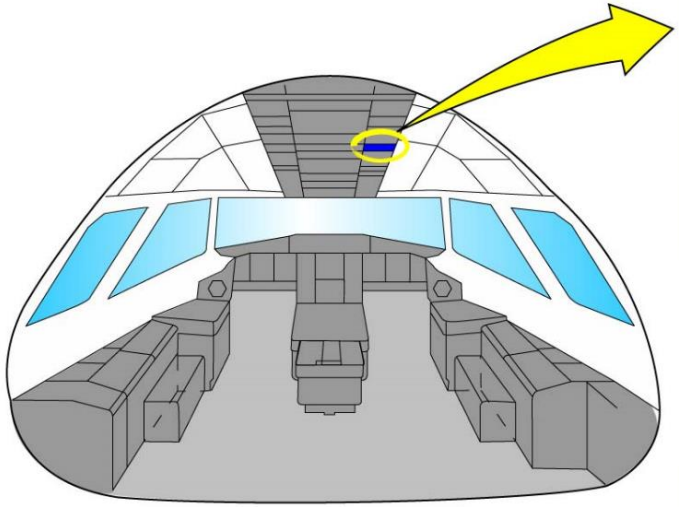
Flight phase inhibition 3-9 required using "engine running" signal.

CYLINDER FAULT light on in AMBER (class 1 failure).

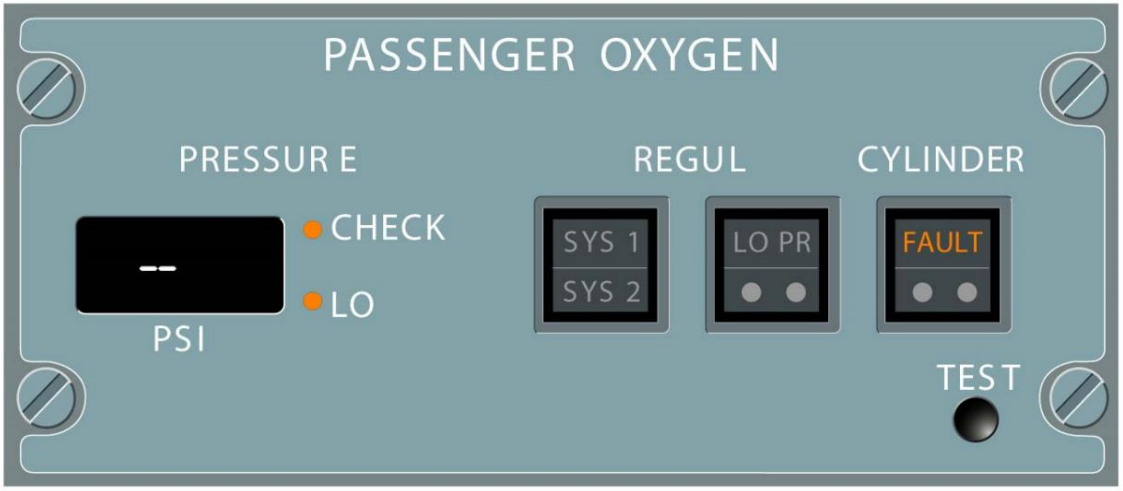
System Pressure Intermediate Line

The failure is shown if the system activated mode and standby mode:

System pressure downstream of pressure reducers is too low or in case of low pressure switch failure.



PASSENGER OXYGEN INDICATION PANEL (POXIP)



REGUL LO PR light ON in AMBER (class 1 failure).

Pressure Oxygen Regulator System standby mode:

One or both pressure oxygen regulators are not fully closed.

REGUL SYS1 and/or REGUL SYS2 light on in AMBER (class 1 failure).

SYS ON light on

System activated and system standby mode: One or both pressure regulators have a power loss.

REGUL SYS1 and/or REGUL SYS2 light on in AMBER (class 1 failure).

