

PCR-2

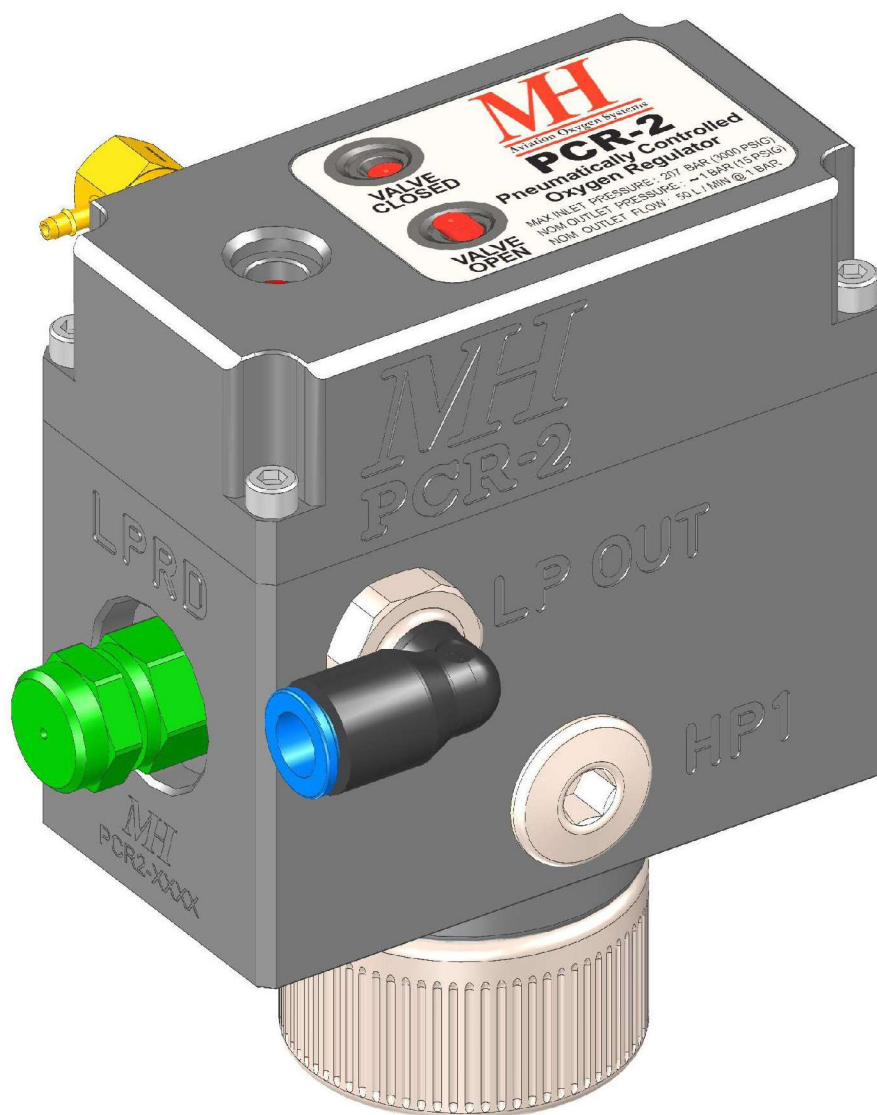


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| REV | ECO NO. YYYY-MM-DD | NAME | NOTES |
|-----|------------------------|------|--------------------------|
| 1.0 | Unknown Unknown | ?? | Unreleased Found Archive |
| 2.0 | 2025-031 2026-01-27 | KQM | Initial Official Release |

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5IBLT-1020-00

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5SMAN-0012-00

5SCMK-001-000

5ICMK-0004-00

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5SBNJ-002-100

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SECTION 1: GENERAL INFORMATION

AUDIENCE & PURPOSE OF THIS MANUAL:

This manual is intended to allow one to become familiar with the purpose, operating aspects & application potential of the PCR-2 adaptive remote controlled oxygen regulator system. Additionally, this manual serves as the primary installation guide for the PCR-2.

GENERAL DESCRIPTION:

The PCR-2 system is a completely integrated, pneumatically powered, and remotely operated oxygen regulator. It was designed to provide you with unmatched remote oxygen control, safety, comfort, and convenience at an affordable price, in pressurized and non-pressurized aircraft.

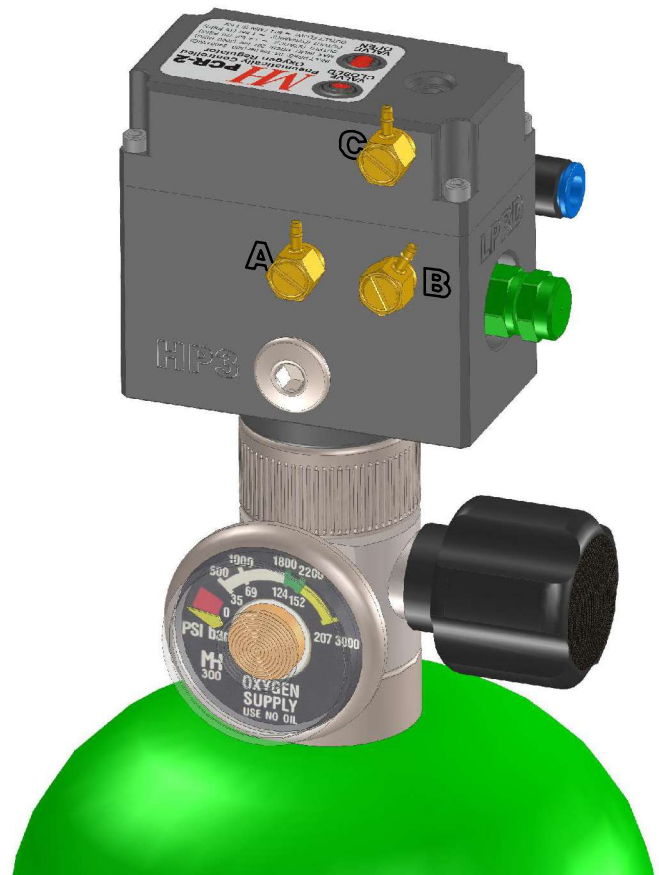
The complete system generally consists of an oxygen tank with a tank-mounted valve, on which is mounted the PCR-2 Pneumatically Controlled Regulator. This system is designed to be accessible at pre- and post-flight to manually open/close the tank valve, and be remotely actuated in flight.

The regulator is controlled via pressurized oxygen lines that run from the regulator to a pneumatic On/OFF switch located on the flight deck. Separate high pressure copper or aluminum lines run from the regulator to a pneumatic gauge also located in the flight deck, as well as a fill port. Another option for monitoring tank pressure would be to use an electric pressure transducer with an electronic gauge.

The PCR-2 system comes in single or multiple outlet configurations. The PCR-2 sends regulated oxygen to remotely mounted check-valved outlet ports, which can be interfaced with MH-3 or MH-4 Flowmeter breathing stations for a constant flow system, or connected to an EDS O2D1 or O2D2 for a Pulse-Demand™ system.

USAGE:

The PCR-2 can be used with any off-the-shelf industry standard CGA-540 or DIN-477-9 cylinder valve, providing the ability to remove the PCR-2 from the cylinder for easy refilling or exchanging purposes with industry standard adapters. If removing the cylinder is not convenient, (3) SAE-4 high pressure access ports are provided on the PCR-2 to allow for an optional remote fill port and/or a remote pressure gauge. These SAE-4 ports provide you with a variety of options for your installation application needs. (see pages 11 and 12 for diagrams of installation suggestions).



MAIN INLET SERVICE PORT:

The PCR-2 is designed to be conveniently attached to the screw threads, by hand and without tools, of the service port of an industry standard CGA-540 oxygen cylinder. Optionally, the PCR-2 can be ordered with a DIN-477-9 screw-on fitting for use with most European oxygen cylinders.

The PCR-2 is not intended to be used as the main high pressure shut off, rather for providing the ability to remotely turn on & off the main regulated low pressure oxygen supply to your delivery system.

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 or for other brief periods (see pg. 15 Post-Flight Shutdown).

**AUXILIARY HP (High-Pressure)
INLET PORTS:**

In addition to the main screw-on port there are three additional SAE-4 HP ports for auxiliary (optional) utility applications. These ports can be used for a remote filler station, pressure gauge, and for cascading to additional cylinders. These auxiliary SAE-4 HP ports come standard with plugs installed. A number of HP AN and Swagelok® style fittings are compatible with these ports. The main 'screw-on' inlet port is internally pneumatically connected to these auxiliary SAE-4 ports.

**MAIN SERVICE (Low-Pressure)
OUTLET PORT:**

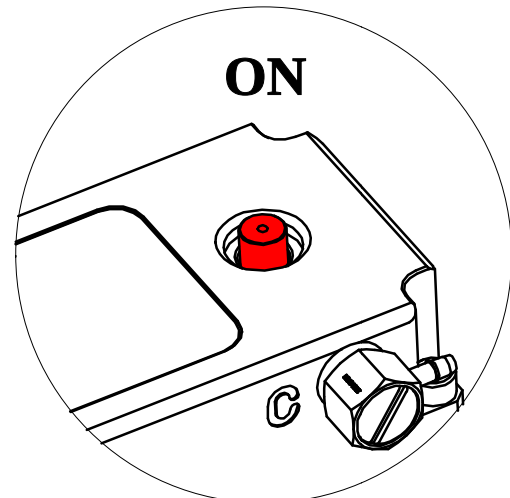
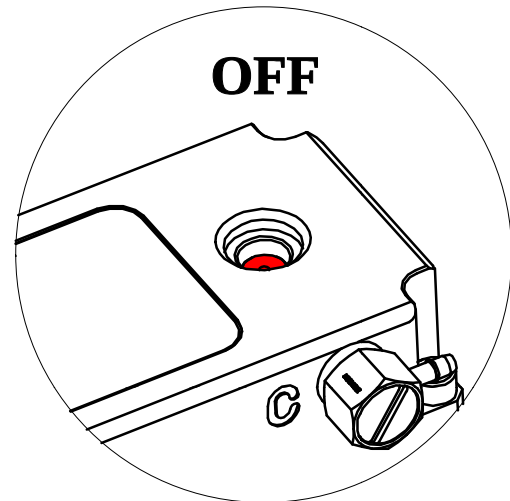
The main low pressure regulated outlet has one O-ring face seal style port (G 1/8 BSPP). This comes standard with a swivel elbow push-in style QD fitting compatible with 6mm OD polyurethane tubing.

LPRD PORT:

For long-term connected and pressurized applications, this SAE-2 port accommodates an optional resetting Low Pressure Relief Device. It relieves (vents) oxygen to mitigate possible damage to the system in the event the main regulator creates an over-pressure of about 70~80 psig. This LPRD port can be applied to an optional over-board relieving system if the installation requires such.

POP-UP VALVE INDICATOR:

There is a small red pop-up button on the top of the PCR-2 that can be observed popping-up or down as the valve is pneumatically opened or shut off. While the button is down, the low pressure outlet port is shut off.



