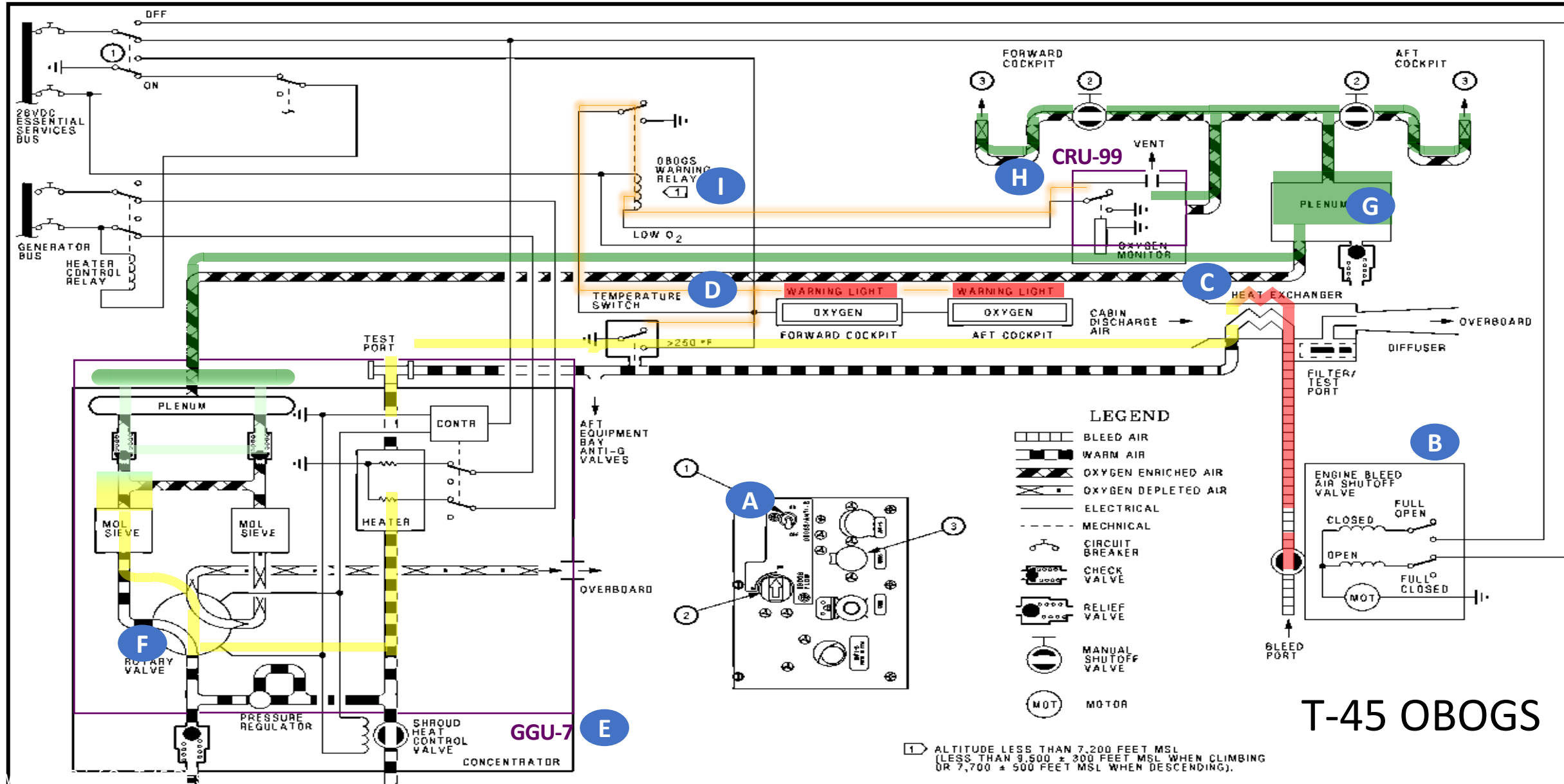


ANNEX F (1): T-45 DATA



T-45 OBOGS

2.19 ON-BOARD OXYGEN GENERATING SYSTEM

The OBOGS provides a continuously available supply of breathing air for the crew while the aircraft engine is operating. The OBOGS system consists of the bleed air shutoff valve, heat exchanger, concentrator, Solid State Oxygen Monitor (SSOM), and chest mounted regulator. Refer to On-Board Oxygen Generating System **FO-23**.

A pneumatic BIT button, located on the bottom of the oxygen monitor, checks operation of the sensor and the OXYGEN warning light. An electronic BIT button located on the front surface of the SSOM checks for operation of the circuitry between the monitor and OXYGEN warning light.

