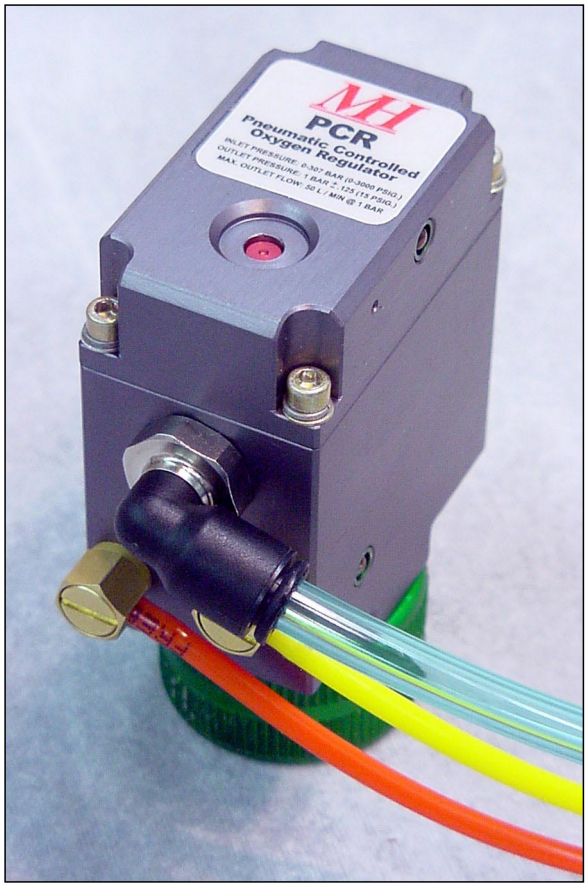
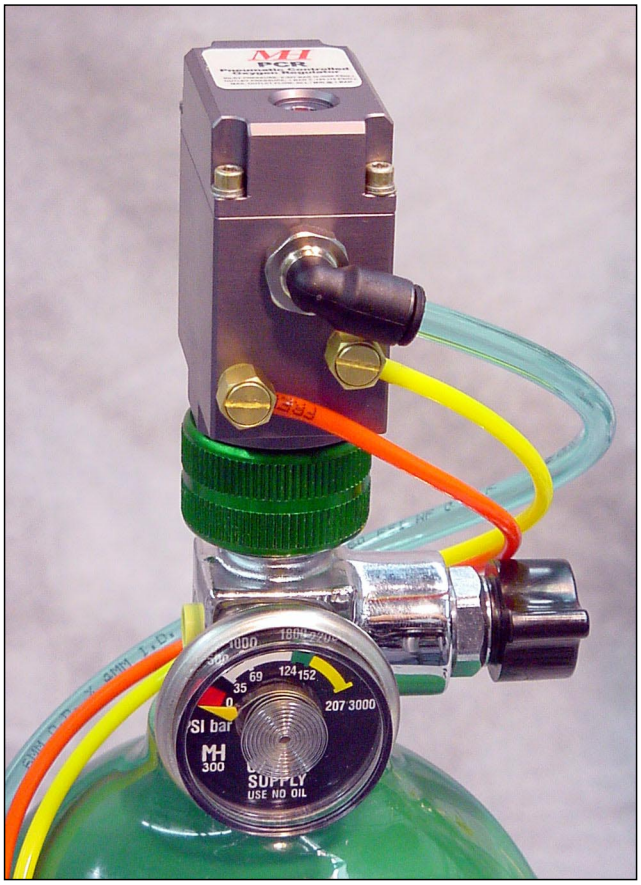
OPERATING MANUAL

Aviation Oxygen Systems
MOUNTAIN HIGH
Equipment & Supply Company





Aviation Oxygen System Solutions by Mountain High

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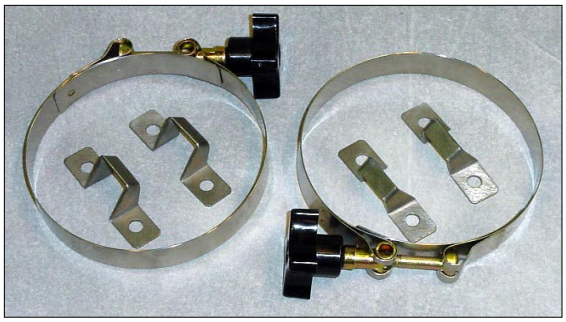


Congratulations on choosing the Mountain High PCR (Pneumatically Controlled Regulator) system. The PCR system is a completely integrated, pneumatic powered oxygen regulator, designed to provide you with unmatched control, safety, comfort, and convenience at an affordable price.

The design intent of the PCR is to allow it to be used with any off-the-shelf CGA-540 valve cylinder, providing the ability to remove the cylinder for refilling purposes. If removing the cylinder is not convenient, a 4-sae high pressure access port (photo B) was provided on the back of the PCR to allow for an installation of a remote fill port and/or a remote pressure gauge, thus providing you with a variety options for your installation application needs. (see pages 3,4,5 & 6 for diagram installation suggestions).

The PCR is not intended to be used as the main high pressure shut off, rather it is for giving the customer ease of use during flights and cylinder installation location options. The valve of the cylinder should be turned off during times of aircraft storage as to mitigate any oxygen system drainage. It is not necessary to close the cylinder valve during refueling, lunch stops, leg stretches, etc.

The 1/8" O.D. pneumatic lines that connect the remote ON/OFF toggle switch to the PCR are flow restricted to a minute 1/64 liter-per-minute to prevent against the low pressure oxygen contributing to a shut-off event emergency.

The PCR is intended to be use with any CGA-540 valve cylinder with a service pressure range of 500 psig. to 2400 psig. (nominal 1850 psig.). The functioning high pressure inlet range is 3,000 psig MAX. Operating past this inlet pressure will not cause damage, rather it may cause the PCR to be forced open, causing a "safety venting" through the low pressure outlet.

The 3-way control switch option must be ordered if the PCR system will be used in a pressurized aircraft.

A standard ***PCR-4p*** system kit includes items the following items:

L	Qty	Description
01	1	**PCR** regulator kit with remote on/off switch & 25' of pneumatic control lines.
02	1	**AL-682** cylinder. Optionally upgradeable to **KF** or **CFF** cylinders.
03	1	'Ω' or 'A' style **CMK** for that cylinder (your choice, 'Ω' style shown).
04	1	6 mm. polyurethane tubing kit. (25').
05	3	'T' & 'Y' union kits for the 6 mm. tubing.
06	4	**CPC** bulkhead style oxygen station outlet kits.
07	4	**XCP** Breathing stations & tote-bags with your choice of **MH3** or **MH4** flowmeters.
08	1	SCD and instruction inserts for all items in kit.

A product of customer requests, the new **PCR** is a completely self-contained remote-controlled oxygen regulator. It connects directly to any oxygen cylinder with a CGA-540 (USA) or optionally with DIN-477 (European) valve. Flow of oxygen to the user is controlled pneumatically through a set of color-coded pneumatic signal-lines that run to a panel mounted on/off switch. The **PCR** can be ordered in various phases from just the **PCR** regulator to complete **PCR** multi-place built-in aviation oxygen systems.

