

# EDS

## Electronic 'Pulse-Demand' Oxygen Delivery Systems

The **EDS** is the lightest, smallest and most capable on-demand oxygen system available that delivers altitude-compensated pulses of oxygen as you inhale, using as little as 1/8 the amount of oxygen and 1/4 the weight and volume of conventional systems for flight operations up to 30,000 ft.

### What is EDS Pulse demand? How does it work and why is it better ?

The breathing cycle of a healthy person is such that 1/4 to 1/3 of the typical respiration cycle is spent inhaling while 2/3 to 3/4 is spent exhaling and pausing. In addition, only 1/4 to 1/3 of the total amount of oxygen taken in is absorbed into the blood.

The rest is simply exhaled back out and wasted.

Therefore, you benefit only from oxygen delivered at the very beginning of inhalation cycles as it leads deep into the most functional and optimum oxygen absorbing part of the lungs. The **EDS** utilizes these well known physiological facts, providing the smallest, lightest and most efficient aviation oxygen system available. The **EDS** monitors micro-pressures from inspiration efforts, to deliver a calibrated pulse of oxygen at the instant it is detected and not at any other time. Ongoing efficiency measurements have shown that up to 90% of the oxygen the **EDS** delivers goes directly into the bloodstream. This 'Pulse-demand' technique is the most efficient

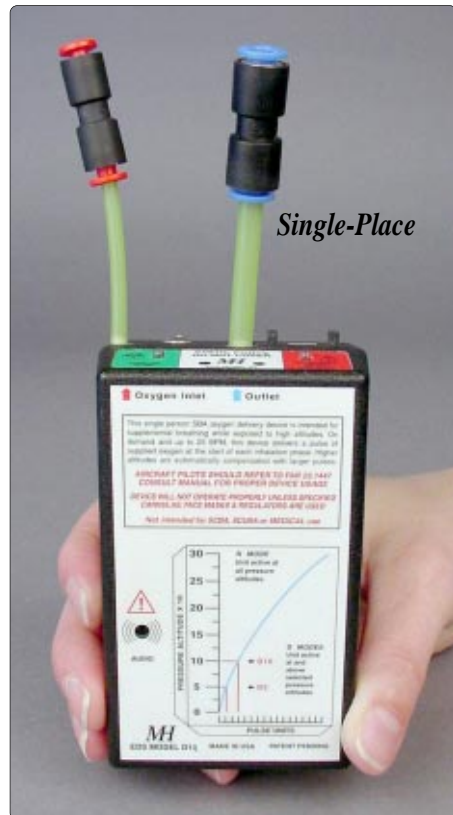
way known by respiratory physiologists to saturate

the blood to levels well over 90% at high altitudes while using as little as one-tenth the oxygen than the typical constant flow systems. Actual altitude chamber tests at pressure altitudes well over 30,000 ft. have yielded blood saturation levels above 90% while using the cannula. However, for flight operations past 17,999 ft. a face mask may need to be used to comply with FAR 23.1447.

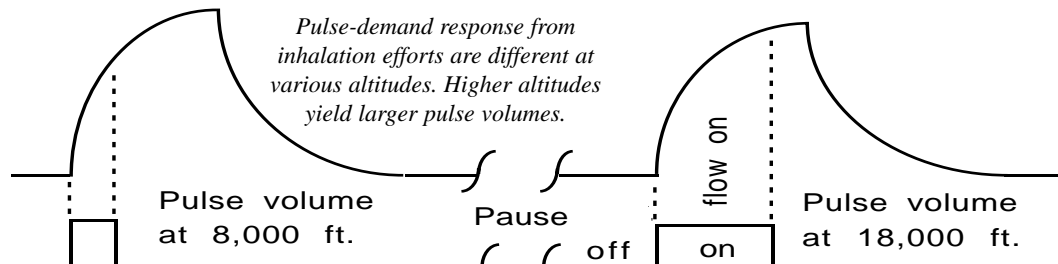
The **EDS** has a precision micro-electronic pressure altitude barometer that automatically determines the volume for each oxygen pulse. Higher altitudes are compensated with pulses of greater volume. The **EDS** can be set to one (1) of two (2) 'D' (day or delayed) modes where it will not respond with oxygen until it senses pressure altitudes around 5k and 10k ft., saving oxygen below altitudes where it is not needed. It can be set to 'N' (night or now) mode for night flying where it responds from sea-level and up. Both modes provide the same amount of oxygen, automatically tracking altitude changes. In addition to three (3) selectable offset modes to accommodate face masks, it limits its response to a maximum respiration rate of about 20 breaths per minute, virtually eliminating hyperventilation (which is usually encountered in stressful conditions). There are no scales to observe or knobs to turn as you climb or descend. Adjusting (zeroing) for new barometric pressures is not needed because the **EDS** responds directly to pressure altitude as do the physiological properties of your body. The **EDS** is a truly automatic oxygen delivery system enhancing your safety and well-being.