The anti-g system allows air pressure to the anti-g suit proportional to the g force experienced. A button on the OBOGS control panel allows the pilot to manually inflate and test the anti-g suit. The system incorporates a safety pressure relief valve.

2.19.1 OBOGS Operation

The OBOGS uses engine fifth stage bleed air which is cooled through a heat exchanger then directed to the concentrator. The concentrator is powered by the 28 Vdc essential services bus and contains rotary valves and molecular sieves which remove most of the nitrogen, CO₂, and water from the bleed air. This oxygen enriched air is routed through the cockpit plenum to the pilot services panel.

The overheat temperature sensor is located in the ducting between the heat exchanger and the concentrator. This sensor illuminates the OXYGEN warning light whenever the bleed air temperature exceeds 250 °F (121 °C).

The oxygen monitor continuously samples oxygen enriched air for the proper concentration level. When the oxygen level drops below an acceptable level the oxygen monitor illuminates the OXYGEN warning light. The OBOGS monitor does not detect contamination of the concentrator, which may cause hypoxia. Contaminants may be odorless and tasteless. A potential cause of contamination is prolonged OBOGS operation in the vicinity of aircraft exhaust, which contain toxic byproducts of fuel combustion. The risk of contamination also increases with uncontrolled oxygen flow, such as from removing mask(s) without placing the OBOGS FLOW selector(s) to OFF or from system or mask/hose leaks. The risk of hypoxia may remain for up to 20 minutes after a source of contamination is removed.

WARNING

Symptoms of hypoxia, regardless of altitude, require the immediate use of emergency oxygen in order to prevent progression to acute incapacitation.

At higher altitudes and lower power settings, the OXYGEN warning light may illuminate due to low oxygen concentration resulting from reduced bleed air flow to the OBOGS concentrator. Increasing the throttle slightly can restore adequate OBOGS inlet pressure and extinguish the OXYGEN light.

WARNING

An OXYGEN warning light indicates low oxygen concentration, and should be addressed immediately with emergency procedures if increasing throttle position fails to extinguish the OXYGEN light.

The aircrew mounted breathing regulator reduces both normal and emergency oxygen system operating pressures to breathing pressure levels. The regulator delivers the OBOGS oxygen enriched air, or emergency oxygen, to the pilot at positive pressure, the limits of which increase automatically with altitude. It interfaces with the hose assembly, which connects with the seat survival kit oxygen disconnect.

The OBOGS is controlled by the OBOGS/ANTI-G switch located on the pilot services panel in the front cockpit.

The SSOM automatically performs a power-up BIT, testing the monitors electronic components during the warm-up period. The OXYGEN warning light may illuminate momentarily during the power-up BIT. The monitor then automatically performs a periodic BIT on 60 second intervals during normal operation. If a fault is detected the OXYGEN warning light is illuminated.

Prior to AYC-1472, the anti-g system for both cockpits is controlled by the OBOGS/ANTI-G toggle switch located on the pilot services panel in the forward cockpit. After AYC-1472 the anti-g system is always on. Each pilot can test their anti-g system with the ANTI-G press to test button located on the pilot services panel. Suit inflation commences at approximately 2g and the suit pressure rises linearly with increasing g reaching 6.5 psi at 6g. Air pressure for the anti-g system is tapped downstream from the OBOGS heat exchanger.

2.19.2 OBOGS Emergency Operation

An emergency supply of gaseous oxygen is contained in an emergency oxygen bottle located in the survival kit. A pressure gauge is mounted on the emergency oxygen bottle and is visible on the left inside portion of the seat pan. The gauge has a red refill sector from 0 to 1,800 psi and full sector from 1,800 to 2,500 psi. During emergency operation, emergency oxygen is routed through the pilot's regulator to the mask. This supply is actuated automatically with seat ejection. The emergency oxygen supply can be manually activated by pulling the emergency oxygen green ring located on the left side of the survival kit.

The emergency oxygen will last 4 to 20 minutes, depending on cabin altitude and breathing rate. Emergency oxygen duration increases as altitude increases. The actuator can be reset after actuation by pushing down on the handle.

WARNING

If the OBOGS FLOW selector(s) is not placed to OFF when emergency oxygen is selected, OBOGS system pressure may prevent emergency oxygen from reaching the breathing regulator.

2.19.3 OBOGS/Anti-g Controls and Indicators

2.19.3.1 OBOGS/ANTI-G Switch

The OBOGS/ANTI-G switch is a two position toggle switch, located in the forward cockpit on the left console pilot services panel.