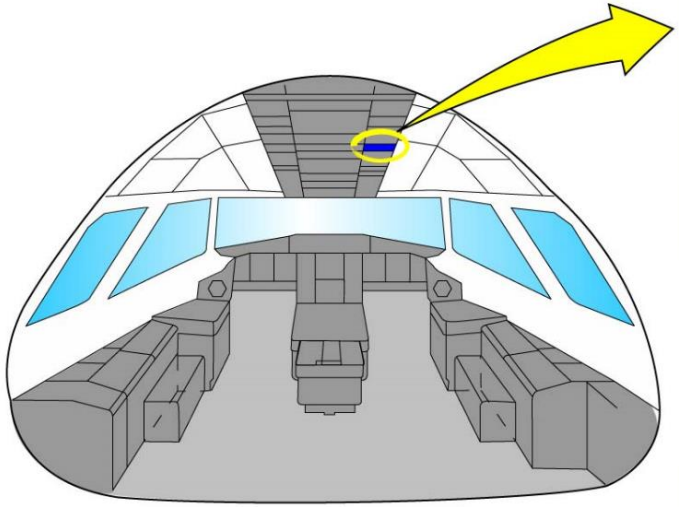
System activated mode: One or both pressure regulators are closed.

REGUL SYS1 and/or REGUL SYS2 light on in AMBER (class 1 failure).

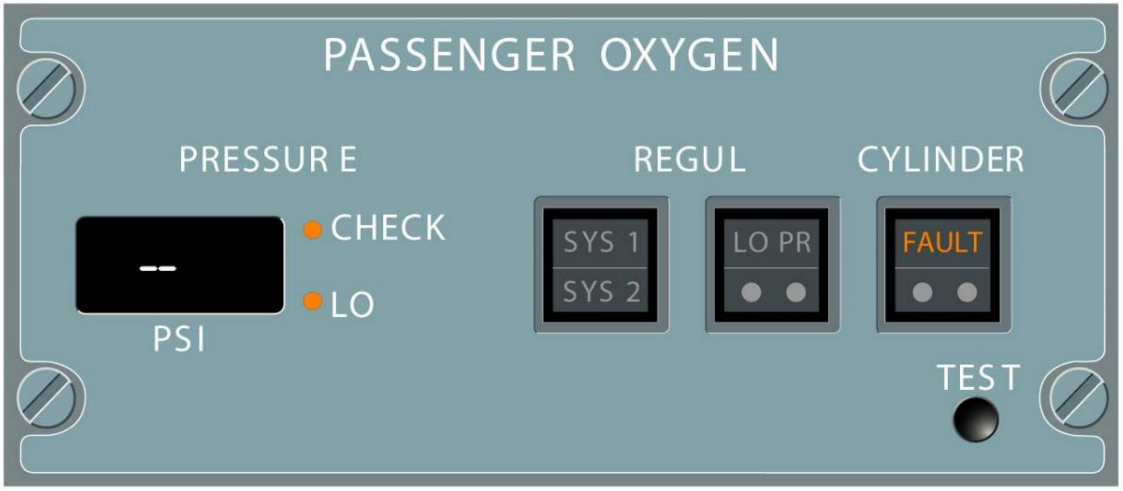
Circuit Breaker

The failure is when the circuit breaker for regulator is not activated:

REGUL SYS1 and/or REGUL SYS2 light on in AMBER (class 1 failure).



PASSENGER OXYGEN INDICATION PANEL (POXIP)



QCCU

The QCCU monitors the oxygen pressure in the installed oxygen cylinders.

The QCCU receives signals from:

the pressure transmitters integrated in each pressure reducer,

the temperature transducer.

The QCCU sends a signal of the arithmetic average pressure of the installed oxygen cylinders to the fill panel indicator (non temperature compensated) and a temperature adjusted pressure to the POXIP.

The QCCU also sends a signal to the POXIP if:

