

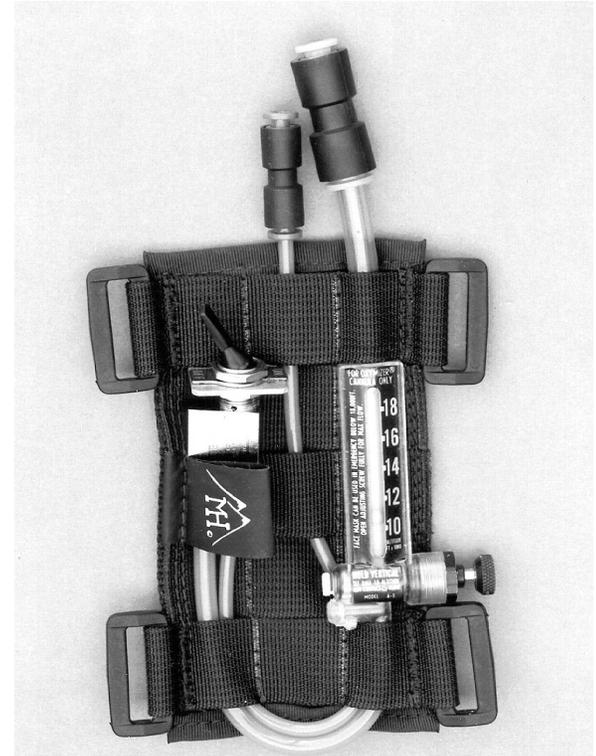
# Operation & Safety Manual

for the

# XCR

## Cross Country Racer Portable Aviation Oxygen Systems

R8



### Using Nasal Cannulas in Aviation

*The cannula type breathing device can be used up to 18,000 ft MSL. Pilots should refer to FAR 23.1447 to see if any restrictions apply for their use of cannula type breathing devices in the operation of their aircraft.*

### Basic Safety

*The XCR Oxygen system deliver pure oxygen for the purpose of supplemental breathing. They are not intended for medical use. The administration of oxygen should be done by a doctor or emergency medical technician with equipment made for that use. Pure oxygen is a highly oxidizing gas in nature and can vigorously accelerates combustion. It can provide a catalyst for spontaneous combustion and may cause personal injury or death if not used properly and with caution. DO NOT use any type of oil or grease on any of the fittings, valves or cylinders. DO NOT use the system while smoking or near an open flame.*

**MH** Aviation Oxygen  
Management Systems

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Tel: 541-923-4100 Fax: 541-923-4141

## A word about oxygen in general

Oxygen is oxygen. There are no specific grades or purities with oxygen under pressure that has been produced by liquefaction. Therefore, oxygen under pressure regardless of the cylinders claim must be 99.9% pure or the cylinder will be damaged by rust or corrosion prematurely. All utility oxygen cylinders will (must) have a service fitting of type CGA-540. This will be for welding, aviation and medical purposes. Oxygen specifically intended for medical purposes will most likely have a service valve fitting of type CGA-870 (sometimes referred to as a post valve) to help make distinction with a hygiene protocol but is still no different. Oxygen for medical purposes does have a specific protocol for hygiene and transport. There are, however, various mixtures of air that may be used strictly for medical purposes or industrial and is not interchangeable and may be the reason many think that there is different grades of oxygen purities. Vessels holding these air mixtures will have a CGA-346 type service fitting that is not compatible with the CGA-540 fitting for oxygen. Once again oxygen is oxygen. It can't be under pressure without any adverse reaction if it is not as pure and dry as possible. The CGA, Compressed Gas Association has adopted and helped develop almost all the standards for compressed gasses used in the USA and adopted by the FDA, DOT and other government agencies as well as many foreign governments. They have a variety of documents about compressed gases, vessels and fittings. To receive specific information, contact the:

***Compressed Gas Association, inc.***  
***1235 Jefferson Davis Highway***  
***Arlington, VA. 22202.***

as of 1994

## Hazards of high pressure oxygen and transfilling

*(refilling your cylinder)*

Transfilling of gaseous oxygen from one cylinder to another involves hazards associated with the handling of oxygen under pressure. A hazardous condition does exist if high pressure oxygen equipment becomes contaminated with hydrocarbons such as oil, grease or other combustible materials which may include oil from a person's hands or contaminated tools.