Once your **PCR** system is plumbed, you can use any of our oxygen delivery systems including the **EDS** pulse-demand system and operate them at the same time others are using **MH3** or **MH4** flowmeters. A maximum number of six (6) slef-sealing bulkhead outlets can be mounted in many ways to suite your needs. You can add **EDS** stations at any time.

EDS O_2D_2 Two-Place Pulse-Demand Oxygen unit

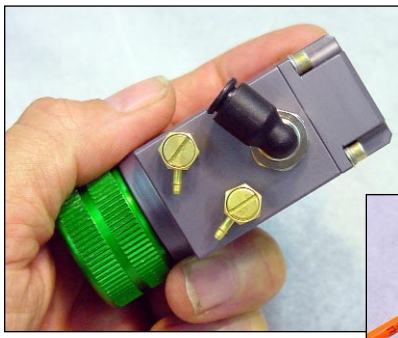
The intended use of the PCR is for use as an aviation oxygen system where a typical cylinder pressure range would be from 500 to 2,400 psig (nominally 1850 psig). The PCR is intended to be used with any off-the-shelf CGA-540 valve cylinder at pressures up to 3,000 psig. The PCR provides a means to remotely control the low pressure outlet circuit for convenience and safety sake.

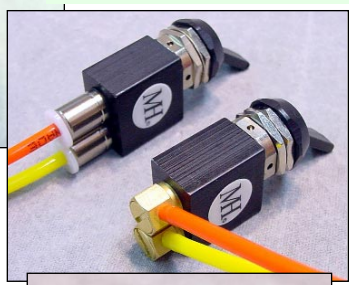
The PCR system is not intend to be the main turn-off for the high pressure of the cylinder used. The PCR has a minute amount of weepage under operating pressure, therefore, the main cylinder valve must be turned off during times of storage to mitigate cylinder drainage.

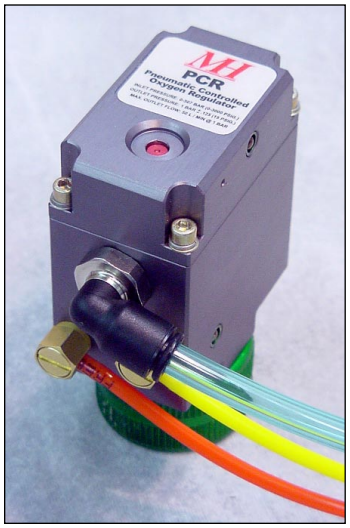
The PCR operates by using a small fraction of the regulated out let oxygen to pneumatically operate a control valve in the PCR body. The 1/8" O.D. pneumatic lines that connect the PCR to the on/off control switch are flow restricted so that the regulated low-pressure oxygen does not contribute to any safety hazard in the event shut-off emergencies are required. In distressed situations, the amount of oxygen that may flow from a complete line cut would be about 1/64 liter per minute. This flow is many orders lower than what will be spilled from a severed 1/16" high-pressure remote gauge capillary line. Over-pressure relief of the PCR is intrinsic of its design.

During times of over pressure by means of the regulator not limiting to the specified pressure, the pneumatically operated control valve then acts as a pressure relief valve where the oxygen from the cylinder will be safely vented through the over-pressure fitting outlets of the installed system.

*The **PCR** regulator directly connects (by hand) to the service/refill port of any oxygen cylinder with the standard CGA-540 (USA) or optionally DIN-477 (Euro) valve allowing the cylinder to be easily removed for refilling or service. An auxiliary port on the rear side of the regulator body (not shown) is provided for an optional remote oxygen fill station and presure gauge.*







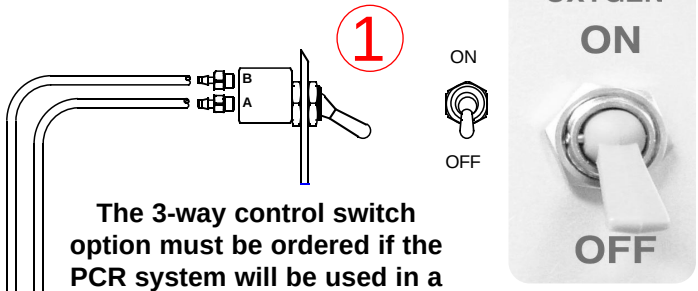
Basic PCR system configuration

The PCR (Pnuematically Controlled Regulator) has three (3) main parts:

1) The PCR unit with on/off control switch

2) The oxygen source (Tank / Cylinder).