the QCCU does not operate,

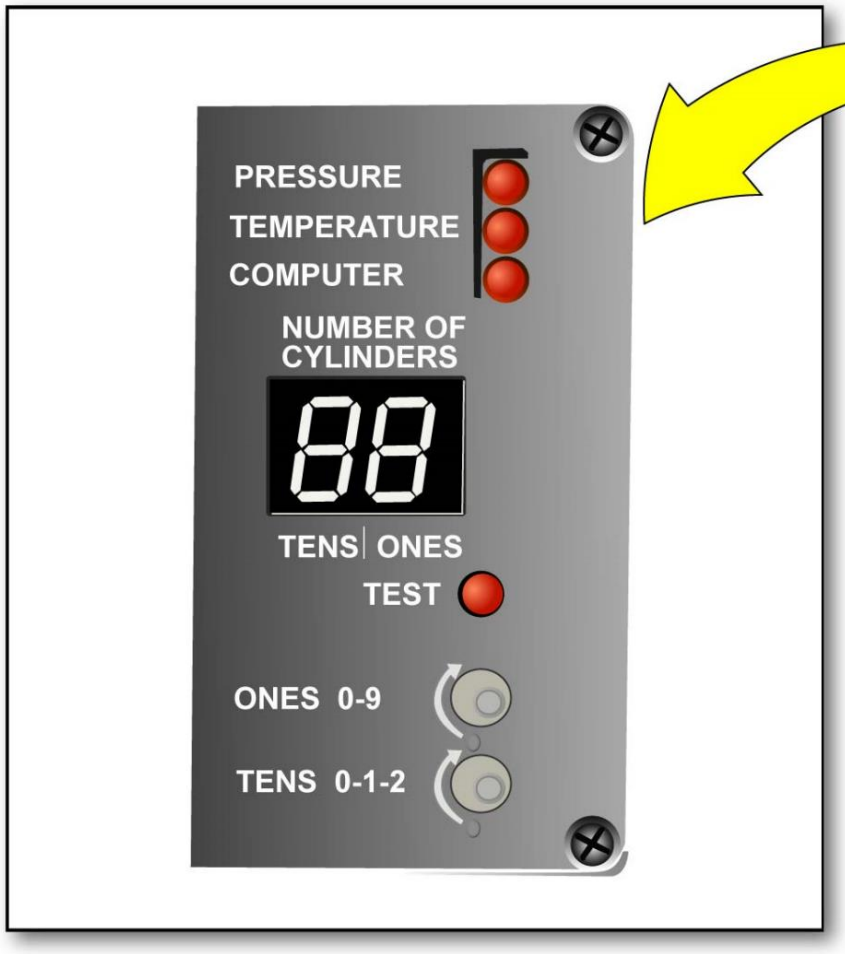
the signal from the temperature transducer is out of range,

the signals from the pressure transducers are out of range.

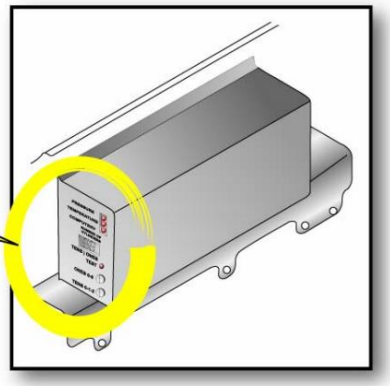
A "- -" instead of a pressure value will be displayed on the POXIP and the respective fault indication on the front of QCCU comes on.

Note: The QCCU is located behind a panel located near the passenger oxygen bottles in the Bulk Cargo Bay.

No image is available at this time



QCCU FRONT FACE



QUANTITY CALCULATION CONTROL UNIT (QCCU)

The QCCU has:

- A way to select the number of the installed oxygen cylinders,
- A way to display the number of oxygen cylinder selected,
- An indication to show fault conditions of the unit itself and related equipment e.g pressure reducers, temperature transducer,
- A way to test the indication of fault conditions and display.

COMPONENT LOCATIONS

The Passenger and cabin crew oxygen containers are above the seats in the hat racks, the lavatories, the galleys and the cabin attendant stations.

If installed, the optional gaseous oxygen is stored in oxygen cylinders installed behind the sidewall panels of the BULK cargo compartment, on the RH side.

The oxygen Pressure Reducer /Transmitter assembly is attached to each cylinder.

Pressure relief valve is installed between the intermediate pressure line and the overboard discharge line.

Thermal compensator is installed in the high-pressure line (fill line) directly upstream of the high-pressure oxygen filling port of each pressure reducer transmitter.

The temperature transducer measures the ambient temperature in the installation area of the oxygen cylinders.

The overboard discharge indicator is installed flush with fuselage skin visible from outside of the aircraft.

It indicates the occurrence of an over pressure in the high-pressure source or intermediate pressure part.

The indicator fill panel is installed on the oxygen fill panel and indicates the actual arithmetic mean pressure (not temperature compensated) of the installed gas cylinders.

The electrical signal is generated from QCCU.

Two redundant Pressure oxygen regulators are installed in the intermediate pressure line.

The low-pressure switch is installed in the intermediate pressure line.

There are three test ports.