A cylinder will heat as it is filled from a high pressure source. The more rapidly the cylinder is filled, the higher the temperature rise in the cylinder resulting from the heat of compression of the gas. Excessive temperature may result in the ignition of any combustible materials that may be present in the system. Refill the cylinder at a flow rate that reduces heating of the cylinder. Use only equipment designed for refilling and transfilling.

Although oxygen itself is nonflammable, materials which burn in air, which is 21% oxygen, will burn much more vigorously and at higher temperatures in an oxygen enriched atmosphere. If ignited, some combustible materials such as oil will burn in oxygen with explosive violence. Many other materials which do not burn in air will burn vigorously in oxygen-enriched atmospheres. Ignition temperatures are reduced in oxygen-enriched atmospheres. Compressed oxygen presents a hazard in the form of stored energy.

Open the cylinder valve slowly. The rapid release of high pressure oxygen through orifices, control valves, etc. in the presence of foreign particles may cause friction or impact resulting in temperatures which may be sufficient to ignite any combustible materials that may be present in the system.

You can have your cylinder refilled by any industrial gas supply facility, airport and at some medical equipment companies. Each cylinder has been hydrostatically tested and stamped with the date of the test. This is good for 5 years. After this time frame, it will need to be tested and certified again before it can be filled and used. Again, almost any industrial gas and welding supply facility that services and/or refills oxygen cylinders can do this.

### **Cleaning for dirt, oil and greases**

*basic hygiene for oxygen equipment*

If any part of the system should become contaminated or you suspect so, you can clean it with hot water and detergent. Do not use the system if it has become contaminated with oil or grease. If the contamination is mild a liquid form of automatic dishwasher detergent or the cleaning product "Formula 409" has shown to work well for this purpose. This type of detergent is able to cut and remove almost all types of oils or greases and will rinse off without any detectable residue.

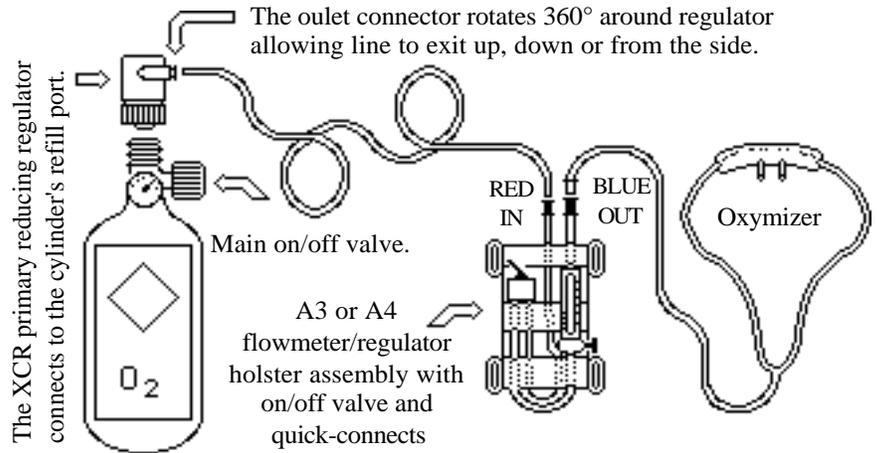
To test for contamination take a clean cotton swab "Q-Tip" and wipe the suspected area with it. With a cup or bowl of CLEAN water do this test. While you are observing a clear reflection of light on the water's calm surface, place the tip of the cotton swab into the water. You should not detect any oil what-so-ever bleed from the cotton tip fanning out over the waters surface. This is an accepted method for oil contamination detection. An oil clean surface will pass this visual test without any doubt.