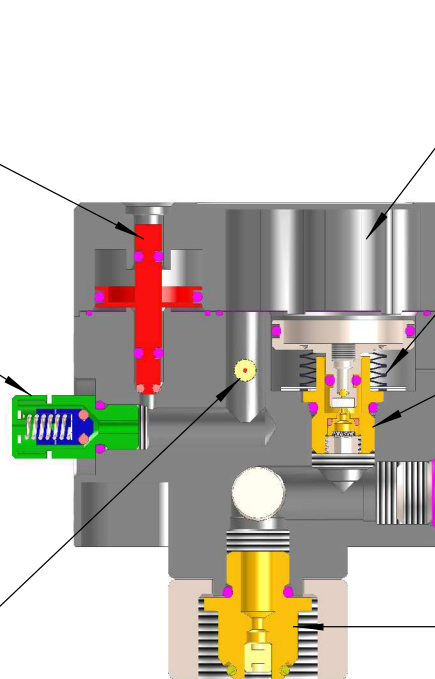
INTERNAL FEATURES:

Desmodromically remotely operating on/off outlet 'Pop-up' valve for operating in extended temperature ranges -20 through +50 °C.

Optional Low-Pressure Relief Device connects to this SAE-2 port for over-pressure situations that may occur in long-term connected and pressurized applications.

An optional over-board system can be fitted for near air-tight or contained small volume installations.

SPrecision Sapphire embedded brass orifices control the rate and flow of oxygen in the lengths of the remotely controlled switch.



Regulator outlet plenum for improved output flow transient stability while using constant flow and EDS Pulse-Demand™ delivery equipment together.

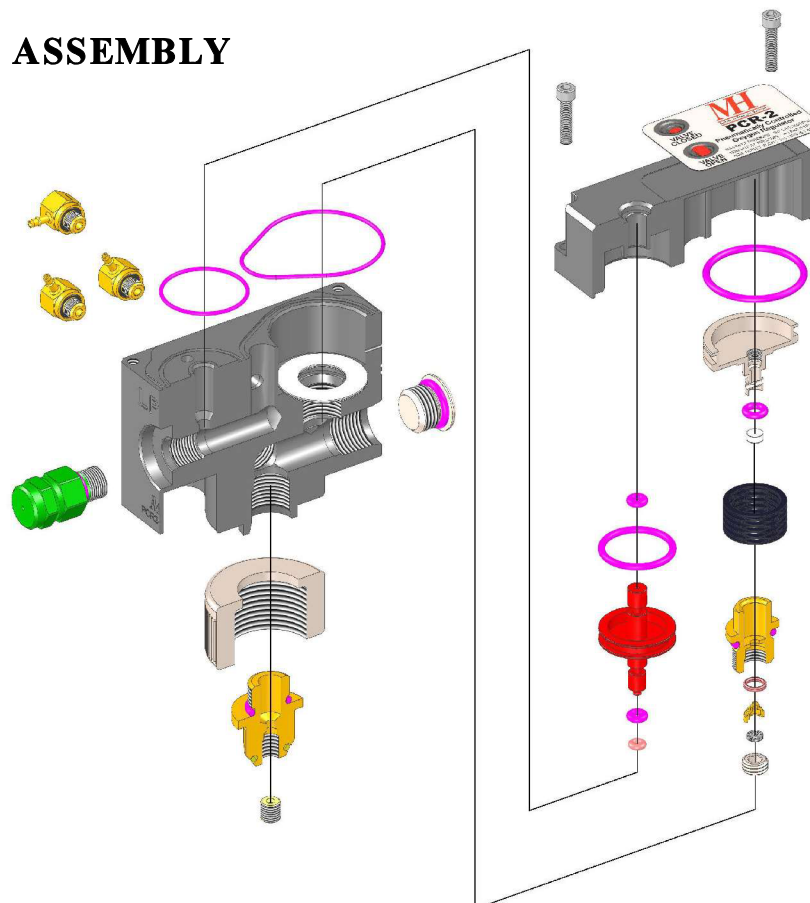
Precision formed wave spring provides a stable and repeatable regulator reference without transient resonance.

Precision PTFE Puck (or Ball) & brass inlet seat with serviceable dual-mesh screen type inlet filter for long-life operations.

SAE-4 HP utility ports for optional supply, fill and gauge configurations.

Main inlet fittings all have an o-ring seal for simple hand-tight connections. Unlike sintered brass we use dual-mesh stainless steel filters that are serviceable for long-life operations.

SECTIONED ASSEMBLY

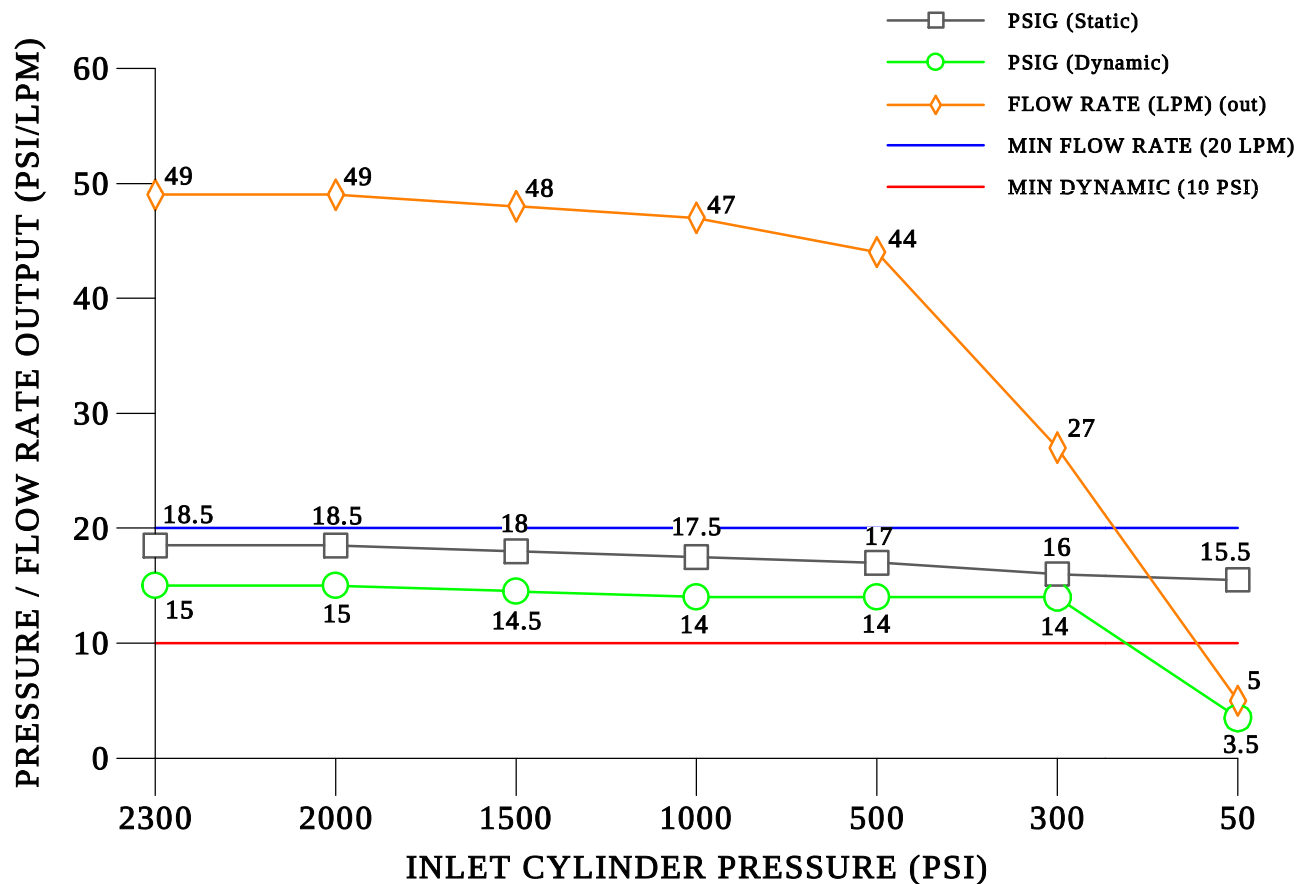


INTERNAL REGULATOR:

Our regulator designs have a virtually flat outlet pressure regulation curve for both lock-up (static) and flowing (dynamic) conditions with inlet pressures from 300 to 2,300 psig. In open and closed-loop instantaneous flow tests, they have very well dampened, oscillation free flows. Flow rates of 45 to 55 liters/minute are measured through a controlled pneumatic resistance with inlet pressures of 1,000 to 2,300 psig. Minimum flow rates are 20 liters/minute throughout the inlet pressure range of 300 to 2,300 psig. EDS units only need to have the regulator that instantaneously delivers ~10 liters/minute to compliment the needed amount of oxygen for pressure altitudes up to 30,000 ft.

Regulator Features Include:

- Very constant lock-up and flowing pressure range and large flow reserve throughout the pressure range of the cylinder.
- Light weight aluminum body with oxygen compatible brass and seat materials in the critical wetted regulating/throttling high-pressure areas.
- Wide operating temperature range. -20 to +50 C°.
- Special flatwire double-helix spring design compliments the gas dynamics and aging characteristics of the inlet seat to provide lock-up to dynamic pressures that are unusually tightly matched for a piston type regulator design throughout its service life. Our unique design provides very fast response times to lock-up with an oscillation free high flow factor specifically designed for use with Pulse-Demand™ systems.

PCR2 - CGA540 INLET x 6MM OUTLET

TESTING AND VERIFICATION:

All of our regulators are 100% tested during assembly for multiple parameters before they are packaged and made ready for sale. Dynamic flow testing is performed with the regulator feeding through a mass-flow meter at the end of 20 feet of 6mm O.D. 4mm ID tubing to guarantee that the regulator will operate up to four EDS units at 18,000 ft. with cylinder pressures as low as 500 psig. The typical length of tubing used in most built-in applications is about 20 feet.

Why a piston type regulator, why not a diaphragm type as seen in medical equipment?

Piston-type compressed gas regulators are well known for being low-cost, rugged, light-weight and able to be serviced with standard assembly practices. Additionally, they have the ability to ingest small particles at extreme temperatures while performing well within specifications called out for their duty. Their simplicity provides the means to a quick diagnostic and repair even in the field. Diaphragm regulators are known more for their precision and high-cost but, are sensitive to harsh environments making them more suited for stationary and controlled in-door applications. Because they usually do not have suitable lock-up to flow pressure characteristics, and are larger and heavier, they are usually unsuitable for pulse-demand systems.

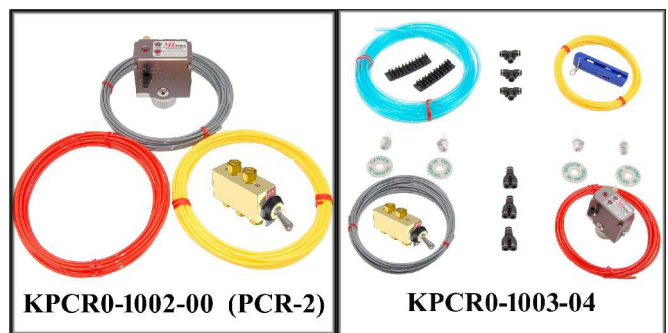
PCR-2 System Specifications:

Elec. req.: None, the system is exclusively pneumatic.

Weight: The approximate weight of the valve, PCR regulator, mount kit, polyurethane tubing, copper tubing, pneumatic switch, fill station, pressure gauge, & C.F. or pulse demand delivery equipment for four people is approximately 12 lbs. [5.44 kg.] plus the tank.

Space Req.: Raw cylinder length plus \approx 5.5 inches [13.97 cm] for the valve, & PCR.