3) Oxygen plumbing & outlets

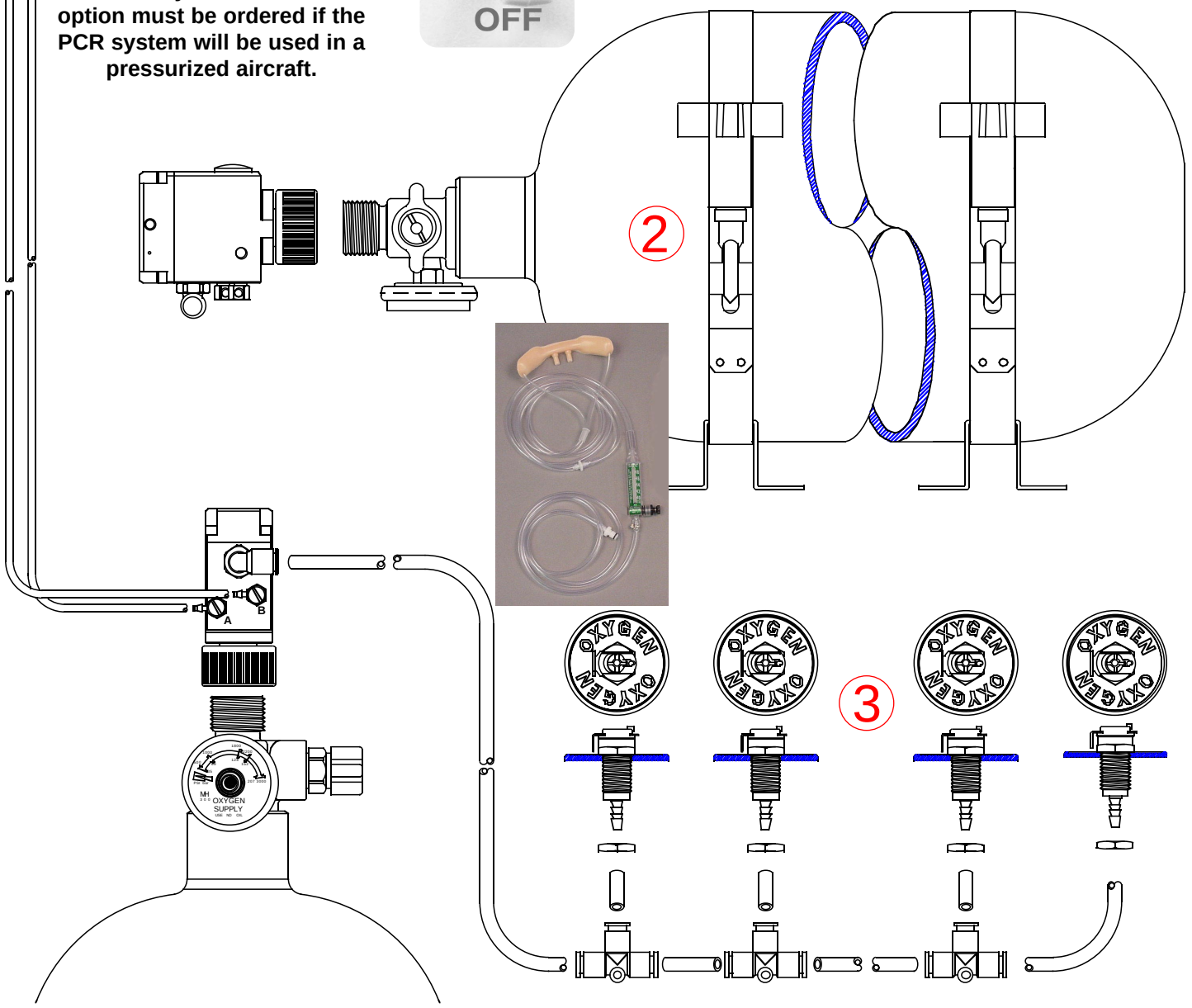


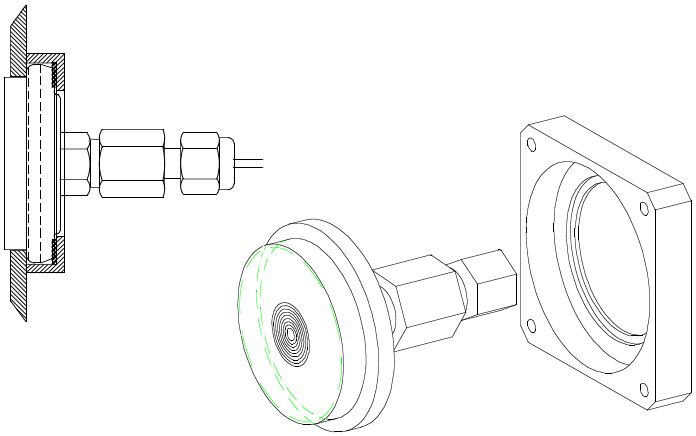
The 3-way control switch option must be ordered if the PCR system will be used in a pressurized aircraft.

Special considerations with the on/off control switch:

While the switch is in the 'ON' position a very small fraction of oxygen pressure from the regulator is used to hold the low-pressure valve open.

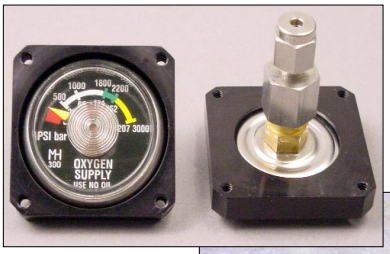
The control switch operates the low-pressure valve on the PCR to allow oxygen to flow to the oxygen station outlets it does not turn the high-pressure supply of oxygen on & off. It is not intend to be the main turn-off for the high pressure of the cylinder used. The PCR has a minute amount of weepage under operating pressure, therefore, the main cylinder valve must be turned off during times of storage to mitigate cylinder drainage.





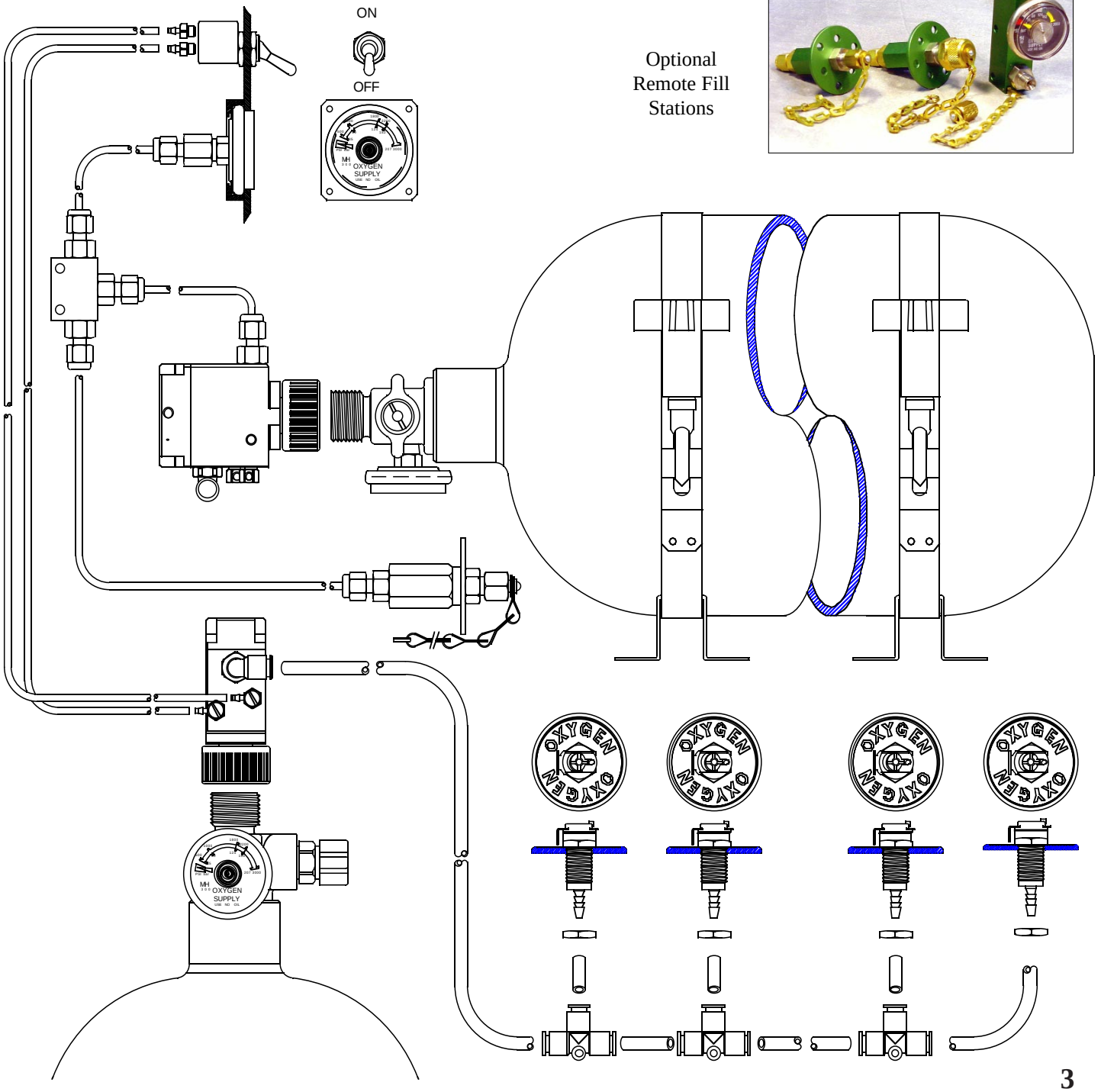
Optional remote gauge & fill station kit includes:

L	Qty	Description
01	1	**MH-300** gauge with rear-mount bezel & fitting kit (for AL & KF cylinders)
02	1	25' coil of 1/8" OD copper line tubing kit (Standard issue)
02a	1	25' coil of 1/16" OD stainless-steel 'capillary-line' tubing kit. (Optional upgrade)
03	1	Basic remote oxygen fill-station kit. Can be upgraded to the deluxe fill, (right).
04	1	SCD and instruction inserts for all items in this kit.