The EDS-D1 internal PCB module showing analog & digital state-of-the-art micro-electronic components.



Single-Place



*Occasionally something comes along that improves the way we've done something all our lives.  
The EDS vastly improves the way a pilot breathes.*

**EDS**

*Electronic 'Pulse-Demand' Oxygen Delivery Systems*

A standard 9 volt alkaline battery may power the **EDS-D1a** for 40 hours. An external power jack electrically replaces the internal battery with external power once plugged in. A low battery indicator gives plenty of time before complete battery exhaustion. A "Flow-Fault" alarm signals that the oxygen supply is either off, has run out or the battery is exhausted. The **EDS-D1a** uses standard aviation type nasal cannulas and may be adaptable to many aviation face masks. The **EDS-D1a** unit measures 6.6 X 10.4 X 3.81 cm. (2.6 X 4.1 X 1.5"). Full-Dress weight is 0.23 kg. (8 oz.) and can be mounted well away from the cylinder at any angle. Very small single-place to large multi-place **EDS-D1a** systems are available. The **EDS-D1a** can be ordered with or without any of our cylinders or with the **EDS-STR** regulator (not shown) that allows operation from a built-in aircraft oxygen system operating up to six **EDS-D1a** units together. *Many single and multi-place EDS systems have flown around-the-world and have allowed pilots in all types of aviation to make and break some sort of record involving altitude and duration.*



Each EDS system

comes with a standard cannula for flight operations up to 18,000 ft. and a face mask for flight operations over 18,000 ft.

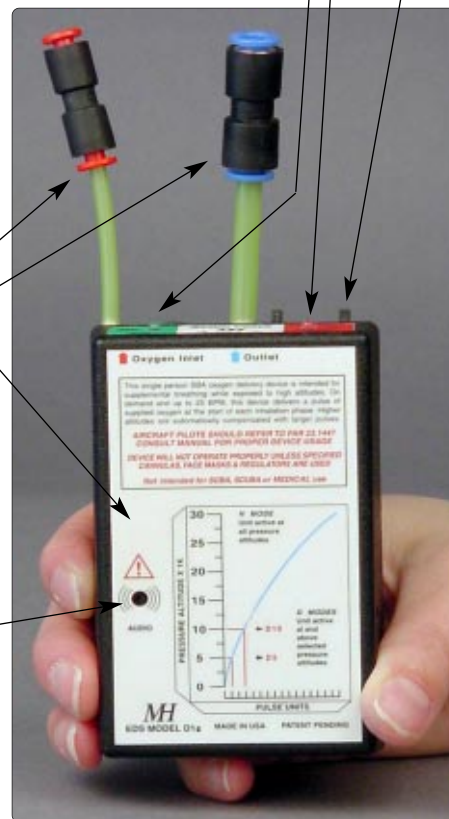
*Color-coded quick connector unions on each EDS-D1 unit help keep connections secure and tight. 4 mm. inlet (red) 6 mm. outlet (blue)*

- Power ON/OFF, mode control switch with indicator
- Oxygen flow-fault & Low Batt red LED
- Positive Oxygen flow green LED

- Color and size coded inlet & outlet unions.
- Red (4 mm.) Inlet
- Blue (6 mm.) Outlet

Operational placecard

Audio Sounder



EDS-011 system

The **EDS-480** dual (pictured left) uses the **CFE-480** glass-fiber-wound cylinder measuring 4.50" (11.43 cm) by 17.5" (44.45 cm) with regulator. Volume; 515 liters (18.18 cu. ft.) @ 3,000 psig. or 317 liters (11.21 cu. ft.) @ 1850 psig. @ 70° F. @ 1.0 atm. Empty weight with regulator, two **EDS-D1** units, cannula, mask, cylinder harness and hardware; 7.5 lbs. (3.4 kg). Operation time @ 18,000 ft.; 14:20 manhours typical.\*