Maint Req.: PCR MTBF \approx 3,650 Hours or \approx 2,735 full flowing on-off cycles. It is recommended to service the PCR regulator at the same interval as the cylinder hydrostatic testing.



KPCR0-1002-00



KPCR0-1003-04

GENERAL SPECIFICATIONS:***Regulator performance***

| | |
|--|-------------------------------------|
| Inlet operating pressure range: | 20.7 to 172 bar (300 to 2500 psig.) |
| Absolute Max inlet pressure: | 207 bar (3000 psig.) |
| Gas Medium compatability: | Oxygen, Air, Nitrogen |
| Nominal lock-up static (no-flow) pressure: | 1.31 - 1.59 bar (19 - 23 psig.) |
| Dynamic (flowing @ ~25 liter/minute flow: | 0.83 - 1.31 bar (12 - 19 psig.) |
| Max free-flow through output port: | ~60 liter/minute |
| Operating temperature range: | -20 to +50 °C |
| Storage temperature range: | -45 to +65 °C |
| Operating Altitudes: | -2K to +35K ft. SPA |
| Operating Humidity: | 0 to 93% RH non condensing |

Pneumatic control

| | |
|--|--|
| Dynamic & static control pressure for desmodromic actions: | 0.80 to 1.25 bar (11.6 to 18.1 psig.) |
| Transitional flow requirements: | < 0.0625 liter/min. |
| Transient time from off to on (down/up-down): | ~ 225 ms. Temperature dependant ⁽¹⁾ |

Construction Material

| | |
|---|--|
| Main Body & Internal non HP wetted Parts: | 6061-T6 ⁽²⁾ Machined Anodized Aluminum ⁽³⁾ |
| Internal HP wetted parts: | CDA-360 Cartridge Brass |
| Internal control orifices: | Brass captured sapphire ruby cartridge, 0.002 - 0.003" |
| Internal filters: | Brass captured dual mesh SS screens, 43 micron |
| Seals & O-rings: | PTFE, FKM, fluorocarbon, EPDM, Polyurethane & Fluoro-Silicone |
| Other fittings & parts: | Brass, FRPABS & Steel |

Physical Properties

| | |
|---------|---|
| Weight: | 383 grams (13.5 Oz.) Regulator Assy. only |
| Height: | 8.6 cm (3.38") |
| Depth: | 7.8 cm (3.08") Including fitting protrusions |
| Width: | 5.8 cm (2.3") Including fitting protrusions |

Endurance & Reliability Statement

| | |
|--|---|
| Estimated Mean Time Before Failure (EMTBF) (MTBF): | ~3,650 Hours or ~2,735 full flowing on-off cycles |
|--|---|

Environmental Testing Compliance Criteria

| | |
|----------------------------|----------------|
| RTCA DO160 section series: | See next sheet |
| RTCA DO178 section series: | N/A |

Regulatory Statement

| | |
|-------------------------------------|--------------------------|
| FCC Part 15 (unintended emissions): | N/A |
| FAA part 23, 25: | Specific to application. |

NOTES

- 1) Operating between 0 ~ 48 °C
- 2) ASTM B209 6061-T651 ALUMINUM
- 3) Anodized Per MIL-A-8625 TYPE II SLATE

This is a list of known RTCA DO-160 tests that will most likely be applicable for FAA STC applications. This chart was derived from experiences with past certified applications and programs.

| DO-160 Sections Applicable for FAA STC | Yes | N/A | No |
|---|------------|------------|-----------|
| Sec 04.0: Temperature & Altitude | * | | |
| Sec 05.0: Temperature Variation | * | | |
| Sec 06.0: Humidity | * | | |
| Sec 07.0: Operational Shocks & Crash Safety | ? | | |
| Sec 08.0: Vibration | | | * |
| Sec 09.0 Explosion Proof-ness | | | * |
| Sec 10.0: Water Proof-ness | | | * |
| Sec 11.0: Fluids Susceptibility | | | * |
| Sec 12.0: Sand & Dust | | | * |
| Sec 13.0: Fungus Resistance | ? | | |
| Sec 14.0: Salt Spray | | | * |
| Sec 15.0: Magnetic Effect § | | | * |
| Sec 16.0: Power Input § | | | * |
| Sec 17.0: Voltage Spike § | | * | |
| Sec 18.0: Radio Frequency Conducted Susceptibility-Power Inputs § | | * | |
| Sec 19.0: Induced Signal Susceptibility § | | * | |
| Sec 20.0: Radio Frequency Susceptibility (Radiated & Conducted) § | | * | |
| Sec 21.0: Emission of Radio Frequency Energy § | | * | |
| Sec 22.0: Lightning Induced Transient Susceptibility § | | * | |
| Sec 23.0: Lightning Direct Effects § | | * | |
| Sec 24.0: Icing | | | * |
| Sec 25.0: Electrostatic Discharge § | | | * |

§ DO-160G Section updates

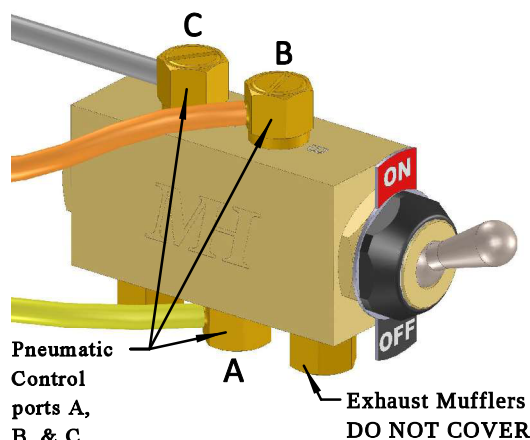
Sec 15: Magnetics Effects
 Sec 16: Power Input - AC & DC up to 45 kVA.
 Sec 17: Voltage spike
 Sec 18: Radio Frequency Conducted Susceptibility
 Sec 19: Induced Signal Susceptibility
 Sec 20: Radiated & Conducted RF Susceptibility
 Sec 21: Radiated & Conducted RF Emissions
 Sec 22: Lightning Induced Transient Susceptibility
 Sec 23: Lightning Direct Effects
 Sec 25: Electrostatic Discharge

SECTION 2: INSTALLATION INSTRUCTIONS

PNEUMATIC CONTROL PORTS (A, B & C):

There are three 10-32 threaded ports where the remote control toggle switch pneumatically connects via o-ring face seal banjo type fittings. These ports are labeled

A, B & C. and have a matching set of labeled ports on the pneumatic toggle control switch (See pg. 28, Pneumatic Valve Switch drawing). There are three small 1/8" O.D. Color coded kink resistant 1/8" dia. polyurethane pneumatic lines that connect the remote ON/OFF toggle pneumatic switch/valve to the PCR-2. The pressure through these lines is the same low pressure that is supplied to the outlet and is flow restricted to just 1/64th of a liter per minute. This helps to prevent against the low pressure oxygen supply contributing to any fires in the event these lines should become severed.

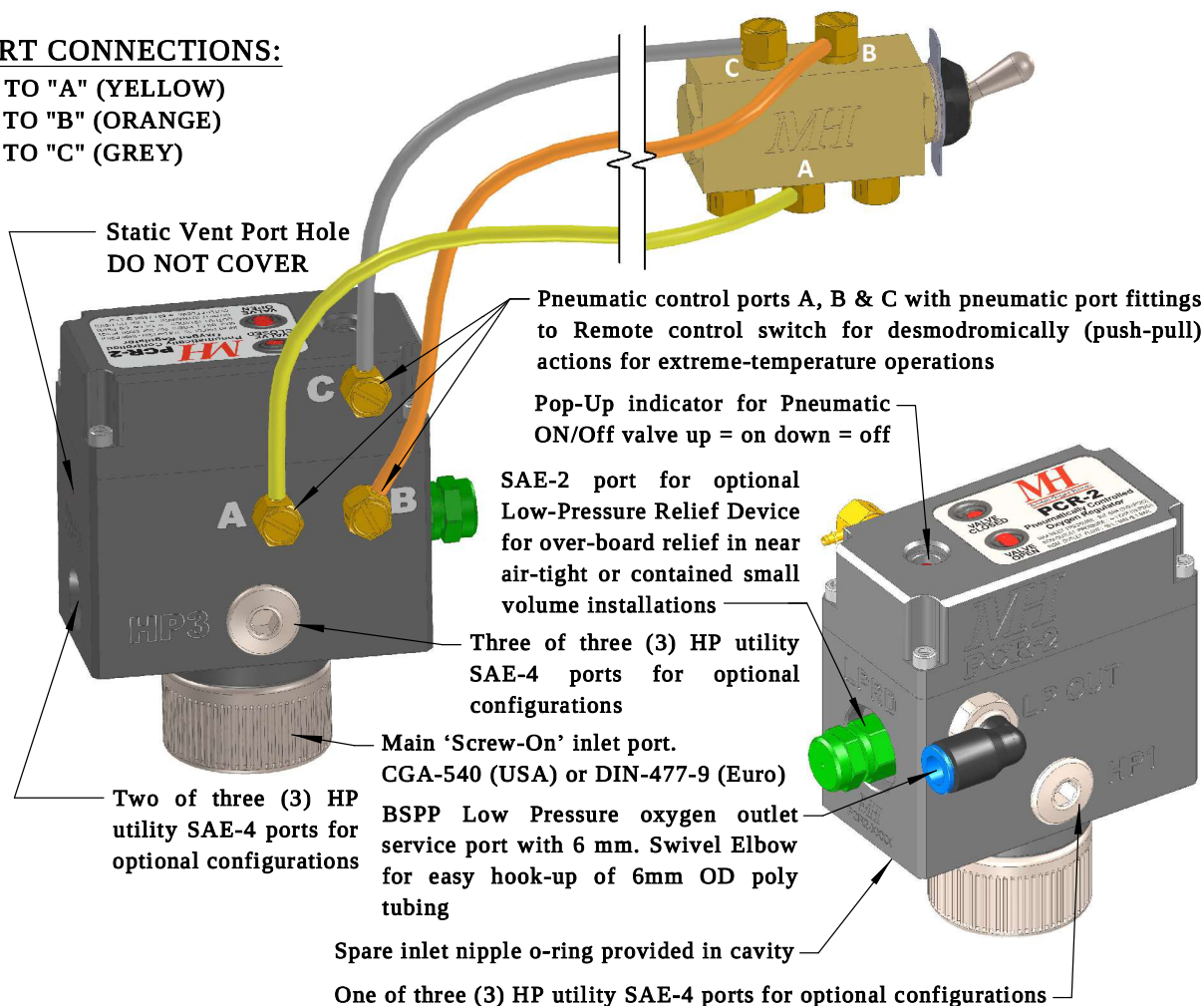


PORT CONNECTIONS:

"A" TO "A" (YELLOW)