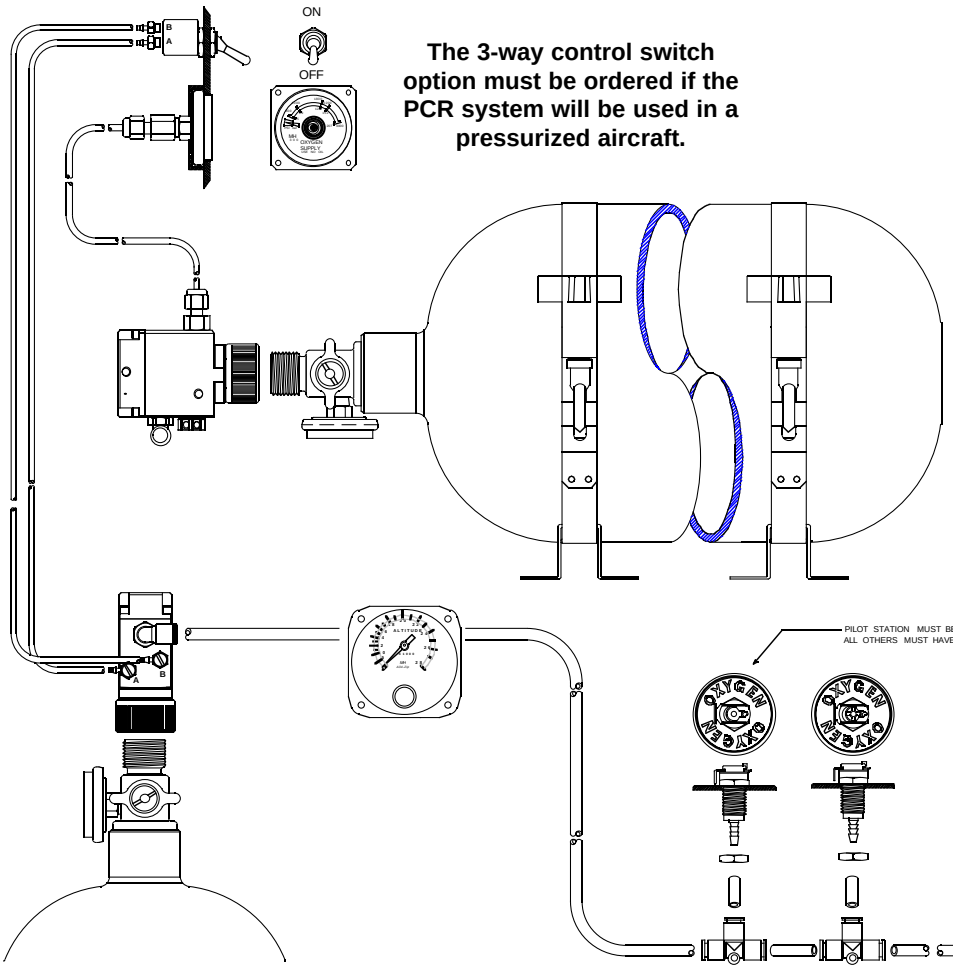


Optional MH-300 Remote pressure gauge

Optional Remote Fill Stations



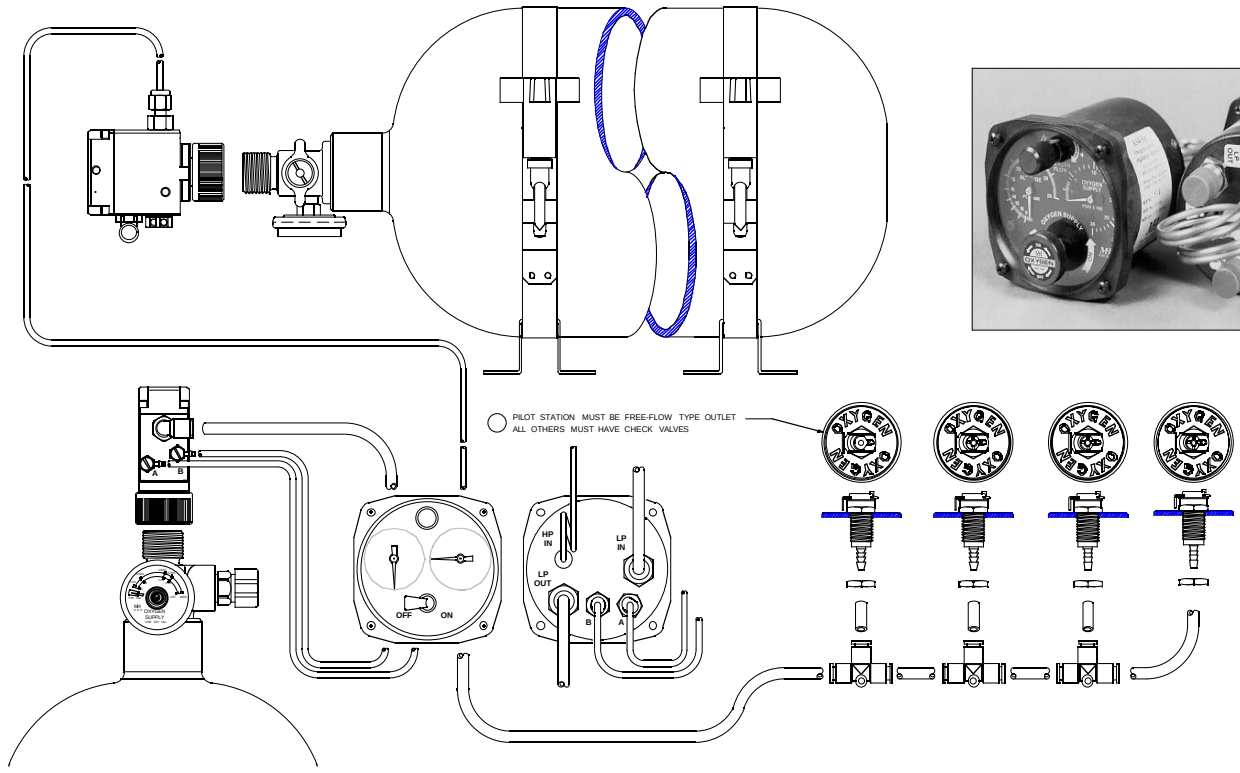
Basic PCR Components & Suggested Installation Layouts

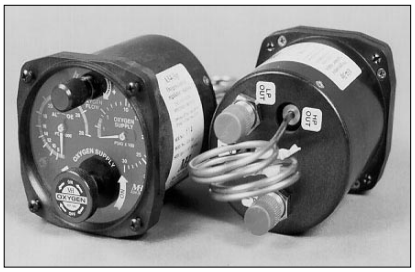


The 3-way control switch option must be ordered if the PCR system will be used in a pressurized aircraft.