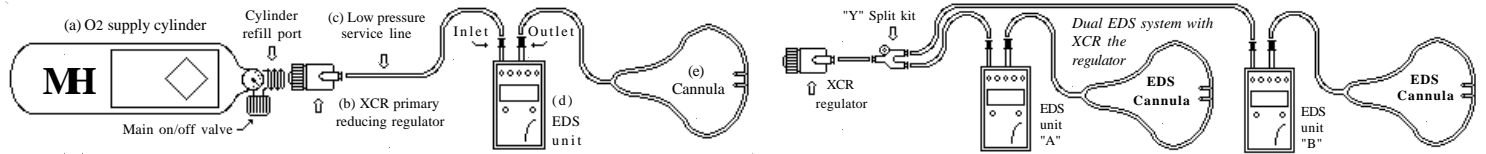
The **EDS-011** single place (pictured right) uses the **KF-011** Kevlar-fiber cylinder measuring 3.6" (9.5 cm) by 22.75" (57.80 cm) with regulator. Volume; 11.21 cu. ft. @ 1850 psig. @ 70° F. @ 1.0 atm. Empty weight with regulator, **EDS** unit, cannula, mask, cylinder harness and hardware; 3.75 lbs. (1.7 kg). Operation time @ 18,000 ft.: 14:20 manhours.\* **Full-Pack & Tuff-Pack** harnesses are *strongly* recommended for all fiber-wound cylinders.

Also available is our **EDS-022** dual-place system (not shown) that doubles the manhour figures of the **EDS-011** dual-place system. This system uses our **KF-022** 634 liters (22 cu. ft.) Kevlar fiber cylinder that weighs a mere 6 lb (2.72 kg.) **Filled!**. Go to our web-site or call for details.

\* *The EDS is an on-demand system, giving as little or as much (up to 20 resp/min.) oxygen as the user demands. Cylinder service time may not be the same from person to person. Therefore, typical-case times are quoted. See cylinder duration chart, page 4*

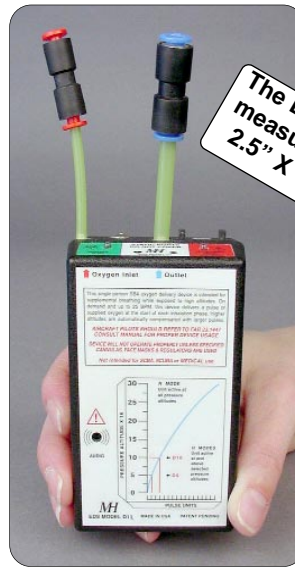
# EDS System Description & Application

The basic EDS system consists of the following items; the main oxygen cylinder (a), the XCR primary reducing regulator (b), the low-pressure service line (c), the EDS unit (d) and the breathing cannula or face mask (e). The EDS should be used with an XCR, XCP, In-line or RCR regulator for correct pressure and oxygen delivery. Other oxygen sources could be used if at 15 psig. @ 20 liter/min. Other oxygen cylinders can be used with the EDS system & regulator providing that the industry standard (CGA-540) service/refill fitting is used on the cylinder. The low pressure service line (c) is a high-quality polyurethane line that is kink-resistant and flexible under varying temperatures. The cannula/face mask and service line connects to the EDS unit via "Quick-Connects" providing an air-tight fitting by hand. These fittings can be connected and disconnected many times over.

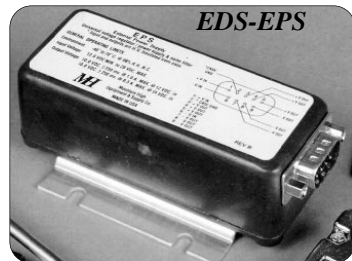
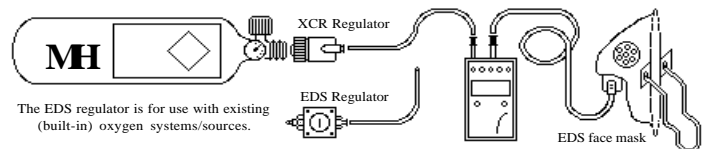


The EDS unit operates for up to 40 hours on one alkaline 9 volt battery. The EDS unit has an external power jack so that it can be operated from an external battery or power source. The power jack will automatically cut-over the internal battery. This can be used as an emergency battery cut-over system for exposed flight applications like soaring, ballooning or ultralight aircraft. This allows the external battery to be placed in a warmer area (flight suit) to prevent loss of battery power due to the cold. The EDS system can be expanded via our "Y" split-kits. These split-kits are quick-connect systems allowing up to six EDS units on one XCR regulator. Figure 2. shows an application for a typical dual EDS system for flight levels below 18,000 ft.