If the service line should become contaminated internally by oil or grease it can be cleaned by soaking the entire line in a vat of hot water and a liquid form of automatic dishwasher detergent. Rinse the line in hot water and inspect. If contaminants are still present repeat soaking. Dry the line by hanging it vertically in a hot air or direct sunlight environment. However, if the contamination is more or so severe you may have to perform the cleaning process several times or use a solvent such as type "111 trichloroethane".

# The XCR Oxygen Delivery system

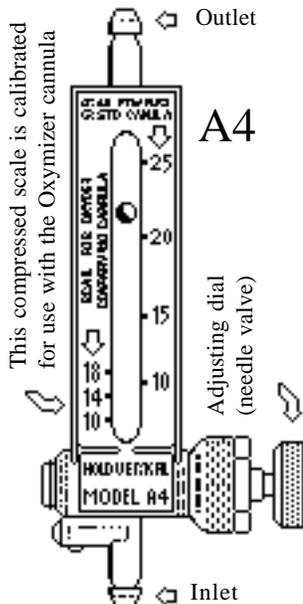
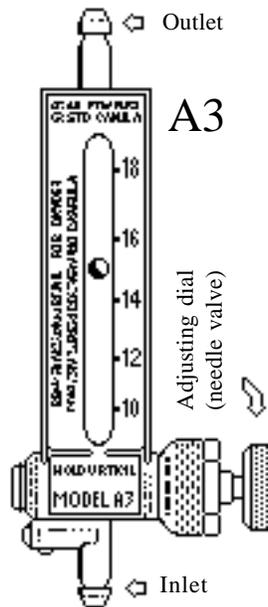
*light-weight, compact, high-duration competition oxygen system*

The XCR (Cross Country Racer) is a high-duration carry-on oxygen system for multiple aviation uses. The XCR system is comprised of the cylinder, the XCR primary reducing regulator, 5 feet of high-quality kink-proof polyurethane service line, one XCR holster with your choice of either A3 or A4 flow meter with remote on/off valve and an "M" type Oxymizer oxygen conserving cannula. You can add up to four (4) flow meters to one XCR regulator with optional split kits. "D" rings on the corners of the pilot control harness/holster allows freedom to mount it to your arm, leg, shoulder-strap, uprights or almost anything.