The PCR regulator compliments the A34!

Place the **A34** between the outlet of the **PCR** and station outlets to regulate the flow to all stations with cannulas and facemasks.



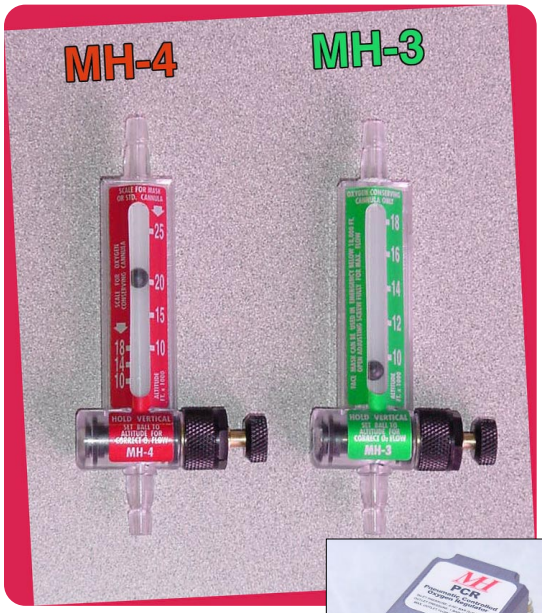


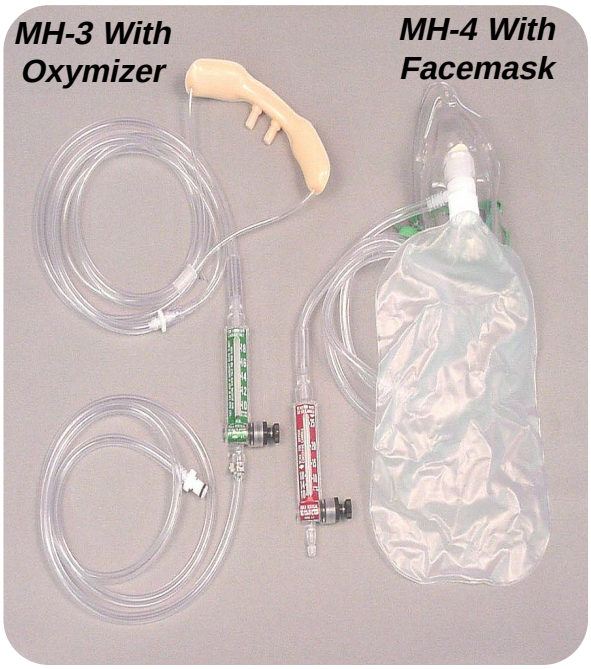
The use of an optional pulse oximeter (see below) may be used to determine optimum settings in unique situations such as with persons who are elderly and/or are known to have respiratory issues.

Altitude (feet)	Arterial O_2 Saturation Without Supplemental O_2	Atmospheric Pressure (mmHg)
0	96%	760
5,000	95%	632
7,500	93%	575
10,000	89%	523
12,500	87%	474
14,000	83%	446
16,500	77%	403
20,000	65%	349
25,000	Below 60%	282

The PCR regulator system can be used with virtually any oxygen cylinder with a CGA-540 valve.

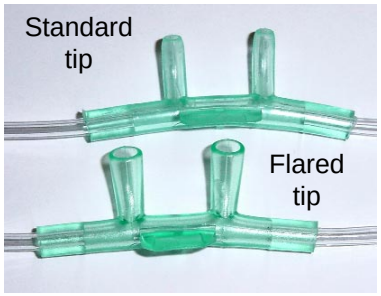
Use the EDS O_2D_1 or O_2D_2, MH3 or MH4 with the PCR regulator system.





Cannula

Standard Avator type cannulas are compatable with the MH-4 flowmwter and aare specifically selected to operate with the standard flow protocol of 1 liter per minute per 10,000 ft. to operate with the PCR system. They complement the physiological needs of a person for flight operations from sea level to the edge of class-A airspace, 18,000 ft. The Aviator cannulas are silicone molded with a 1 meter length of high quality PVC tubing and fitting. They fit to the face with a set of over-the-ear feed tubes to accommodate almost any face. Beards and mustaches will not compromise the delivery properties of cannulas in general. However, even the slightest amount of nasal congestion can. Therefore, it is advisable that a face mask be used in the event of such problem.

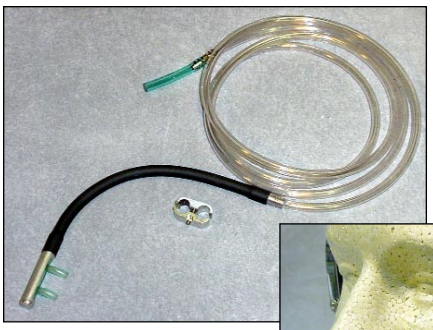


In most cases the standard-tip cannula suits the needs of most people, while the flare-tip type may be needed to fit a large person or one that has large nasal openings. Standard-tip cannulas are issued by default unless otherwise stated at time of purchase.

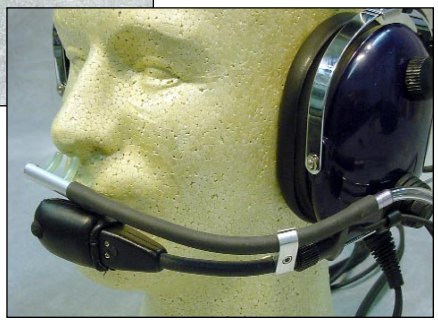
Cannulas are a personal device and should not be shared between persons. In addition, it is the only item in the system that should be replaced frequently, because even with the best cleaning efforts, bacteria and such can contaminate cannulas and pose a health risk.

Head-Set Boom Mounted Cannula

Our optionally available



MH E-Z-Flow Boom Cannula is a head-set mountable cannula system that can be used with the PCR system.

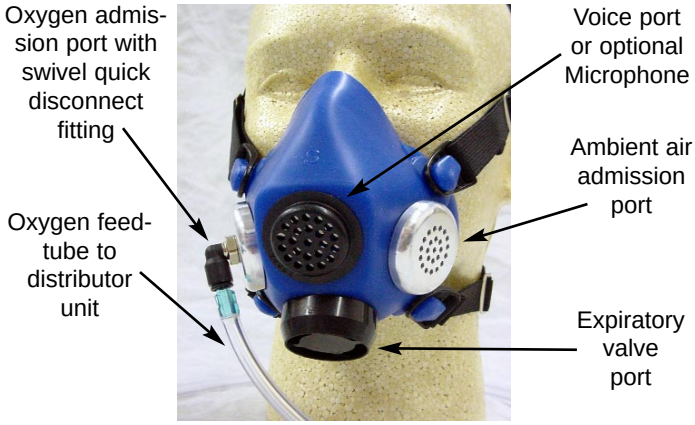


Oxymizer Cannula

The Oxymizer cannula is specifically calibrated to operate with the MH-3 flowmeter and is compatable wit the PCR system.