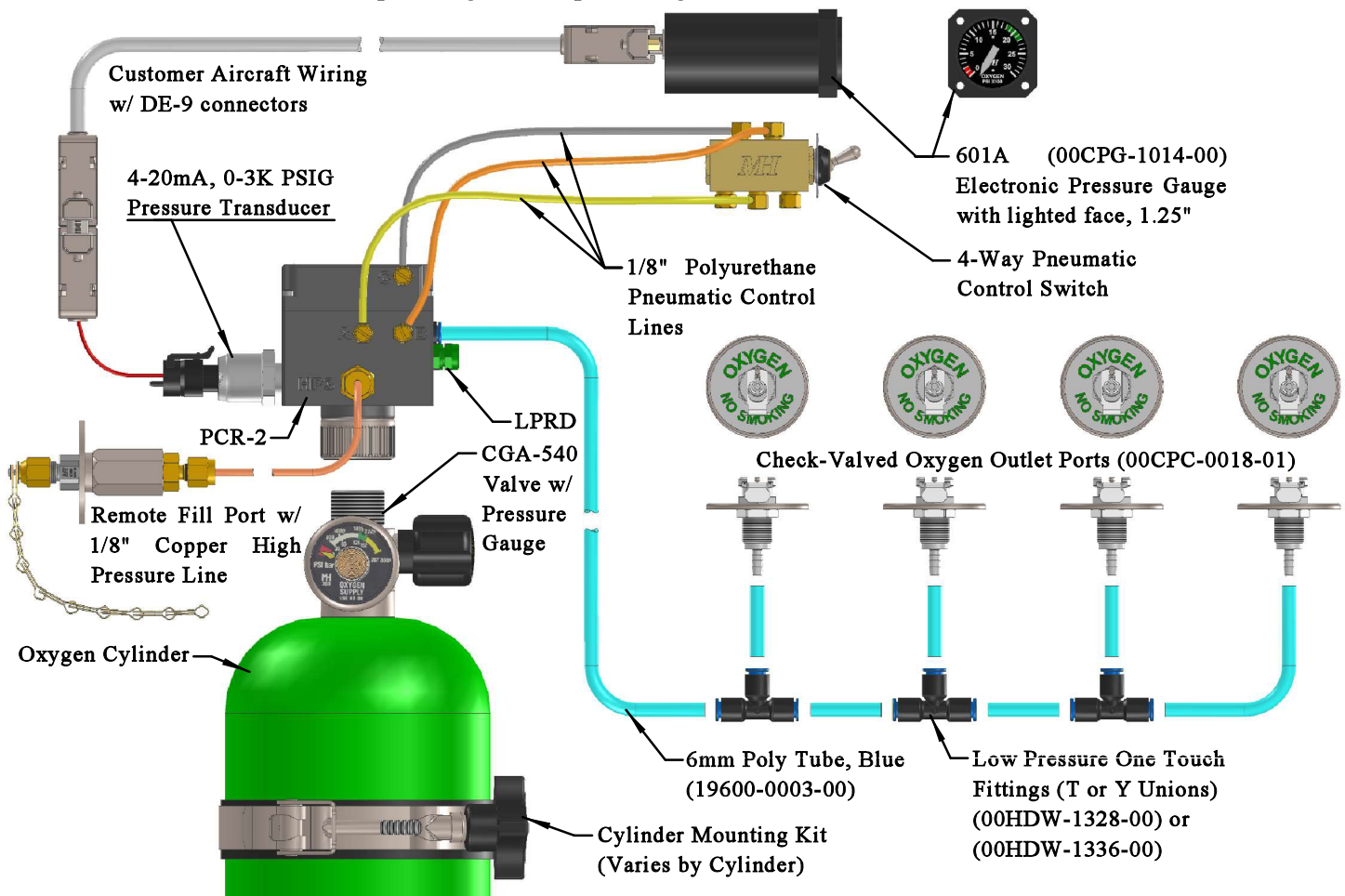
"B" TO "B" (ORANGE)

"C" TO "C" (GREY)

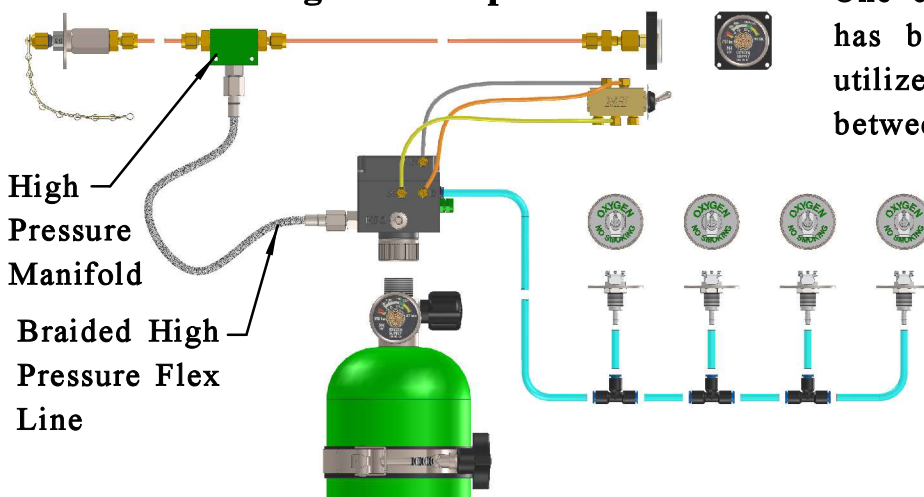


BASIC CONFIGURATION OPTIONS:

With our high and low pressure pneumatic accessories, there are many ways to configure your PCR installation application. This section will show some of the most popular applications our customers have. The system can be installed in non-pressurized and pressurized aircraft; in the latter case, the tank can be installed outside of the pressure bulkhead. When mounting the tank, it can be oriented horizontally or vertically, and must be accessible at pre-flight and post-flight.

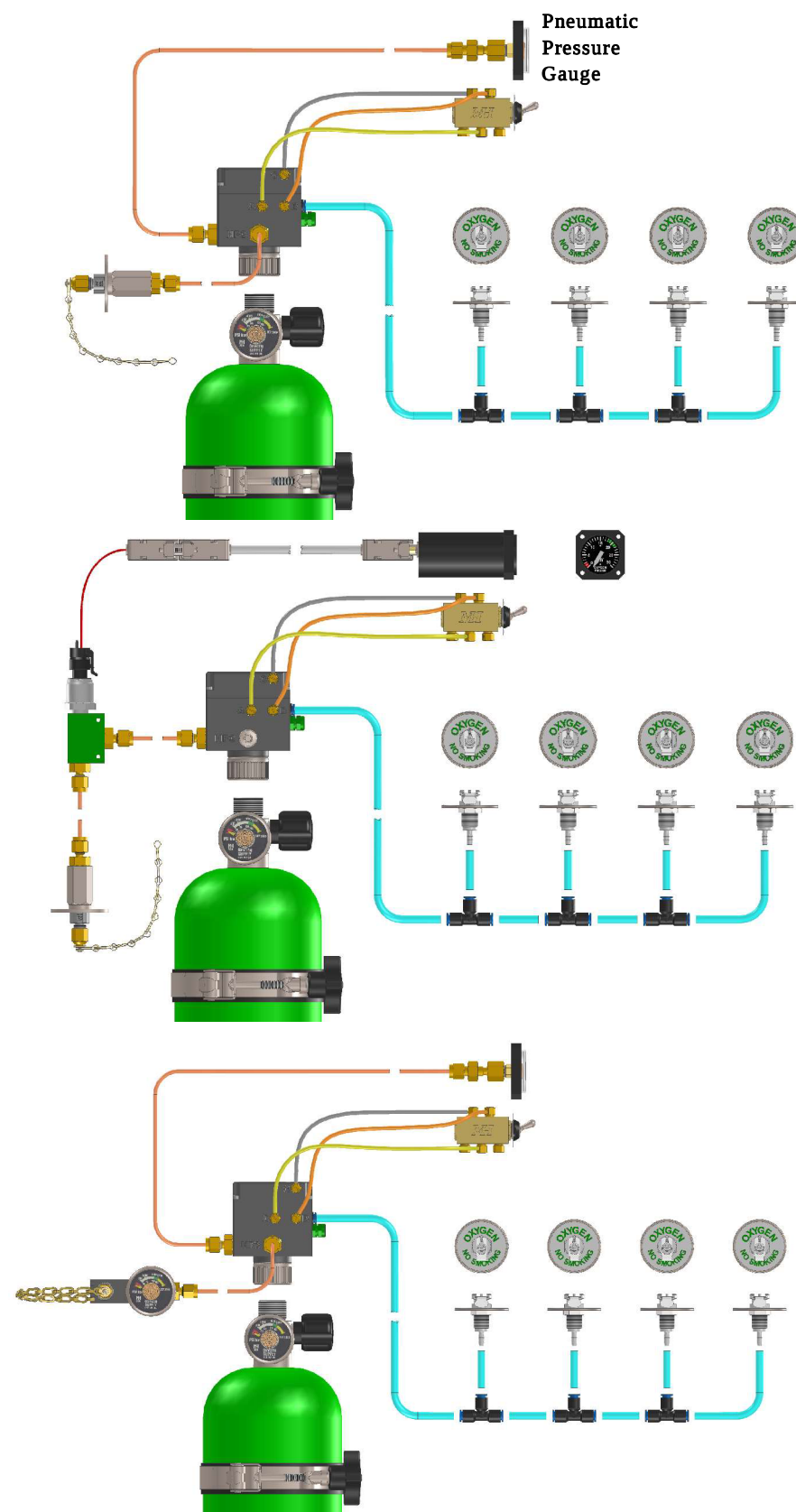


Flex Hose Configuration Option



One common configuration option that has been popular with builders is to utilize a high pressure braided flex-line between the PCR -2 and a high pressure manifold, thus enabling easy removal of the PCR-2 from the tank without disturbing a hard line installation. A Remote Fill Station and Pressure Gauge (Elec. or Pneumatic) can then be added to the rigid-mounted manifold via copper high pressure hard line.

BASIC CONFIGURATION OPTIONS (Cont.):



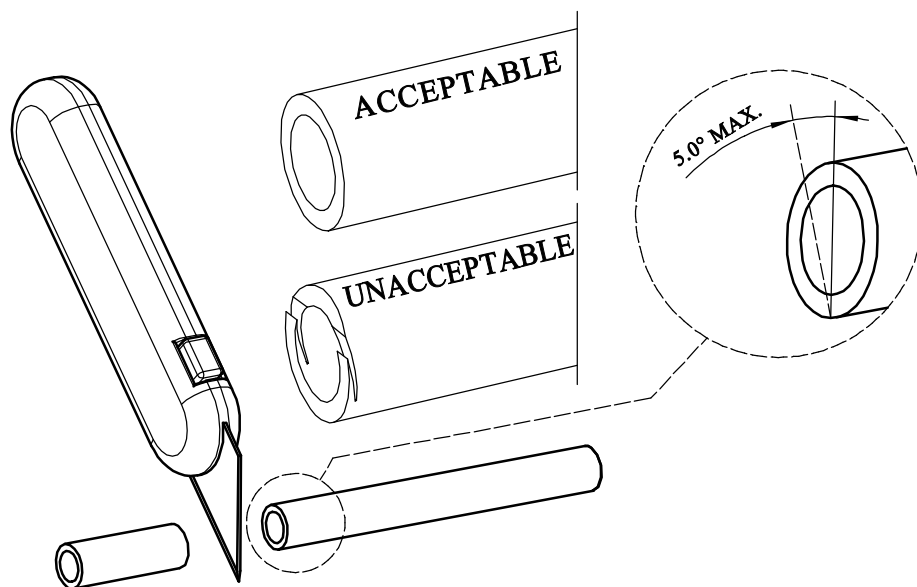
In order to conserve aircraft power, or for simplicity, some builders opt to use a pneumatic pressure gauge, the MH-300 (00CPG-0030-00). The MH-300 gauge is lighter and more cost effective than the Electronic gauge, however it does require a high pressure copper hard line to be run from the PCR (or a high pressure manifold) to the gauge in the flight deck.