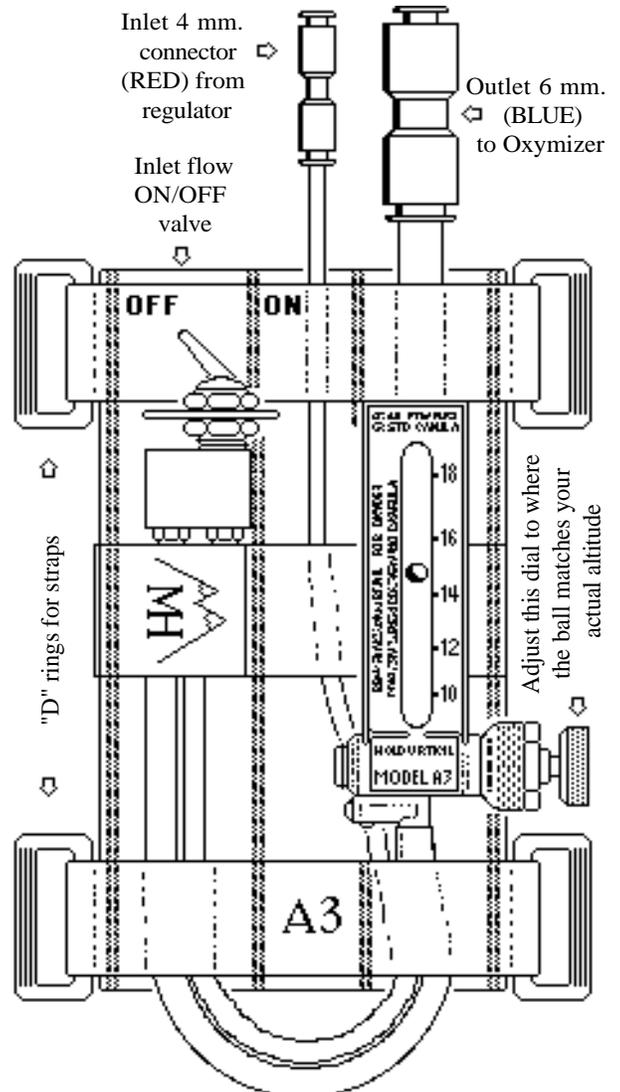


The XCR holster/harness holds the A3 or A4 flowmeter and secondary on/off valve. The four "D" rings provide a method to use almost any type of straps. It can be mounted via straps to yourself, shoulder strap or almost anywhere desired.

The XCP system comes with the A3 or A4 flow meter. The A3 has an altitude/flow scale calibrated for the unique Oxymizer oxygen-conserving cannula. The scale is marked in 2,000 ft. increments, for flight levels (up to 18,000 ft.). To receive the proper amount of oxygen, simply adjust the A3 to where the scale reads the same altitude you are flying. Example: If you are at 15,000 ft. you would hold the meter vertical and adjust the needle valve on the A3 to where the ball reads between the 14 and 16 on the scale. Counter clock-wise increases and clock-wise decreases oxygen flow. The outlet flow of the A3 can be adjusted well beyond the limits of the scale for emergency purposes.