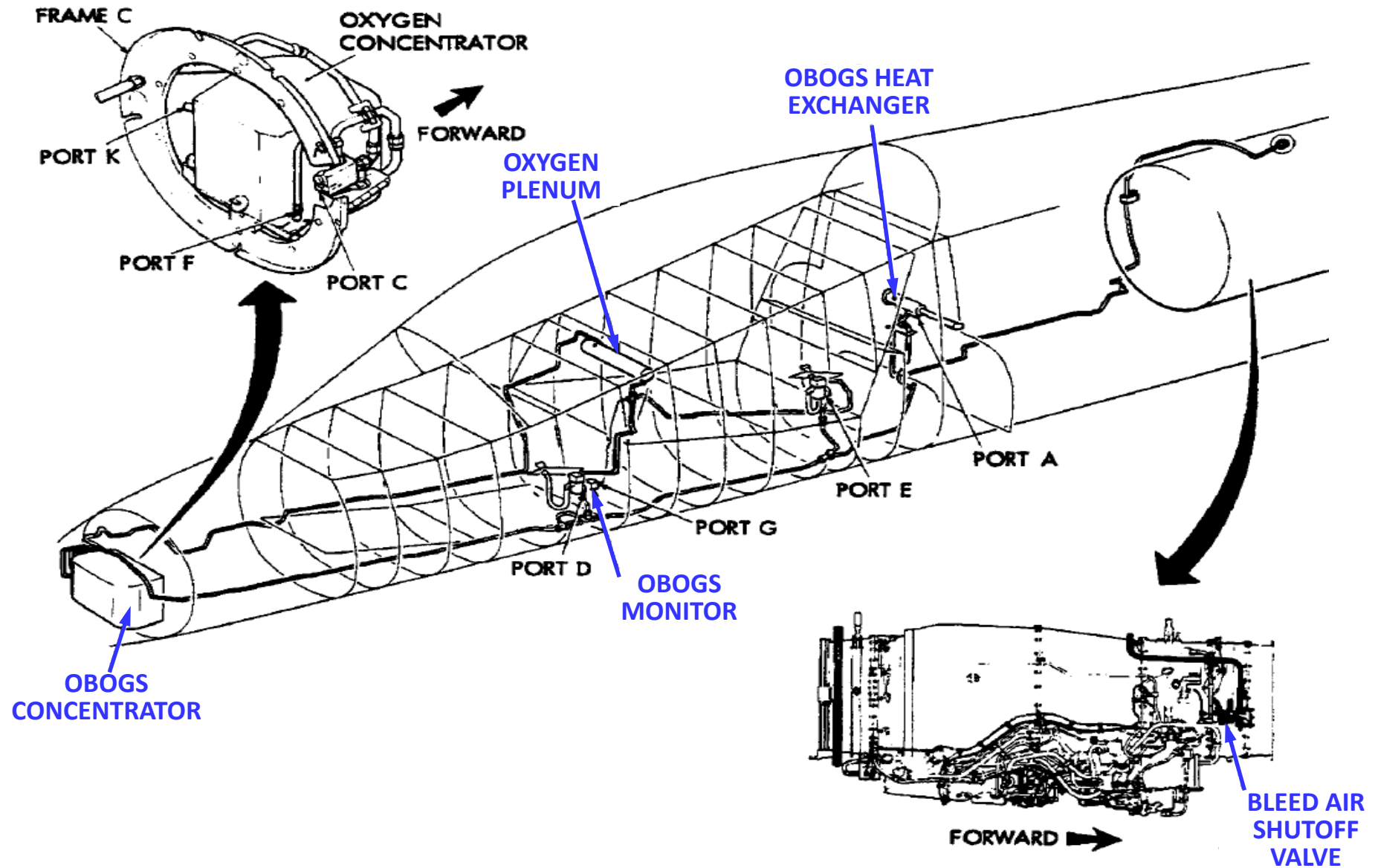
ON	Prior to AYC-1472, turns on the OBOGS concentrator and supplies bleed air to the OBOGS and anti-g systems. After AYC-1472, turns on the OBOGS concentrator only.
OFF	Prior to AYC-1472, closes the bleed air shutoff valve to turn off the OBOGS and anti-g system and turns off electrical power to the OBOGS concentrator. After AYC-1472, turns off the OBOGS concentrator only.

2.19.3.2 OBOGS FLOW Selector

The OBOGS FLOW selector is located on the left console pilot services panel.

OFF	Shuts off the OBOGS flow from the pilot services panel.
ON	Open OBOGS flow from the pilot services panel.

T-45 OBOGS General Arrangement



WARNING

Selection of any intermediate position outside of the detents may prevent intended operation.