Rather than connecting all peripheral components directly to the PCR-2's high pressure outlet ports, a high pressure copper hard line may be run from a single port to a separately mounted high pressure manifold, and from there connected to the various peripheral components. Using a manifold frees up high pressure ports on the PCR-2, enabling them to be used, for example, as inlets for additional cascaded cylinders.

In addition to the standard remote fill port, Mountain High also offers a 'Deluxe' Fill Station that incorporates a gauge at the station manifold, enabling the ground crew to monitor tank pressure as it is being filled without looking at the gauge in the flight deck.

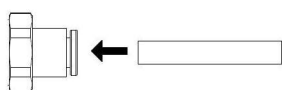
HOW TO CUT POLYURETHANE OR PVC TUBING:

Use a razor to cut the tubing at the desired location. If multiple cuts are required, ensure that no 'tags' are left behind from the previous cut (see "Unacceptable"). Make the cut as perpendicular to the tube as possible (within $\pm 5^\circ$).



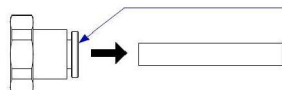
HOW TO USE THE ONE TOUCH FITTING:

TUBING CONNECTION



INSERTING

Push in the tubing



REMOVING

1. Push in the connector collar
2. Pull the tube straight back while holding the collar in

To INSERT TUBING: push the tubing into the connector until resistance is felt, then push a little further, about 1/8 inch [3 mm]. Gently tug on the tubing to make sure it is captured.

To REMOVE TUBING: push the tubing in slightly, then push in the connector collar while pulling gently on the tubing.

When removing tubing, ***DO NOT*** pull on the tubing without pushing in the collar, as this will likely damage the connector.

HOW TO CUT COPPER TUBING:

See drawing 5SHDW-0100-00 on pages 30-33 for instructions for cutting, purging, and installing copper hard lines.

WHAT DIAMETER COPPER TUBE SHOULD I USE FOR MY INSTALLATION?

It depends on how it is used within the system. 1/8" copper line should be used for connecting a remote fill station. 3/16" copper line should be used for cascading multiple cylinders or connecting a cylinder to a remotely mounted valve/regulator (such as the RCV-2).

HOW TO SECURE THE POLYURETHANE OR PVC TUBING:

Mountain High Oxygen provides tubing track kits for securing 4mm & 6mm tubing for built-in systems. See MHOxygen.com for more information.



HOW TO CHECK FOR LEAKS:

See Section 3 "Troubleshooting"

VIDEO TUTORIALS:



How to Fill Your Own Oxygen Cylinder



How to Fill a Built-in Oxygen System Using Transfill Adapters



When to Refill Your Oxygen Cylinder

SECTION 3: OPERATING INSTRUCTIONS

PRE-FLIGHT SYSTEM TEST:

- Turn the manual tank valve under the PCR-2 to the fully open position.
- Cycle the pneumatic switch and verify that the red pop-up valve indicator on top of the PCR-2 moves up and down to match the position of the pneumatic switch.

If used with a constant flow system:

- Ensure that the flow indicator ball on your Flowmeter, when held vertically, indicates that oxygen is flowing when the pneumatic switch is in the ON position. Then turn the pneumatic switch OFF and observe the indicator ball of the flowmeter. The ball should gradually return to the zero indication.

If used with an EDS electronic oxygen delivery system:

- With the pneumatic switch in the OFF position, turn the EDS system to "N" (normal) mode, don the cannula or facemask (see "How to Don A Cannula" video (QR code on this page)), and attempt to breathe. The EDS should give a flow fault alarm. Then turn the pneumatic switch ON and attempt to breathe. The EDS flow fault alarm should stop and you should feel a pulse of oxygen, as well as observe the LED indicator on the EDS flash once per pulse. Turn the pneumatic switch and EDS back to OFF until ready to use.

IN-FLIGHT USE:

- Turn the pneumatic switch on.
- Don the cannula or facemask (see "How to Don A Cannula" video).

If used with a constant flow system:

- Hold the Flowmeter vertical and use the adjustment wheel to move the indicator ball to your current altitude (or greater if more oxygen is desired). The Flowmeter should be re-adjusted when altitude changes.

Alternatively, you may adjust the Flowmeter to your highest expected cruising altitude at the beginning of the flight. This would allow you to fly without adjusting for altitude changes, however more oxygen will be used than necessary. Once adjusted, the flowmeter can be laid in any orientation and will continue to flow at the set rate.

If used with an EDS electronic oxygen delivery system:

- With the pneumatic switch in the ON position, turn the EDS system to the desired setting.

"N" (normal) mode will provide immediate oxygen delivery.

"D5" & "D10" will delay oxygen delivery until 5,000 or 10,000 feet (pressure altitude) respectively. This setting enables you to set the EDS to the altitude you want oxygen delivered at the beginning of the flight, without unnecessary oxygen delivery at lower altitudes.

"F1 - F4" facemask settings should be used with a facemask when in the flight levels (or anytime a mask is used), or alternatively when the user desires a larger amount of oxygen with each pulse (see the EDS manual for comprehensive use instructions).

If the EDS gives a flow fault alarm, double check that the pneumatic switch is in the ON position and the valve is fully open.

POST-FLIGHT SHUTDOWN:

- Remove the cannula or mask.
- Turn the pneumatic switch OFF.
- If using an EDS electronic oxygen delivery system, turn the system off.
- Close the manual tank valve and vent the lines (see pg. 15) if the system will be shut down for an extended period of time (longer than 24 hrs).

How To Don A Cannula



SECTION 4: TROUBLESHOOTING GUIDE

TROUBLESHOOTING LEAKS:

Use Snoop leak detector (00VEN-0070-00) or a non-petroleum based soap (Dawn) and water solution to check for leaks.

- Check copper tubing/brass compression fitting connections. If there is a leak, see pages 31-32 (5SHDW-0100-00, sheets 2-4) for assembly, re-assembly, & ferrule replacements.

- Check the switch banjo fittings. Apply leak detector to top, bottom, and barb of the banjo fitting on both the switch and the PCR. If there is a leak, ensure the fitting O-rings are clean and undamaged. If the barb has been damaged during tubing removal, the fitting may need to be replaced. See pages 26-27 (5SBNJ-002-100, sheets 1-2) for details.

- Check outlet ports using a test gauge or leak detector, verify no oxygen is flowing with the port check valve closed (fitting not clicked into port). If there is a leak, the CPC port may need to be replaced (p/n 00CPC-0018-00).

- Check the remote fill station (if installed). Using a test gauge or leak detector, verify no oxygen is flowing out of the fill port. If there is a leak, send the fill station in for repair. If it is a deluxe fill station, apply leak detector to gauge threads. If there is a leak, re-apply teflon tape. See pages 17-18 (5SCPG-1010-00 & 5SCPG-1011-00) for details.

OPERATION TROUBLESHOOTING:

If the PCR-2 is not operating properly or does not turn on, use the following guidelines:

- Verify the switch fitting tubing is correct. See page 10 (Pneumatic Control Ports) for connections.

- Verify the switch fittings are tight and not leaking.

- Verify the switch is oriented properly. See page 10 (Pneumatic Control Ports) for switch orientation.

- Observe the pop-up valve indicator to verify operating conditions as shown on page 4.

- Verify that the 6mm outlet tubing is properly seated/installed in their respective fittings and unions.

- verify the cylinder valve is fully opened.

VENTING THE LINES TO REMOVE THE PCR-2:

If the PCR-2 cannot be easily unscrewed from the tank valve, the lines are still pressurized and need to be vented. With the switch off and the tank valve closed, the following are ways to vent the system:

- The blue 6mm tubing can be removed from the outlet elbow on the PCR-2 itself.

- If using a constant flow system, keep the flowmeter(s) connected to the CPC outlet ports to gradually vent the lines.

- If using an EDS system, with the feed tube still installed in the CPC outlet port, remove the red 4mm end from the EDS inlet fitting.

- If no delivery equipment is available, use a clean, blunt object, like a ball-point pen cap, to vent any CPC outlet port by gently, and partially, pressing it into the port to release the oxygen.

If the PCR-2 nut is forced, by hand or with tools, while the lines are pressurized, it could damage the outer and underside O-rings of the inlet nipple.

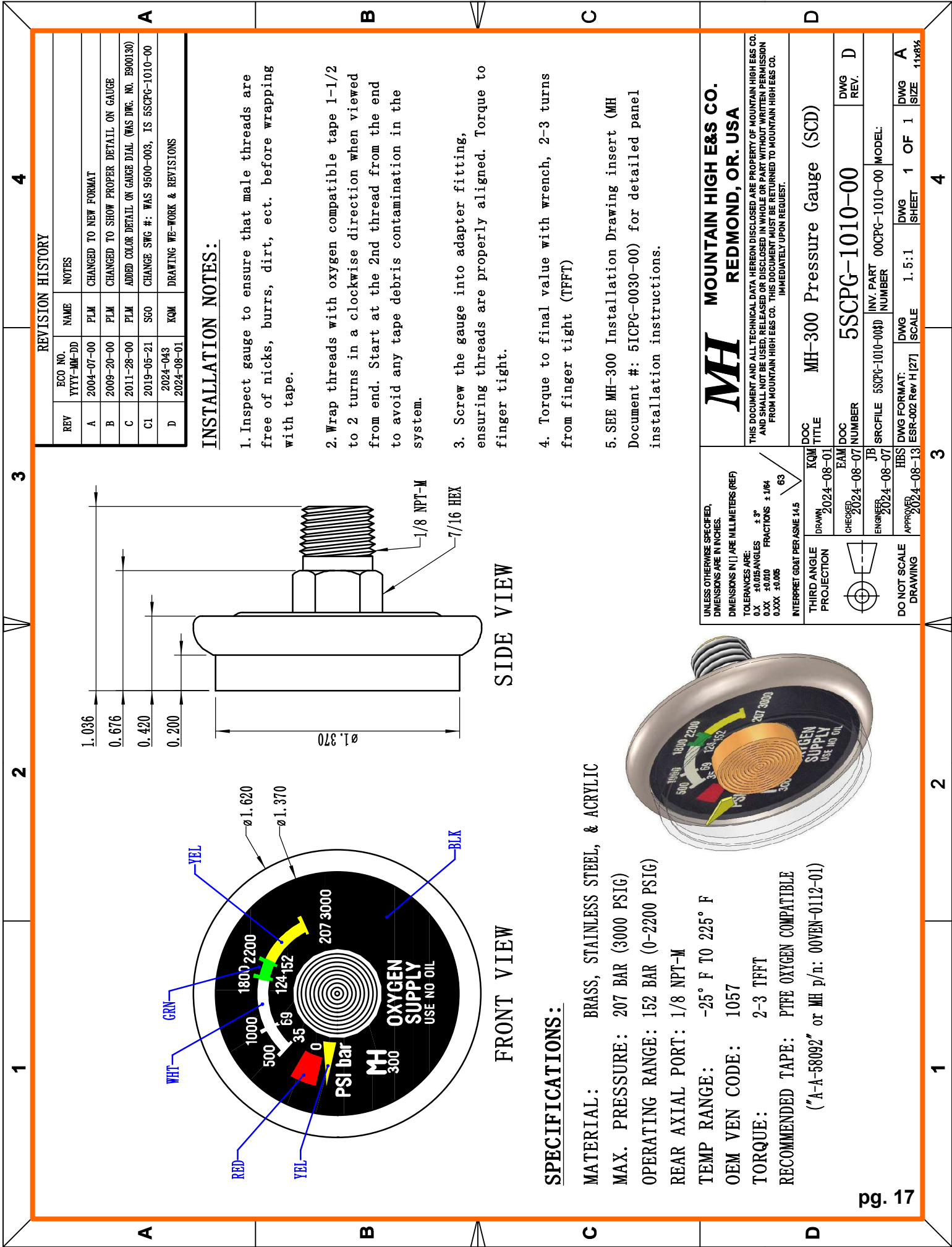
REPLACING THE OUTER INLET NIPPLE O-RING:

A spare inlet nipple O-ring is provided in the recessed cavity next to the inlet nut. To replace, use a pick probe, or exacto-blade to poke, pull away, then pry off the old O-ring. Take care not to scratch the brass. Install the spare O-ring without lubrication.