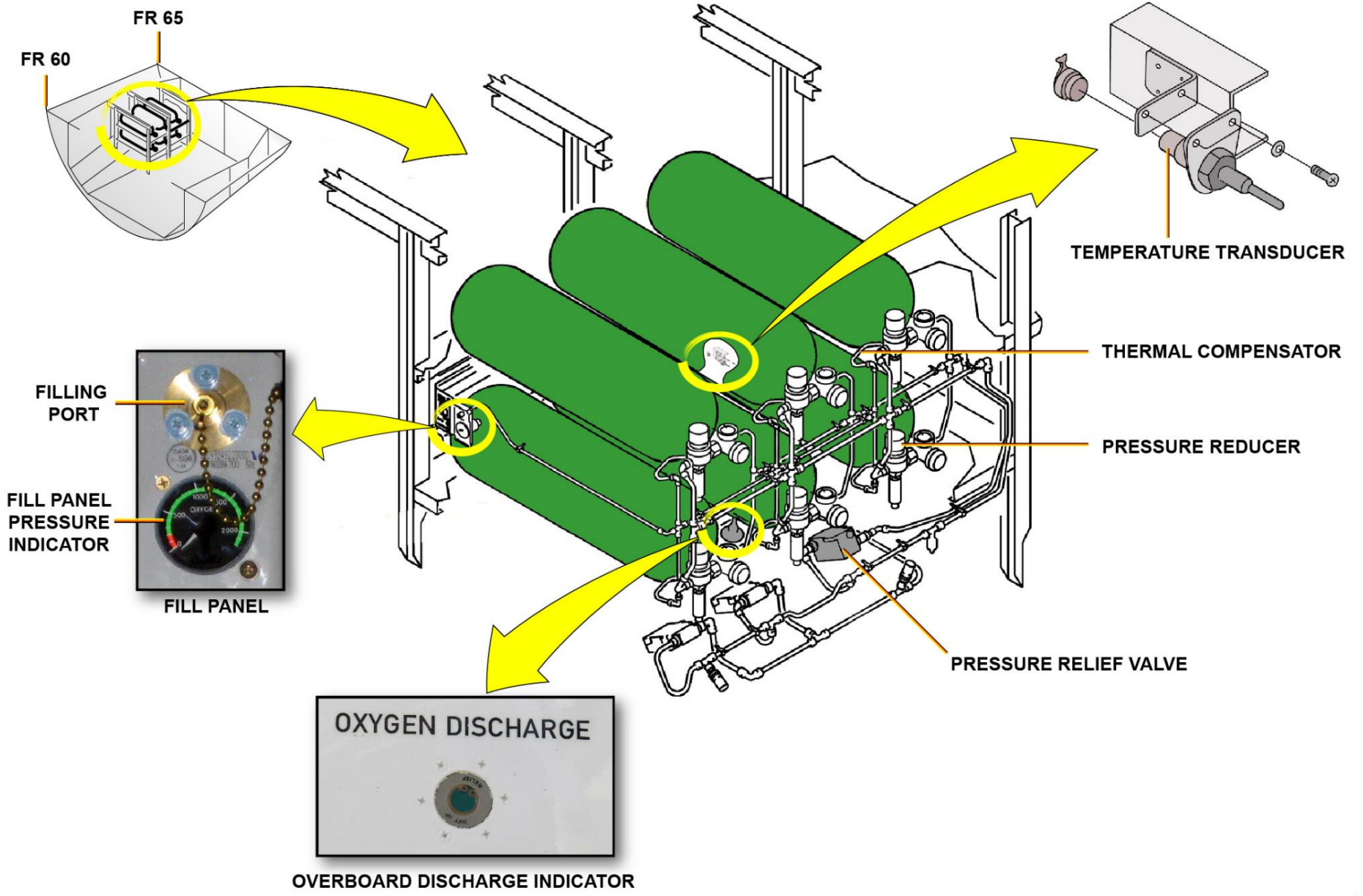
One is installed in the intermediate pressure line and the other two are installed in the low-pressure distribution network.

Passenger oxygen container assemblies are installed in the passenger service unit (PSU), in the lavatories, at the attendant stations, galley working areas.

Two types of oxygen containers (type I and type II) and different variants are used depending on installation location.

Type I installed in overhead stowage compartments to supply 2 to persons with oxygen.

Type II installed in galley working area, lavatories, and side walls to supply 2 persons with oxygen.