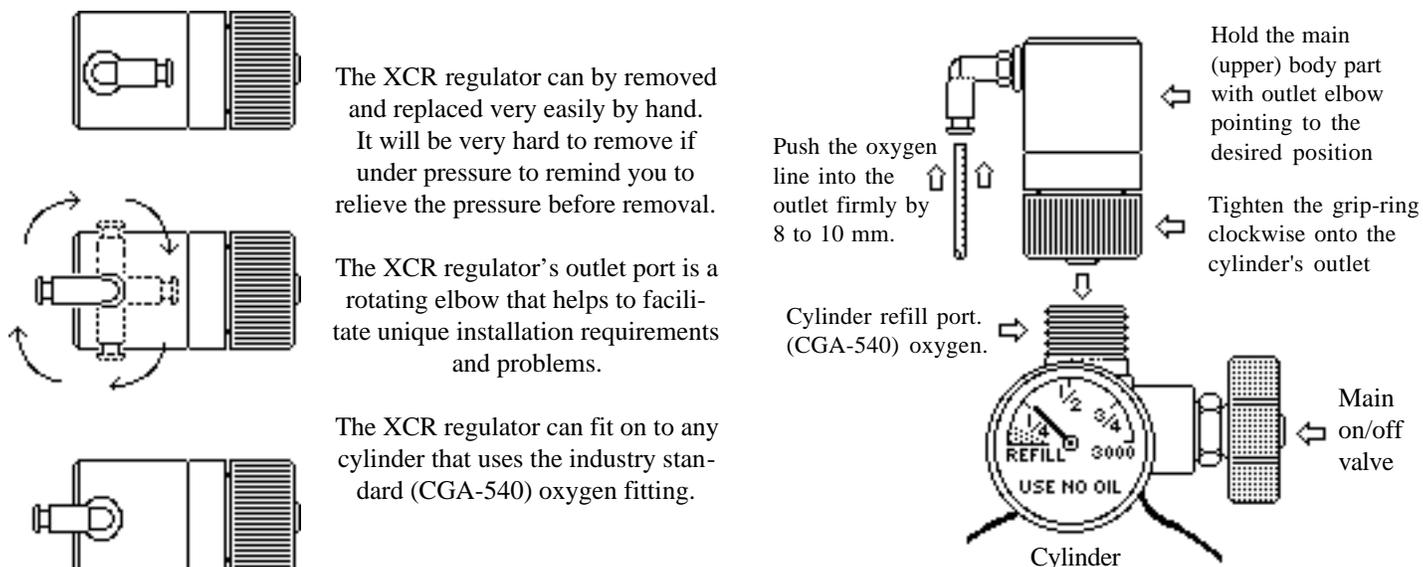


You can operate the XCP at flight levels (above 18,000 ft.) with the optional A4 flow meter and associated F1 face mask. This will, however, use much more oxygen. One (1) liter/min. per 10,000 ft. The A4 has two altitude/flow scales. The left (compressed) scale is calibrated for the Oxymizer cannula and is limited to flight levels (below 18,000 ft.). The right scale is calibrated for a standard cannula and face mask and is limited to 25,000 ft. The outlet flow of the A4 can be adjusted well beyond the limits of the indicated scale for emergency purposes.



## Assembly of the XCR delivery system

The flow of the XCR regulator is remotely controlled via a small ON/OFF toggle valve mounted in a fabric holster/harness that can be mounted conveniently close to the pilot. Because the XCR regulator is a "constant pressure" type, the system will not blow lines off fittings while the pilot control valve is off. The Oxymizer® nasal cannula in conjunction with your nasal cavity operate as a diluter demand regulator by conserving oxygen in a reservoir between breaths. This allows maximum use of your oxygen where only 1.0 liter/minute of oxygen enables persons (without any medical conditions) to get more than 90% Sat of O<sub>2</sub> in their blood for pressure altitudes up to 20,000 ft. Standard cannulas need about 2.0 to 2.5 liters/minute to achieve this. The XCR regulator connects by hand to any O<sub>2</sub> cylinder that has the industry standard CGA-540 outlet service connection.



### CAUTION

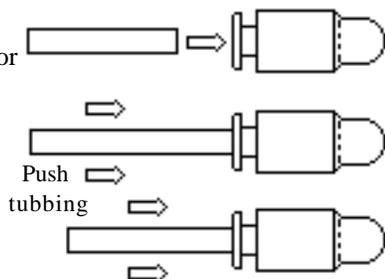
Do not attempt to remove the XCR regulator from cylinder while under pressure ! Doing so may destroy the O-ring on the inlet nipple of the XCR regulator. The grip-ring on the XCR regulator will be difficult to turn while under pressure reminding you to stop and follow these steps.

#### *To bleed pressure:*

- 1: Turn off main cylinder valve (fully clockwise) not much force is needed for full off.
- 2: Connect at least one A3 or A4 flowmeter to an outlet port of the XCP regulator.
- 3: Let remaining oxygen bleed via one of the A3 or A4 flowmeters still connected.

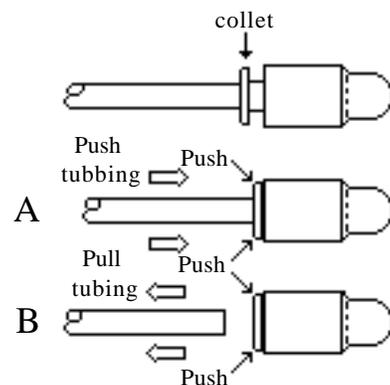
#### **To insert tubing:**

push firmly into connector by 8 to 10 mm.



#### **To remove tubing:**

"A" push tubing and collet in.  
"B" while pushing in collet, pull tubing out.



### CAUTION

Do not force the polyurethane tubing from the quick-connectors without performing steps A & B. Doing so will cut off the tip of the tubing inside the connector rendering it useless

Your XCR oxygen system comes as a kit or complete with the following material:

- 1: XCR regulator with rotating quick-connect outlet elbow connector.
- 1: 5.0 ft (3 meters) of high grade 5/16" (4 mm) polyurethane O<sub>2</sub> service line.
- 1: XCR pilot control valve & holster/harness with A-3 or A-4 flow control.
- 1: "M" type Oxymizer® oxygen conserving nasal cannula.
- 1: Storage & travel zipper-bag for the XCR regulator, cannula and flowmeter.