SECTION 5: PERIPHERAL SYSTEM COMPONENTS

The following drawings detail the various peripheral components that may be included in a built-in PCR oxygen system.

| Schedule Of Drawings | | | |
|----------------------|---------------|--------|---|
| Drawing # | Part # | Page # | Description |
| 5SCPG-1010-00 | 00CPG-1010-00 | 17 | MH-300 Pressure Gauge, SCD |
| 5SCPG-1011-00 | 00CPG-1011-00 | 18 | MH-400 Pressure Gauge, SCD |
| 5ICPG-0030-00 | 00CPG-0030-00 | 19 | MH-300 Gauge Plate & Installation, SCD |
| 5IBLT-1020-00 | 00BLT-1020-00 | 20 | Deluxe Refill Station, SCD |
| 5IBLT-1022-xx | 00BLT-1022-xx | 21 | AN800-3 Bulkhead Refill Assembly, SCD |
| 5SMAN-0012-00 | 00MAN-0012-00 | 22 | High Pressure Tee Manifold, (3) SAE-4F, SCD |
| 5SCMK-001-000 | 00CMK-00xx-0x | 23 | Cylinder Mounting Kit Chart, SCD |
| 5ICMK-0004-00 | 00CMK-003x-00 | 24 | Cylinder Mounting Brackets, Short/Tall, SCD |
| 5ICMK-0006-00 | 00CMK-00xx-13 | 25 | Cylinder Mounting Kits, Saddle Bracket Style, SCD |
| 5SBNJ-002-100 | 19055-x002-0x | 26-27 | Banjo Fittings, SCD |
| 5ICR0-0118-00 | APCR0-011x-00 | 28 | 4-Way Pneumatic Valve Switch, SCD |
| 5I930-0001-00 | 19600-000x-00 | 29 | Low Pressure Polyurethane Tubing, SCD |
| 5SHDW-0100-00 | 00HDW-0xxx-xx | 30-33 | High Pressure Copper Tubing & Fittings, SCD |



| REV | ECO NO. YYYY-MM-DD | NAME | NOTES |
|-----|------------------------|------|--|
| - | 1996-04-27 | PLM | INITIAL DRAFT |
| A | 2009-01-28 | PLM | CORRECTED TEXT ON SCALE AND PLACED ON NEW FORMAT |
| B | 2024-045 2024-08-07 | QOM | DRAWING WE-WORK & REVISIONS |

1. Clean per MH in-house document: ESR-008

2. Inspect gauge to ensure that male threads are free of nicks, burrs, dirt, ect. before wrapping with tape.
3. Wrap threads with oxygen compatible tape 1-1/2 to 2 turns in a clockwise direction when viewed from end. Start at the 2nd thread from the end to avoid any tape debris contamination in the system.

SIDE VIEW

Note: Gauge marked per MH
in-house document: ESR-005

SPECIFICATIONS:

MATERIAL: BRASS, STAINLESS STEEL, & ACRYLIC
FINISH: NONE

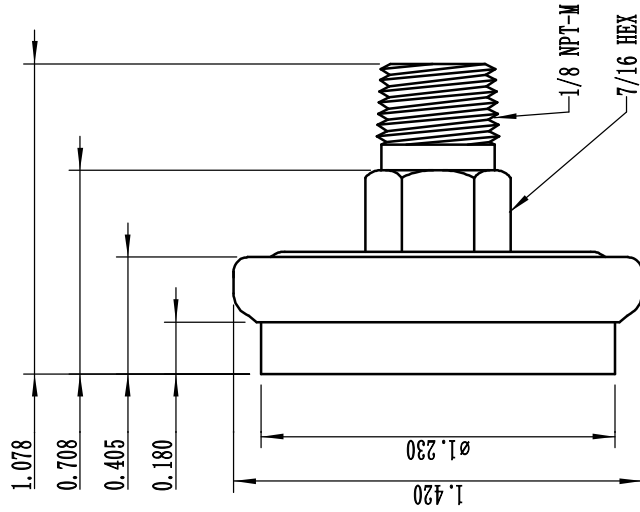
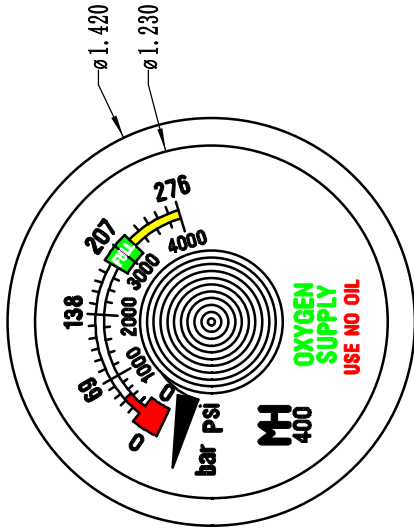
MAX. PRESSURE: 276 BAR (4000 PSIG)
OPERATING RANGE: 207 BAR (0-3000 PSIG)


REAR AXIAL PORT: 1/8 NPT-M

TEMP RANGE: -25° F TO 225° F

TORQUE: 2-3 TFFT

RECOMMENDED TAPE: PTFE OXYGEN COMPATIBLE
("A-A-58092" or MH p/n: 00VEN-0112-01)



| | | |
|---|---|----------------------------|
| UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. DIMENSIONS [IN] ARE MILLIMETERS (REF) TOLERANCES ARE: .XX ±0.05 ANGLES ± 3° .XX ±0.00 FRACTIONS ± 1/64 .XXX ±0.06 |  | DRAWN KOM 2024-08-07 |
| | | CHECKED EAM 2024-08-07 |
| | | ENGINEER JTB 2024-08-07 |
| | | APPROVED HBS 2024-08-13 |
| | | DO NOT SCALE DRAWING |

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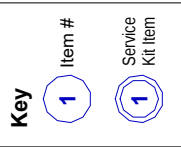
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MH-400 Pressure Gauge (SCD)

5SCPG-1011-00

| | | |
|---------------------|---------------|--------|
| INV. PART NUMBER | 00CPG-1011-00 | MODEL: |
|---------------------|---------------|--------|

| | | | | |
|-------|--------------|--------|-------------|---------------|
| 1.5:1 | DWG SHEET | 1 OF 1 | DWG SIZE | A 11x8 1/2 |
|-------|--------------|--------|-------------|---------------|



GENERAL SPECIFICATIONS

Materials:

- UNS C36000 (CDA-360) Brass
- UNS A96061 (6061-T6) Aluminum
- UNS S30300 (303) Stainless Steel

Weight: 5.8 oz [165 g]

Working Pressure: 3000 PSI

Temp Range: -50°F to +130°F [-45°C to +55°C]

Service Kit:

- MH p/n KM100-1010-01
- Items (2)(3)(4)(6)(9) (indicated by double circle)

Cleaned for oxygen service per MH ESR-008

Installation

- Install Deluxe Fill Station per AC 43.13 Chapter 6
- THRU holes in side of Deluxe Fill Station manifold will accommodate #8 or #10 machine screws. Locate mounting holes per indicated dimensions, or match-drill.
- Threaded holes in bottom of manifold are for #10-32 fasteners. Locate mounting holes per indicated dimensions.
- MH-300 Pressure Gauge is included separately with the Deluxe Fill Station so that the gauge may be installed in the field and oriented as required. Gauge threads are 1/8-27 NPT and come pre-taped as a convenience.
- Leak-check gauge connection with snoop or equivalent
- If gauge is loosened or removed, remove old tape and re-apply new oxygen-compatible Teflon tape (e.g., MIL-SPEC T27730A) to NPT male threads prior to re-installation. Take care to maintain cleanliness of all parts of the oxygen system - failure to do so could create an **extreme safety hazard**. Refer to MH document # 5SHDW-0300-00 for information on cleaning/purging/installing oxygen system fittings.

| REF | QTY | Description |
|-----|-----|------------------------------|
| 1 | 1 | Refill Body |
| 2 | 1 | O-Ring (AS-568-003) |
| 3 | 1 | Poppet |
| 4 | 1 | Retaining Ring |
| 5 | 1 | 1/8" Tube Adapter |
| 6 | 2 | O-Ring (AS-568-904, SAE-4) |
| 7 | 1 | AN800-3 [3/8-24] Adapter |
| 8 | 1 | Orifice |
| 9 | 1 | Filter |
| 10 | 1 | AN800-3 Cap & Chain Assembly |
| 11 | 1 | Pin |
| 12 | 1 | MH-300 Medium Pressure Gauge |



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Customer Drawing

Deluxe Refill Station [SCD]

5IBLT-1020-00

HO

| | INV. PART NUMBER | PROD. NAME |
|----|---------------------|-----------------------|
| H0 | 00BLT-1020-00 | Deluxe-Refill-Station |

| | | | | | | | |
|-------------------------|----------|-----------------------------------|--------------|--------------|--------|-------------|------------|
| DO NOT SCALE DRAWING | APPROVED | DWG FORMAT: ESR-002 Rev H [20] | DWG SCALE | DWG SHEET | 1 OF 1 | DWG SIZE | A 11x8½ |
|-------------------------|----------|-----------------------------------|--------------|--------------|--------|-------------|------------|

2

3

Insert #: 5IBLT-1020-00

| REV | ECO | Release | Drawn | REVISION HISTORY |
|-----|----------|------------|-------|------------------|
| G0 | 2020-011 | 2020-06-02 | SGO | Customer Drawing |

GENERAL SPECIFICATIONS

Materials:

- UNS C36000 (CDA-360) Brass
- UNS A96061 (6061-T6) Aluminum
- UNS S30300 (303) Stainless Steel

Weight: 3.0 oz [85 g]
Working Pressure: 3000 PSI
Temp Range: -50°F to +130°F [-45°C to +55°C]