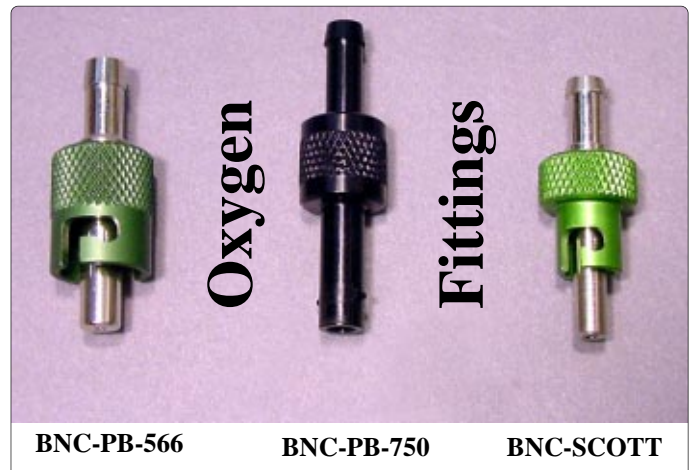
*With the XCP connecting kit the EDS-D1a can be used with a XCP system at the same time the MH3 and MH4 flowmeters are being used.*



The optional EDS-STR oxygen stabilizer regulator allows you to operate (up to four) EDS unit(s) from a non-regulated oxygen source. such as an aircraft with a built-in oxygen system. The EDS-EPS voltage stabilizer regulator does with the aircraft electrical supply for (up to four) EDS units what the EDS-STR does with the oxygen supply. Together these optional items allow you to custom build the portable EDS units into your aircraft.



*The EDS regulator can be optionally ordered with one of the three most common OEM type connectors for direct 'Plug-n-Fly' with your aircraft type.*



## EDS O<sub>2</sub>D<sub>2</sub> System Description

One for Two . . . The MH EDS O<sub>2</sub>D<sub>2</sub> Two Place Pulse-Demand Oxygen System

The EDS O<sub>2</sub>D<sub>2</sub> with the patented digital electronic “Pulse Demand” oxygen delivery system enables the general aviation pilot and passenger to fly at pressure altitudes up to 30,000 feet with safety and comfort. The O<sub>2</sub>D<sub>2</sub> digital pulse demand system reduces oxygen consumption dramatically. Different from the “standard” constant flow systems, the O<sub>2</sub>D<sub>2</sub> pulse demand system wastes no oxygen during the breathing cycle (exhaling and pausing before inhaling again) when oxygen is not being delivered to the lungs. Studies show that 90% of the oxygen supplied by the EDS Pulse-demand technology is transferred to the blood. The average user will enjoy a conservative consumption drop of four times compared to the constant flow systems. The system operates with two people for up to 50 hours on (3) three ‘AA’ alkaline batteries. A low battery warning gives about three hours.

• Power ON/OFF mode control switch and indicator.

Easy to use, the two-person O<sub>2</sub>D<sub>2</sub> with a built-in barometer reduces oxygen system workload to almost nil. There are no oxygen flow indicators to watch nor do you have to manually operate a flow valve, as you would with the constant flow system, due to altitude changes. Two push buttons cycle the O<sub>2</sub>D<sub>2</sub> through the various modes that automatically deliver the required supplemental oxygen pulses for various altitudes for both the pilot and passenger.

The complete standard system consists of an aluminum oxygen cylinder (buyer has a choice of sizes with upgrades available to very lightweight composite cylinders), a cylinder carry case, primary reducing regulator, low pressure service line, connection fittings, the EDS O<sub>2</sub>D<sub>2</sub> unit, breathing cannulas, face masks, and a tote bag. The EDS Pulse Demand Technology is the only aviation oxygen system that adapts automatically and independently to the needs of each person using it.



Color and size coded inlet & outlet unions.

- Blue (6 mm.) outlets
- Red (4 mm.) inlet



- Oxygen flow status & Low Batt LEDs
- Green for Positive O<sub>2</sub> flow
- Red for Flow-Faults
- Winking red for low battery

All controls, indicators and connections are mounted on the front panel so that the unit can be slipped into a pocket



D-loops molded into the case allows the unit to be mounted to almost anywhere desired