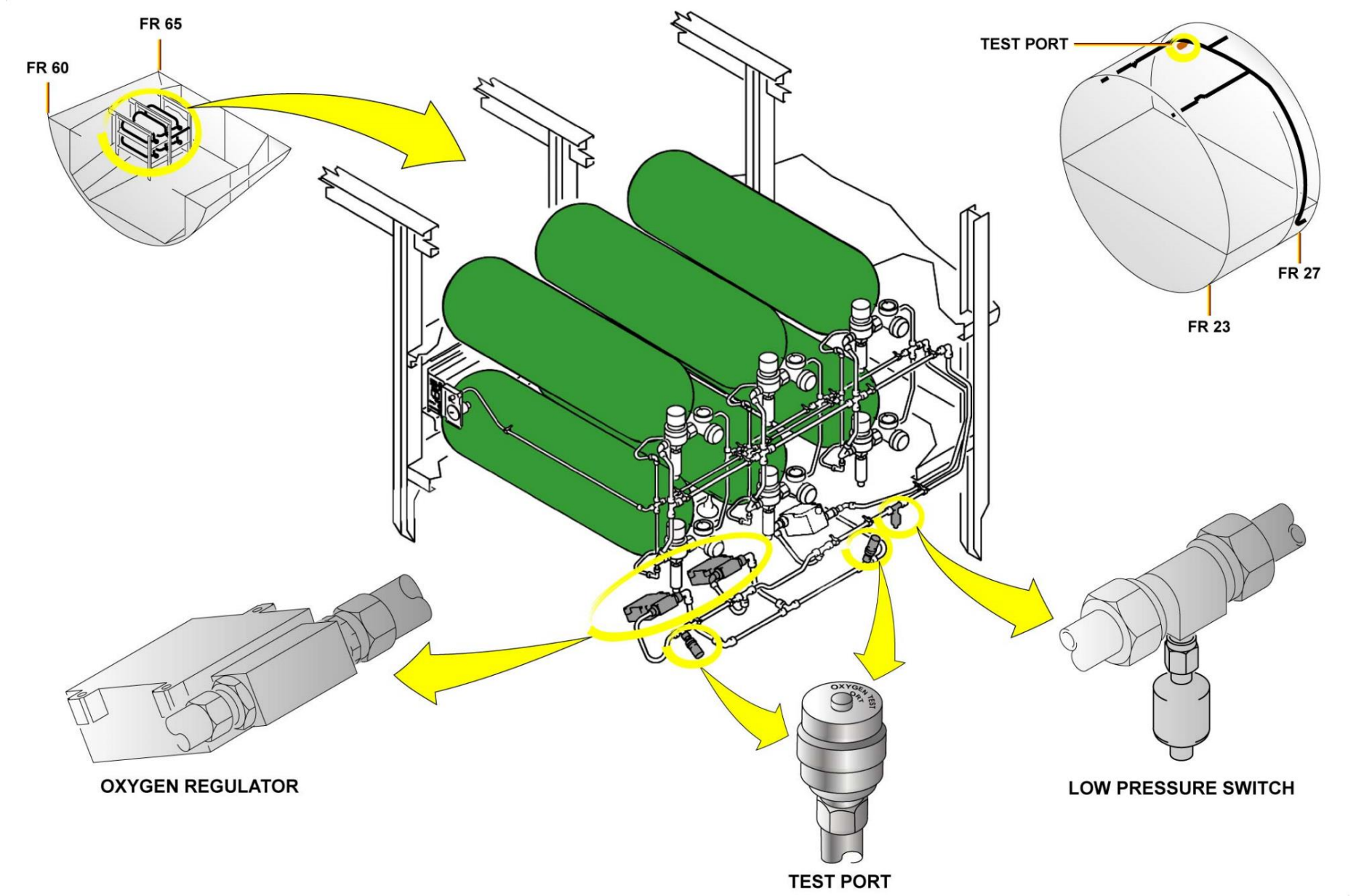

FR 65
FR 60
TEMPERATURE TRANSDUCER
THERMAL COMPENSATOR
PRESSURE REDUCER
FILLING PORT
FILL PANEL PRESSURE INDICATOR
FILL PANEL
PRESSURE RELIEF VALVE
OXYGEN DISCHARGE
OVERBOARD DISCHARGE INDICATOR

As an option, all the lavatories are equipped with Type II decentralized gaseous oxygen containers according to FAA Authority request.