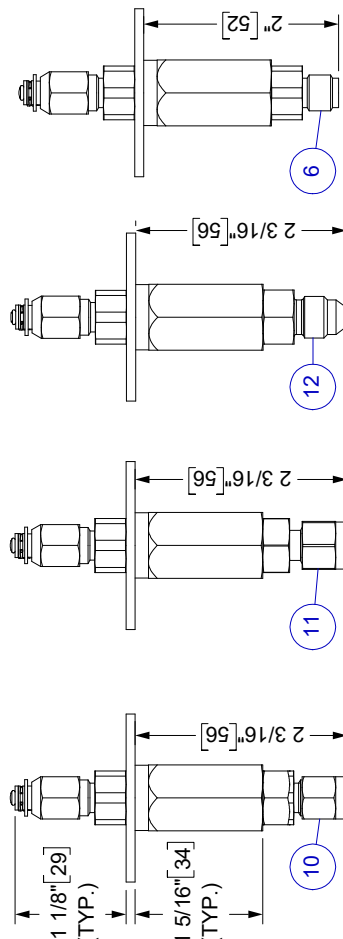
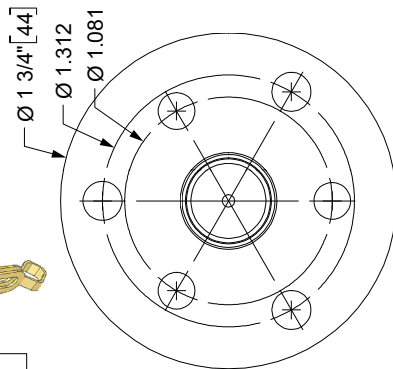
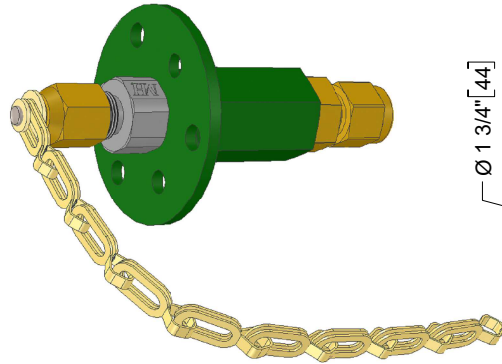
Service Kit:

MH p/n KM100-1010-01

- Items (2)(3)(4)(5)(8) (indicated by double circle)

Cleaned for oxygen service per MH ESR-008

Inlet: AN800-3 [3/8-24]




| REF | -01 | -02 | -03 | -04 | Description |
|-----|-----|-----|-----|-----|---------------------------------|
| 1 | 1 | 1 | 1 | 1 | Bulkhead Adapter w/ Check-Valve |
| 2 | 1 | 1 | 1 | 1 | O-Ring (AS-568-003) |
| 3 | 1 | 1 | 1 | 1 | Poppet |
| 4 | 1 | 1 | 1 | 1 | Retaining Ring |
| 5 | 2 | 2 | 2 | 2 | O-Ring (AS-568-904, SAE-4) |
| 6 | 1 | 1 | 1 | 2 | AN800-3 [3/8-24] Adapter |
| 7 | 1 | 1 | 1 | 1 | Orifice |
| 8 | 1 | 1 | 1 | 1 | Filter |
| 9 | 1 | 1 | 1 | 1 | AN-800-3 Cap & Chain Assembly |
| 10 | 1 | | | | 1/8" Tube Adapter |
| 11 | | 1 | | | 3/16" Tube Adapter |
| 12 | | | 1 | | JIC-4 37° Flare Adapter |

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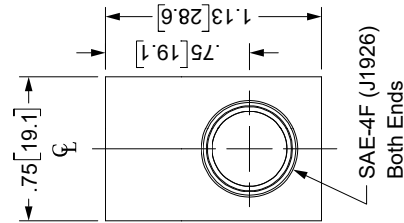
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Customer Drawing, Bulkhead Refill Assembly,
AN800-3 Inlet Versions [SCD]

| | | | | | | | |
|---|----------------------|-----------------------------------|-------------------|----------------------|---------------|------------|---------------------|
|  | CHECKED | DWG NUMBER | | 5IBLT-1022-xx | | DWG REV. | G0 |
| | ENGINEER | CAD FILE | 00BLT-1022-xx\$G0 | INV. PART NUMBER | 00BLT-1022-xx | PROD. NAME | AN800-B-H-Fill-xxxx |
| | APPROVED | DWG FORMAT: ESR-002 Rev H [20] | | DWG SCALE | DWG SHEET | 1 OF 1 | A 11x8 1/2 |
| | DO NOT SCALE DRAWING | | | | | | |

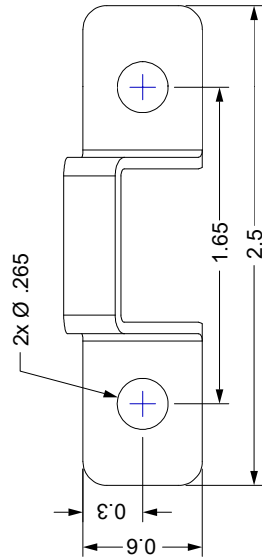
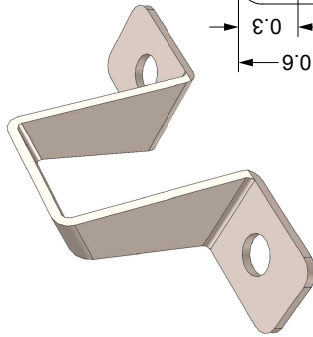
Insert #: 5IBLT-1022-xx

Cleaned for Oxygen Service per MH ESR-008

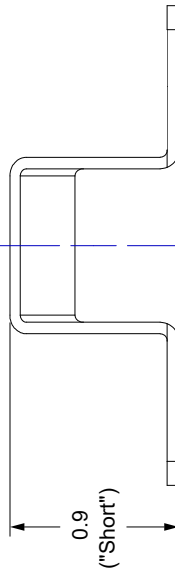
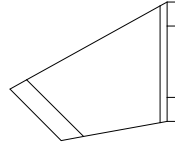


Cleaned for Oxygen Service per MH ESR-008

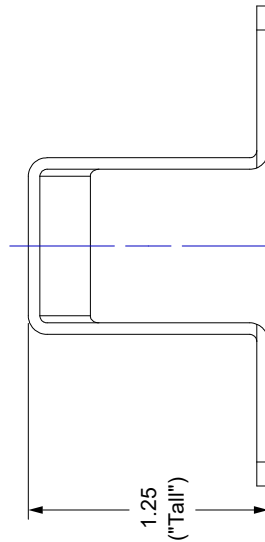
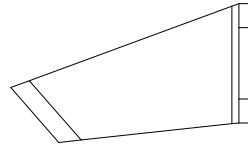
Insert #: 5IMAN-0012-00



00CMK-0030-00
Cylinder Mounting Bracket, Short
SCALE 1:1



00CMK-0032-00
Cylinder Mounting Bracket
SCALE 1 : 1




Cylinder M

1. Material: 16ga (.060) T-304 Stainless Steel
2. See document 5ICMK-0003-00 Cylinder Mounting Kit Selection Chart for information on selecting a Cylinder Mounting Kit for a particular cylinder. Cylinder Mounting Brackets (feet) and Hand Grip Knobs are included with the Cylinder Mounting Kit.

Notes:

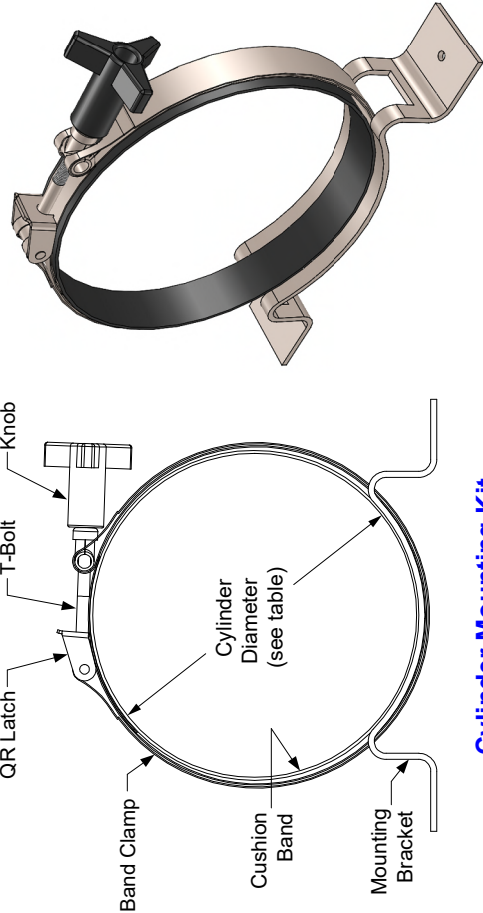
1. Material: 16ga (.060) T-304 Stainless Steel

2. See document 5ICMK-0003-00 Cylinder Mounting Kit Selection Chart for information on selecting a Cylinder Mounting Kit for a particular cylinder. Cylinder Mounting Brackets (feet) and Hand Grip Knobs are included with the Cylinder Mounting Kit.

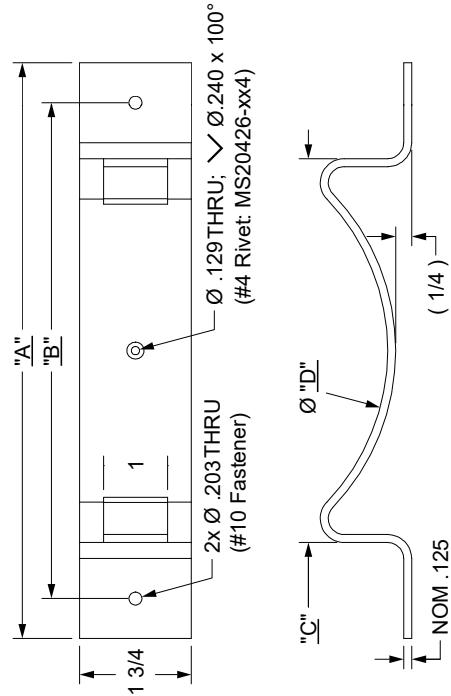
| | | | | | | | | | | |
|---|---|------------------|---------------|-----------------------------------|---------------|-----------|--------|-------|------|----------|
| <div>UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.</div> <div>DIMENSIONS IN [] ARE MILLIMETERS (REF)</div> <div>TOLERANCES ARE: 0.X ±0.015 ANGLES ±3° 0.XX ±0.010 FRACTIONS ±.164 0.XXX ±0.005</div> <div>63</div> <div>INTERPRET GD&T PER ASME 14.5</div> | MOUNTAIN HIGH E&S CO. REDMOND, OR. USA | | | | | | | | | |
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| | Cylinder Mounting Brackets, Omega Style, Short/Tall [SCD] | | | | | | | | | |
| | DWG TITLE | 5ICMK-0004-00 | | | | | | | | |
| DWG NUMBER | SRC FILE | INV. PART NUMBER | PROD. NAME | CMK-Foot-Short | CMK-Foot-Tall | DWG REV. | | | | -1 |
| | 00CMK-03x-000\$B1 | 00CMK-0030-00 | 00CMK-0032-00 | | | | | | | |
| THIRD ANGLE PROJECTION | CHECKED | ENGINEER | APPROVED | DWG FORMAT: ESR-002 Rev H [27] | DWG SCALE | DWG SHEET | 1 OF 1 | CMK-A | SIZE | 11x8 1/2 |
| DO NOT SCALE DRAWING |  | | | | | | | | | |

REVISION HISTORY

| REV | ECO NO. YYYY-MM-DD | NAME | NOTES |
|-----|------------------------|------|---|
| -0 | 2016-036 2016-07-21 | SGO | Initial Release |
| -1 | 2016-045 2016-08-17 | SGO | Correct table entry: 6.8 Cushion Band was 09033-0002-00, is 09033-0003-00 |
| -2 | 2016-051 2016-09-27 | SGO | Omit 7.6" Cylinder Kit: Correct Cylinder Mounting Kit p/n's: 00CMK-1048-03 is 00CMK-0006-13, 00CMK-1115-03 is 00CMK-0012-13 |