Face masks should be on board in the event someone should develop nasal congestion where a nasal cannula would fall short in performance.

Alps Face Mask *(with or without microphone)*

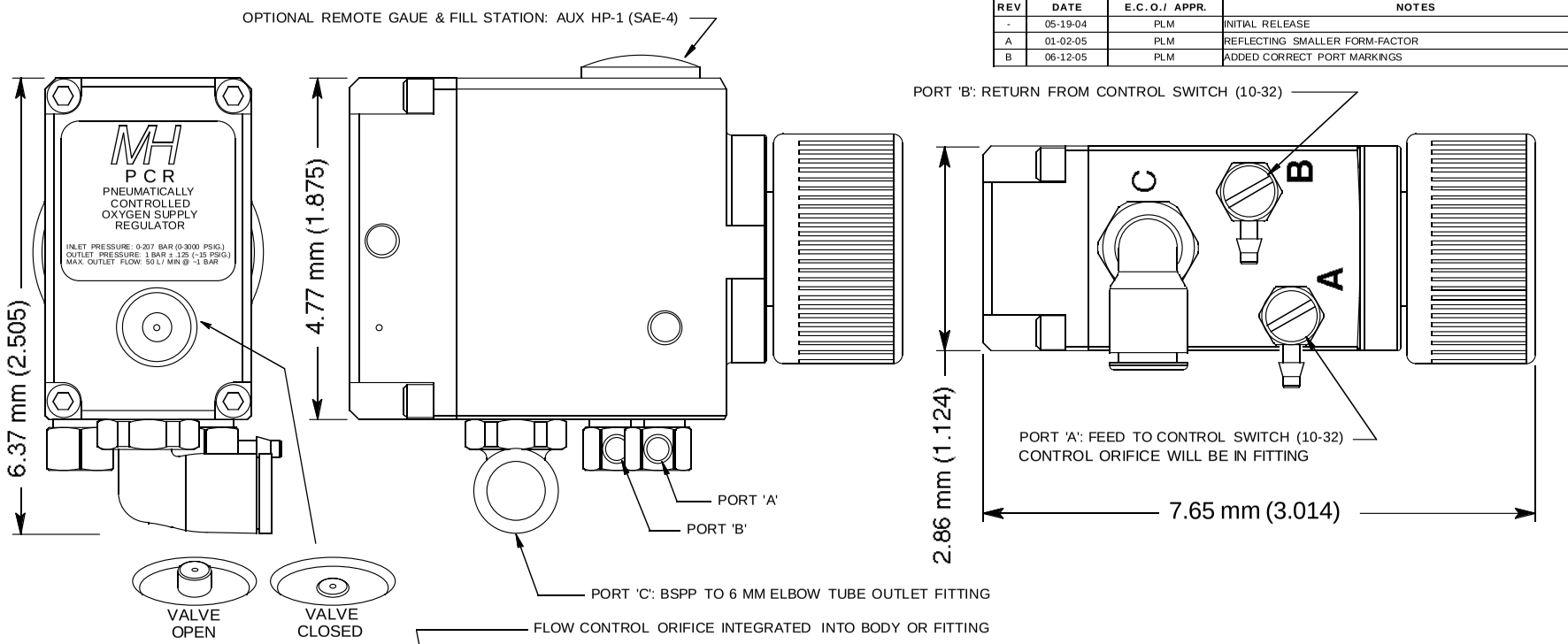


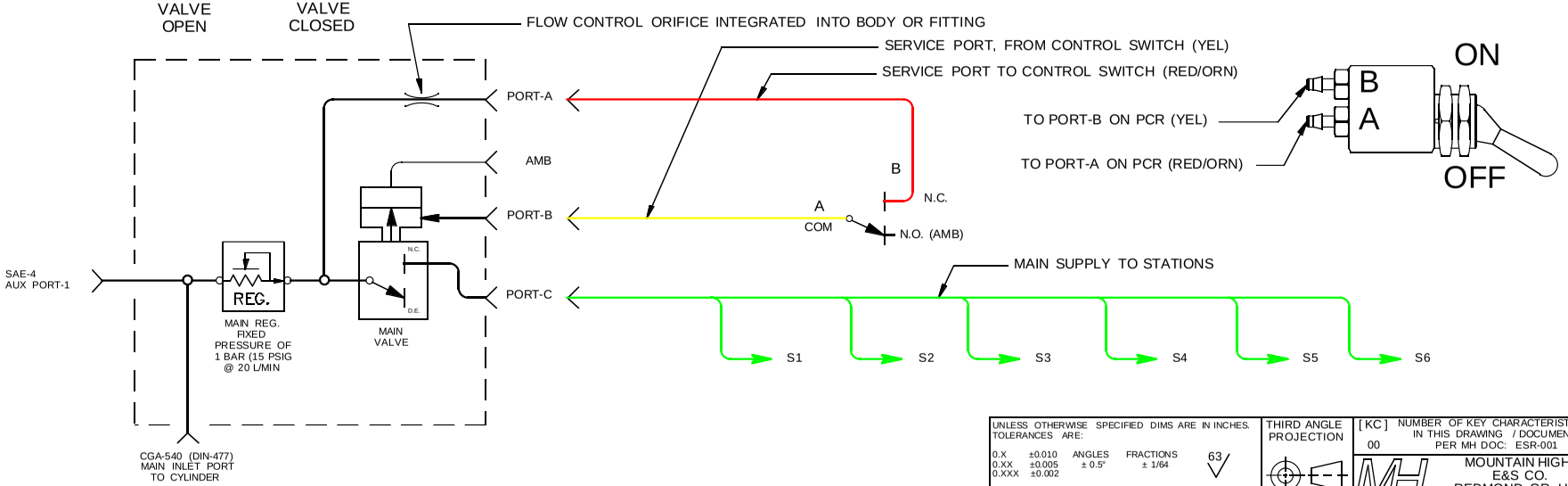
The **Alps** face mask is compatable with the MH-4 flowmeter to complement the physiological needs of a person for flight operations from sea level through pressure altitudes up to 25,000 ft. They have a four-point detachable clip system with two independently adjustable straps to accommodate almost any face. Beards and mustaches will compromise the sealing properties of face masks in general. These face masks can be cleaned with mild detergents and water.

The **Alps** face masks have a voice-port so vocal communication is possible without mask removal. The microphone of a head-set can be placed close to the voice-port and used with satisfactory results. The **Alps** face mask can be ordered with an optional noise canceling electret-condenser microphone & cord set compatible with most com & audio systems in place of the voice port. Please specify during ordering.