2.19.3.3 OBOGS Pneumatic BIT Button

The OBOGS pneumatic BIT button is located on the bottom of the oxygen monitor, refer to **Figure 2-44**. The OBOGS pneumatic BIT allows cockpit air into the OBOGS monitor in order to reduce oxygen concentration and induce an OXYGEN warning light. OBOGS pneumatic BIT is accomplished by pressing and holding the button for up to 1 minute. Releasing the button allows only oxygen-enriched OBOGS air to enter the OBOGS monitor in order to increase the oxygen level. BIT success is indicated when the OXYGEN warning light extinguishes. Because of the recovery period in OBOGS performance and the risk of a stuck vent valve, OBOGS pneumatic BIT is not used during normal operations.

Note

When performing OBOGS pneumatic BIT, it is possible for the pilot to cover the OBOGS vent holes on the oxygen monitor, causing an incorrect BIT check.

The pneumatic BIT button can be rotated when pressed, locking the button in the pressed (BIT) position. To release the button, press, rotate the button in the opposite direction and release. The lock feature is intended to be used only during maintenance. If the pneumatic BIT is left in a locked position, it can cause intermittent OXYGEN warning lights and potentially lead to hypoxia.

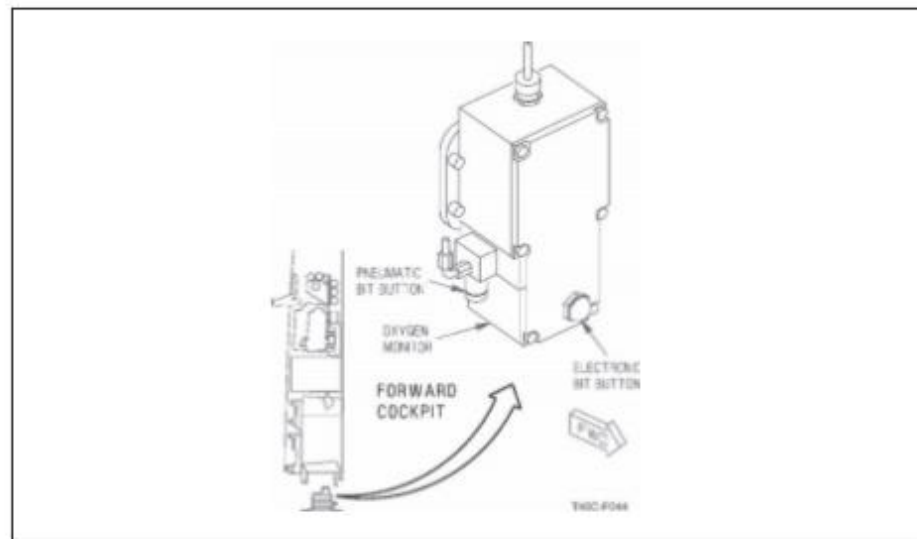
2.19.3.4 OBOGS Electronic BIT Button

The OBOGS electronic BIT button is located on the front side of the oxygen monitor, refer to **Figure 2-44**. The OBOGS electronic BIT artificially induces a low oxygen concentration signal in the monitor in order to check OXYGEN warning light circuitry. OBOGS electronic BIT terminates automatically. A successful OBOGS electronic BIT is required prior to flight in order to assure satisfactory OBOGS protection. BIT success is indicated by an OXYGEN warning light that extinguishes automatically.

WARNING

- Pressing and holding the electronic BIT button for longer than 30 seconds will place the monitor in Maintenance BIT status, which is not detectable by the aircrew and prevents normal monitor functioning. Aircraft power must be removed to exit Maintenance BIT.
- Automatic OBOGS power-up BIT and good mask flow do not ensure adequate OBOGS system performance.

Figure 2-44. Oxygen Monitor

**2.19.3.5 ANTI-G Press to Test Button**

The ANTI-G press to test button is located on the left console pilot services panel. Pressing and holding the button directs air into the anti-g suit to check the anti-g system operation.

2.19.4 OBOGS/ANTI-G Warning, Caution, and Advisory Lights**2.19.4.1 OXYGEN Warning Light**

The OXYGEN warning light is located on the caution/warning light panel. The light illuminates when an OBOGS failure is detected. Either low oxygen concentration from the concentrator or heat exchanger discharge air temperature exceeding 250 °F (121 °C) indicates a system failure. The warning light also illuminates when the OBOGS/ANTI-G switch is in the OFF position.

WARNING

Low mask flow or increased breathing resistance may occur without an accompanying OXYGEN warning, which indicate a potential OBOGS degradation that may result in oxygen levels below physiological requirements.