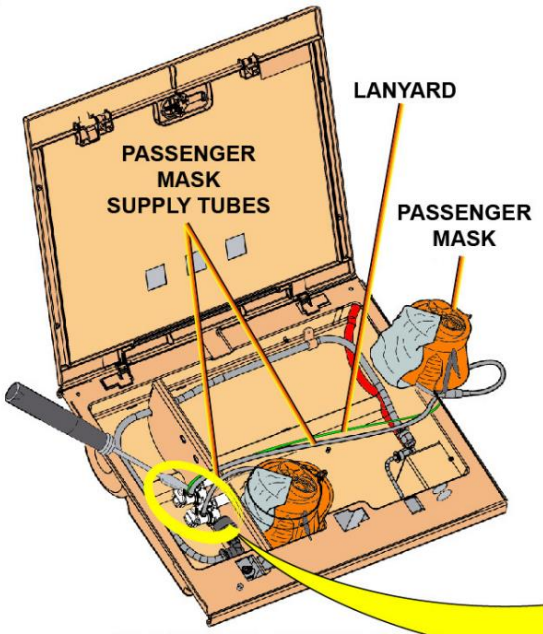
The oxygen source within the oxygen container is a 3000 psig high pressure oxygen cylinder with flow dosing instead of a chemical oxygen generator.

The Type II gaseous oxygen containers have the same dimensions and interfaces (electrical & mechanical) as the Type II chemical oxygen containers.

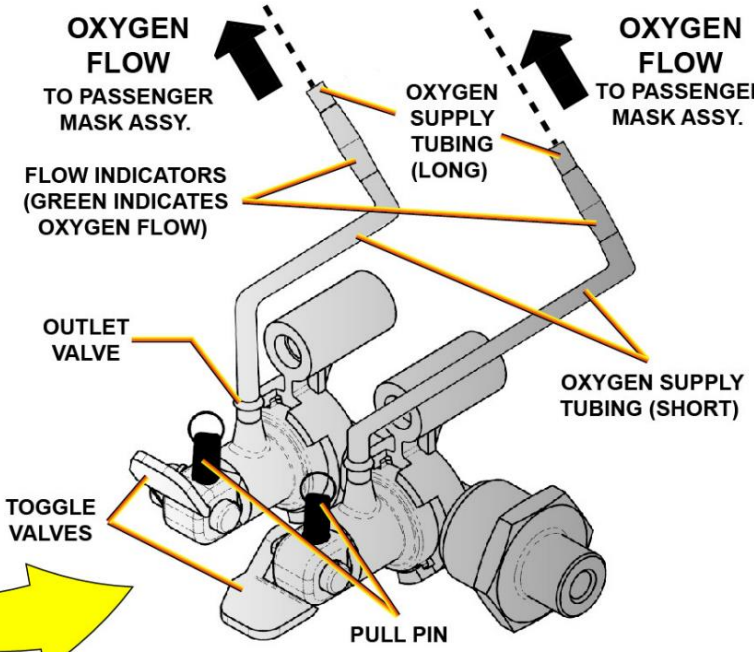
The oxygen supply time remains unchanged.


FR 65
FR 60
TEST PORT
FR 27
FR 23
OXYGEN REGULATOR
TEST PORT
LOW PRESSURE SWITCH

INTENTIONALLY BLANK



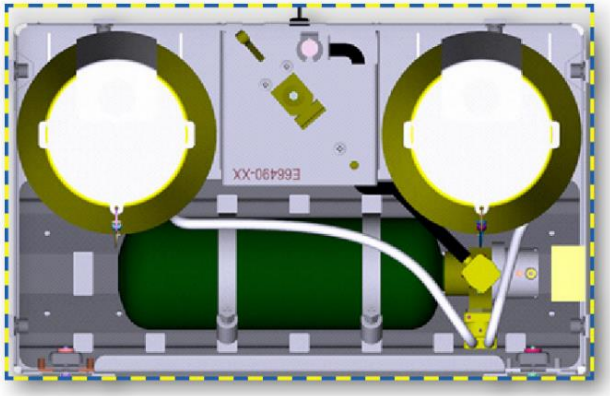
CHEMICAL OXYGEN CONTAINER ASSEMBLY (PASSENGER OXYGEN)



MANIFOLD ASSEMBLY (2 MASKS)

OPTION

CHEMICAL OXYGEN CONTAINER



DECENTRALIZED GASEOUS OXYGEN CONTAINER (LAVATORIES)

INTENTIONALLY BLANK