The **Alps** face mask comes in three sizes: medium, small and large. In most cases the medium and small fit most women, while the medium and large fit most men. The medium size face mask is issued by default unless otherwise stated at time of purchase.

REVISION HISTORY			
REV	DATE	E.C.O./ APPR.	NOTES
-	05-19-04	PLM	INITIAL RELEASE
A	01-02-05	PLM	REFLECTING SMALLER FORM-FACTOR
B	06-12-05	PLM	ADDED CORRECT PORT MARKINGS





UNLESS OTHERWISE SPECIFIED DIMS ARE IN INCHES.
TOLERANCES ARE:
0.X ±0.010 ANGLES ± 0.5° FRACTIONS ± 1/64
0.XX ±0.005
0.XXX ±0.002
INTERPRET GD&T PER ASME 14.5 (FMT REVC)
63

THIRD ANGLE PROJECTION

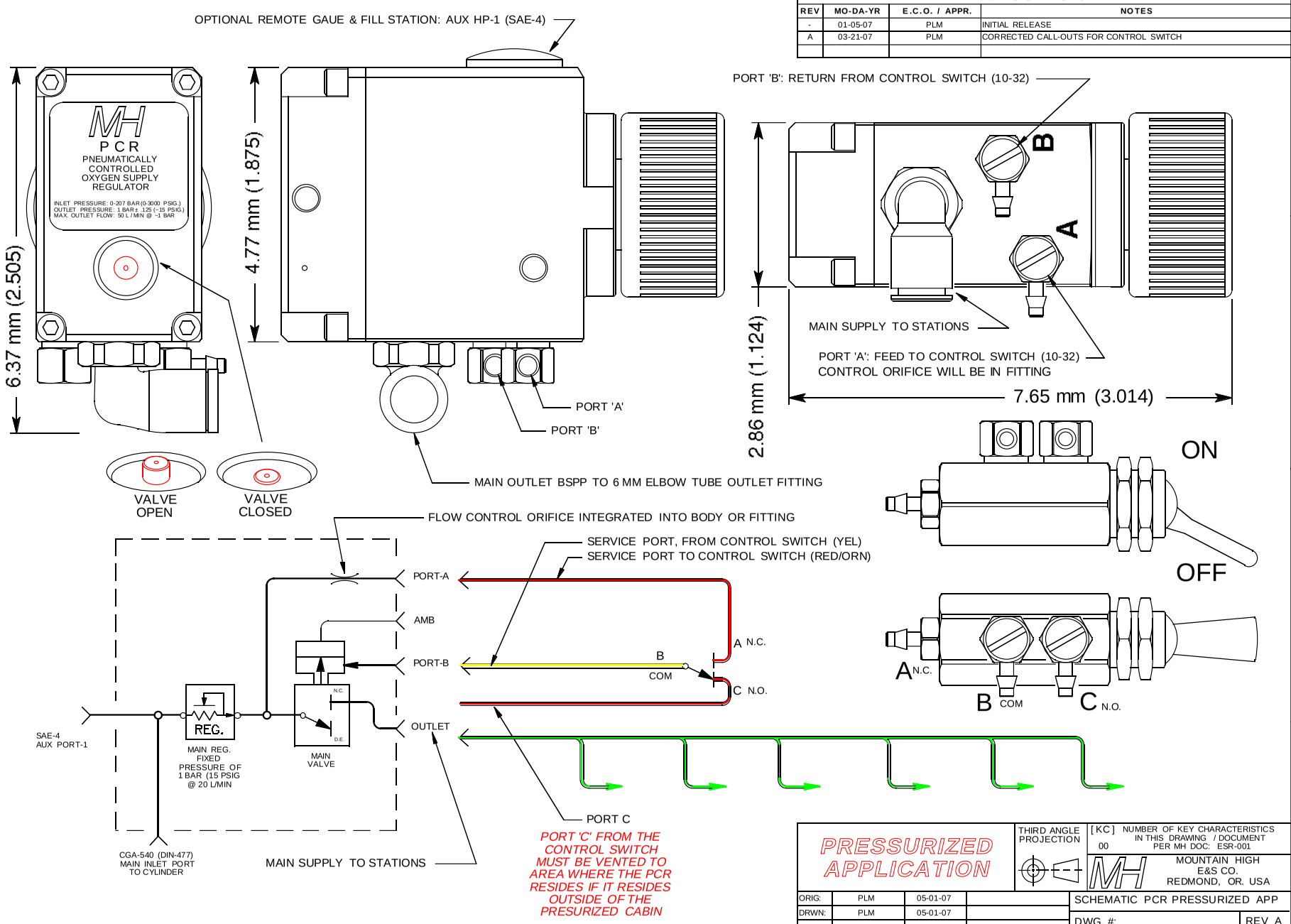
[KC] NUMBER OF KEY CHARACTERISTICS IN THIS DRAWING / DOCUMENT
00 PER MH DOC: ESR-001

MOUNTAIN HIGH E&S CO.
REDMOND, OR. USA

ISSUED:	DATE	
DRAWN: PLM	05-19-04	
ENGINEER: PLM	05-19-04	
APPR:	DATE	

SCHEMATIC PCR
DWG. #: REV B
SIZE A | SHEET 1 OF 3 | DO NOT SCALE DRAWING

REVISION HISTORY			
REV	MO-DA-YR	E.C.O. / APPR.	NOTES
-	01-05-07	PLM	INITIAL RELEASE
A	03-21-07	PLM	CORRECTED CALL-OUTS FOR CONTROL SWITCH



PRESSURIZED APPLICATION

THIRD ANGLE PROJECTION

[KC] NUMBER OF KEY CHARACTERISTICS IN THIS DRAWING / DOCUMENT PER MH DOC: ESR-001
00

MH MOUNTAIN HIGH E&S CO. REDMOND, OR. USA

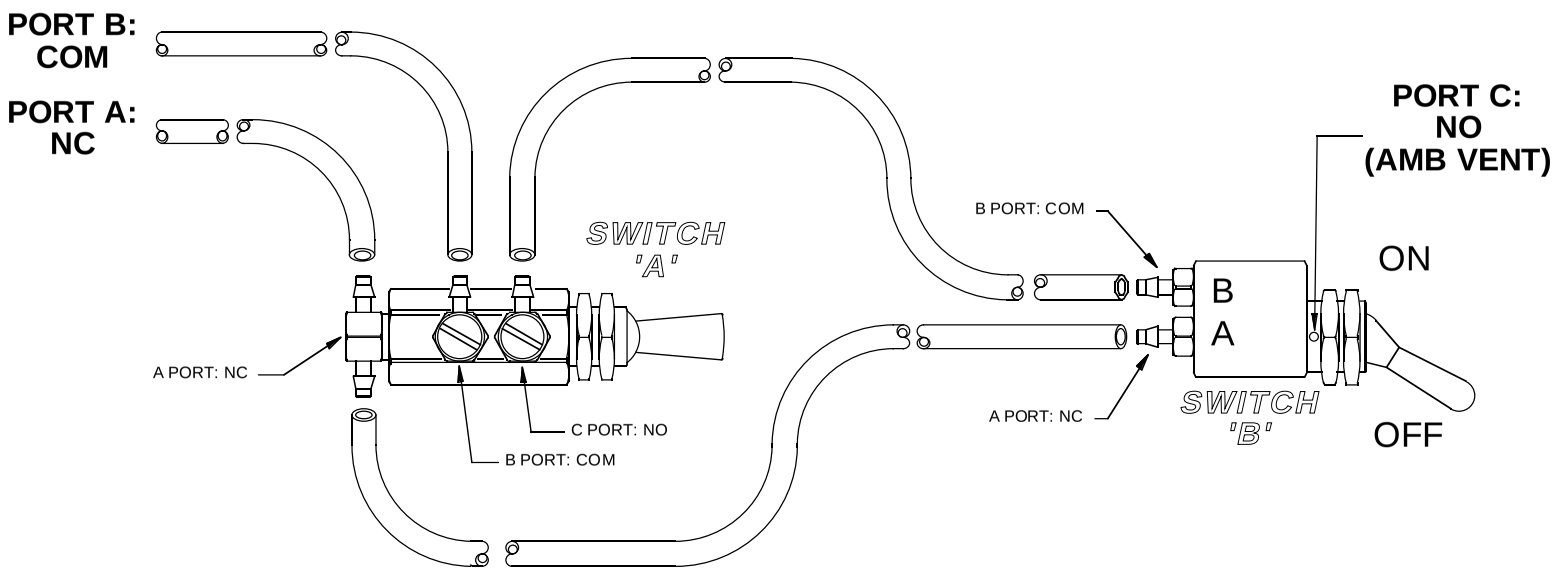
ORIG:	PLM	05-01-07	
DRWN:	PLM	05-01-07	
ENG:	PLM	05-01-07	
APPR:	NAME	DATE	

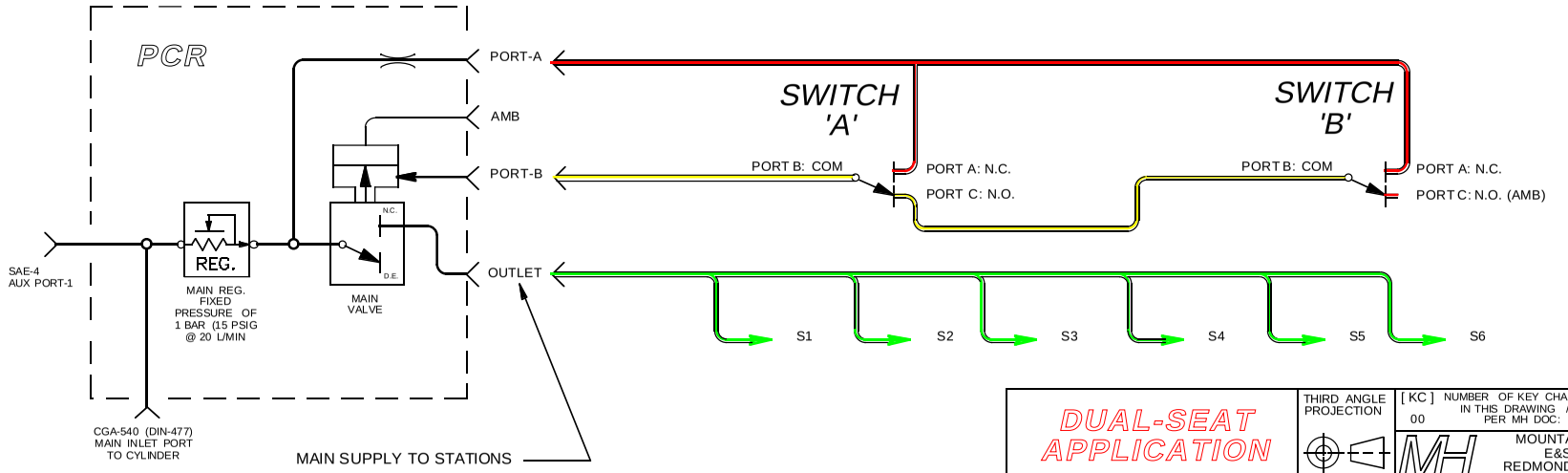
SCHEMATIC PCR PRESSURIZED APP

DWG. #: REV A

SIZE A | SHEET 1 OF 1 | DO NOT SCALE DRAWING

REVISIONHISTORY			
REV	MO-DA-YR	E.C.O./ APPR.	NOTES
-	04-11-07	PLM	INITIAL RELEASE





DUAL-SEAT APPLICATION

THIRD ANGLE PROJECTION

[KC] NUMBER OF KEY CHARACTERISTICS IN THIS DRAWING / DOCUMENT 00 PER MH DOC: ESR-001

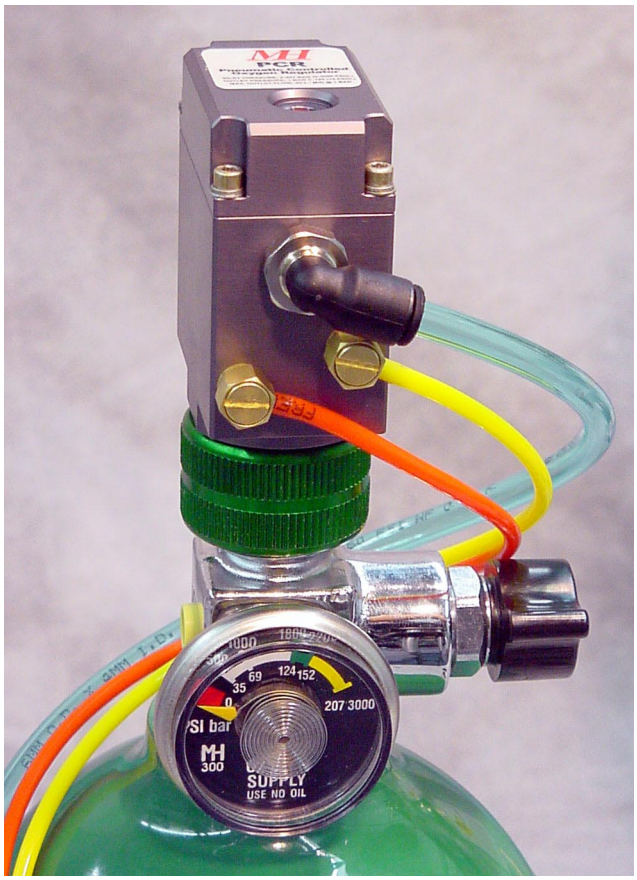
MOUNTAIN HIGH E&S CO. REDMOND, OR. USA

ORIG:	PLM	04-11-07	
DRWN:	PLM	04-11-07	
ENG:	PLM	04-11-07	
APPR:	NAME	MO-DA-YR	

SCHEMATIC FOR PCR DUAL-SEAT

DWG. #: REV -

SIZE A | SHEET 1 OF 1 | DO NOT SCALE DRAWING



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