Cylinder Mounting Kit



Mounting Bracket Dimensions

GENERAL SPECIFICATIONS

Weight: 20 oz [56 g] (per set of 2, p/n 00CMK-0006-13)
Threads: 1/4-28 UNJF (T-Bolt, Knob)

Material: 300 Series Stainless Steel
Band Clamp: 6061-T4 Aluminum
Mounting Bracket: 6061-T4 Aluminum

Mounting Hardware: #10 (or bracket may be drilled out for 1/4")
Mounting Bracket: (optional) #4 Rivet (MS20426-xx4)
Bracket/Band:

Cylinder Mounting Kits, Saddle-Bracket Style, QR

| | | |
|--------------------------------|------------------|---------------|
| Cylinder Diameter (in.) | 6.8 | 9.1 |
| Applicable Cylinder(s) | CFFC-048, KF-050 | KF-115 |
| Cylinder Mounting Kit (p/n) | 00CMK-0006-13 | 00CMK-0012-13 |
| Replacement/Spare Parts (p/n): | | |
| Band Clamp | 00CMK-0055-02 | 00CMK-0072-02 |
| Knob | 00CMK-0036-00 | 00CMK-0036-00 |
| Cushion Band | 09033-0003-00 | 09033-0004-00 |
| Mounting Bracket | 00CMB-0048-00 | 00CMB-0115-00 |

Mounting Bracket Dimensions (in.):

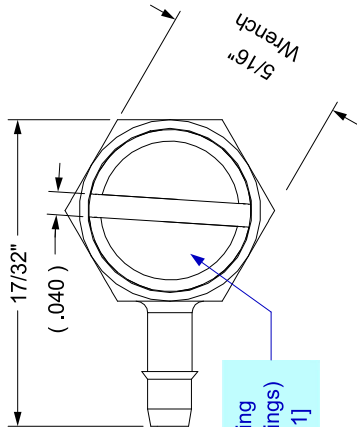
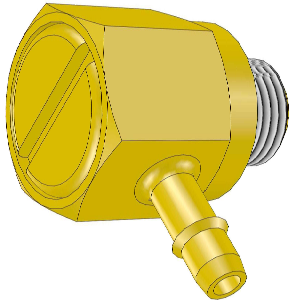
| | | |
|-----------------------------|------|------|
| "A" = Bracket OAL | 9 | 10 |
| "B" = Mounting Hole Spacing | 7.75 | 9 |
| "C" = Saddle Width | 6 | 7.5 |
| "D" = Saddle Diameter | 6.85 | 9.15 |

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
0.X ±0.015
0.XX ±0.010
0.XXX ±0.005
ANGLES ±3°
FRACTIONS ±1/64
63
INTERPRET GO&T PER ASME 14.5

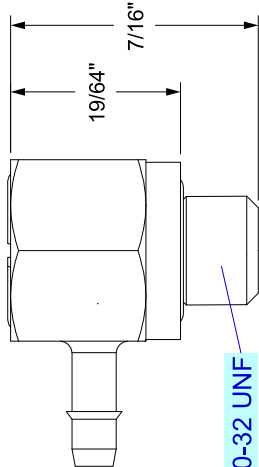


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| | | | | |
|------------------------|------------|--|------------------|----------|
| THIRD ANGLE PROJECTION | DWG TITLE | Cylinder Mounting Kits, Saddle-Bracket Style, QR [SCD] | | |
| DRAWN | SGO | 51CMK-0006-00 | | |
| CHECKED | EAM | DWG NUMBER | INV. PART NUMBER | DWG REV. |
| ENGINEER | TD | FILE | PRODUCT NAME | -2 |
| APPROVED | HBS | DWG FORMAT | DWG SCALE | DWG SIZE |
| 2016-07-21 | 2016-07-21 | ESR-002 Rev H [16] | SHEET 1 OF 1 | A |



"A" Marking
(orificed fittings)
[NOTE 1]



#10-32 UNF

| REV | ECO | Release | Drawn | REVISION HISTORY |
|-----|----------|-----------|-------|--|
| -0 | 2017-003 | 2/8/2017 | SGO | Customer Draw ing |
| -1 | 2025-058 | 12/2/2025 | KQM | Removed EPDM O-Rings, will use Silicone only |

GENERAL SPECIFICATIONS

Material: Body/Stud: Brass
O-rings: (see table)

Weight: .15 oz [4 g]

Thread: #10-32 UNF
Hose-barb: 1/16 ID [1/8 OD] tubing
Orifice: [NOTE 1]

Pressure Rating: 100 psi MAX [NOTE 2]
Temp Range: -50°F to +130°F [-45°C to +55°C]
Clean: For Oxygen Service

NOTES:

[1] ".01" Fittings include an orifice. Relevant applications would typically include one orificed Fitting. Orificed Fittings should have a letter "A" stamped on the face of the Stud, and the associated port should also be stamped "A".

[2] Max Pressure rating is for Brass Fitting only. Effective system pressure capability would generally be limited by the type of tubing used, and whether the tubing is additionally secured by some form of tubing clamp.

| MH Part Numbers | | | |
|-----------------|------------------------|------------------------|---------------------------|
| O-Ring Material | Banjo Fitting Assembly | Replacement Top O-ring | Replacement Bottom O-ring |
| Silicone | 19055-1002-0x | 09001-1014-70 | 09001-1516-70 |

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
D.X. ±.0015
C.X.X. ±.0010
C.X.X.X. ±.0005
ANGLES ± 3°
FRACTIONS ± 1/64
INTERPRET GD&T PER ASME 14.5 63



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| THIRD ANGLE PROJECTION | | DRAWN | | SGO | | DWG TITLE | |
|------------------------|--|------------|--|-------------------------------|--|----------------------------------|--|
| CHECKED | | EAM | | 2017-02-07 | | #10-32 x 1/16 ID Tube Barb [SCD] | |
| ENGINEER | | 2017-02-08 | | NUMBER | | 5SBNJ-002-100 | |
| APPROVED | | HBS | | DWG FORMAT: 5SBNJ-002-100\$-1 | | INV. PART NUMBER 19055-x002-0x | |
| DO NOT SCALE DRAWING | | 2017-02-08 | | ESR-002 Rev H [20] | | DWG SCALE 1 OF 2 | |
| | | | | | | DWG SHEET 1 OF 2 | |
| | | | | | | DWG SIZE 11x8 1/2 | |

Banjo Fittings,

#10-32 x 1/16 ID Tube Barb [SCD]

5SBNJ-002-100

-1

PROD. NAME

19055-x002-0x

DWG

1 OF 2

DWG

SIZE

11x8 1/2

O-Ring Replacement

O-rings may be replaced in the event of damage, or to upgrade existing fittings. See Parts Table on Sheet 1 for replacement O-ring part numbers.

Banjo Fitting consists of 4 parts (as illustrated):

- (1) Bottom (large) O-ring (seals between Body and port mating-surface)
- (2) Banjo Body (with hose-barb)
- (3) Top (small) O-ring (seals between Stud and Body)
- (4) Threaded Stud (secures Body to threaded port)

Disassembly

It is important to maintain cleanliness and not contaminate the oxygen system. Keep oil, grease or other petroleum products away from oxygen equipment.

Tubing does not necessarily need to be removed from Fitting prior to disassembly in order to replace O-rings. If tubing must be removed, take care not to damage hose-barb rib, otherwise Fitting may leak. If replacing orificed and non-orificed Fittings at the same time, be certain that orificed Fitting is installed back into correct port.

Unscrew Stud until Fitting is disengaged from port. Withdraw Stud from Body and remove O-rings.

Reassembly

Care is required in re-assembly to avoid contaminating the system or damaging the O-rings, Stud, or hose-barb.

O-rings may be lightly lubed with Christo-Lube or other oxygen-compatible product if preferred.

If tubing has been removed or is being replaced, it may be attached to Banjo Body hose-barb either before or after assembling the Banjo Fitting, as convenient.

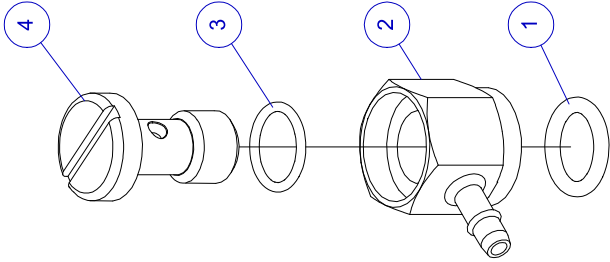
1. Carefully slip the Top O-ring over the threads of the Stud and seat the O-ring into the groove under the head of the Stud.

2. Insert the Stud through the "top" of the Body ("top" and "bottom" may be determined by locating the cylindrical shoulder feature which identifies "bottom")

3. Seat Bottom O-ring into "bottom" of Banjo Body.

4. Install the assembled fitting into the threaded port and turn the stud until the threads are fully engaged. Adjust the fitting to the desired orientation before tightening.

5. Torque Stud to 7 in-lbs. The Bottom O-ring will be compressed until the Body contacts the port mating-surface "metal-to-metal". At this point a firm stop should be felt if tightening by hand. Do not attempt to tighten any further beyond this point as the Stud could be stripped or broken off.



| REF | Description |
|-----|---------------|
| 1 | Bottom O-ring |
| 2 | Banjo Body |
| 3 | Top O-ring |
| 4 | Stud |

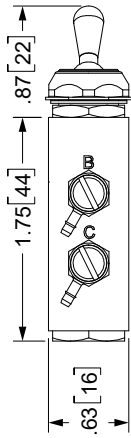


MOUNTAIN HIGH E&S CO.
REDMOND, OR. USA

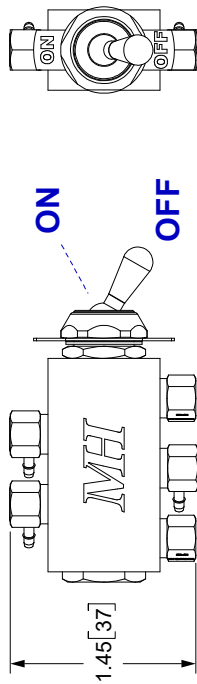
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| | | | | | |
|------------------------|--|--------------------|------------|----------------------------------|--|
| THIRD ANGLE PROJECTION | | DRAWN | SGO | DWG TITLE | |
| DO NOT SCALE DRAWING | | CHECKED | 2017-02-07 | #10-32 x 1/16 ID Tube Barb [SCD] | |
| | | ENGINEER | 2017-02-08 | 5SBNJ-002-100 | |
| | | PLM | CAD | -1 | |
| | | APPROVED | HBS | 19055-x002-0x | |
| | | DWG FORMAT: | DWG | 2 OF 2 | |
| | | ESR-002 Rev H [20] | SCALE | DWG SHEET | |
| | | | | A | |
| | | | | 11x8 1/2 | |

Insert #: 51BNJ-1002-00



C.N.O. B.N.C.



4



GENERAL SPECIFICATIONS

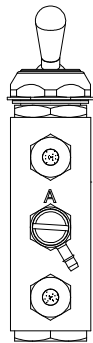
Material: Brass, Stainless Steel
Weight: 4.6 oz [130 g]
Mounting Hole: Ø.500[1/2"]; 12mm
Mounting Thread: 15/32-32 UNS
Control Ports: #10-32 UNF
Pressure Rating: 150 PSIG MAX
Temp Range: -15°F to +400°F [-29°C to +204°C]

Notes

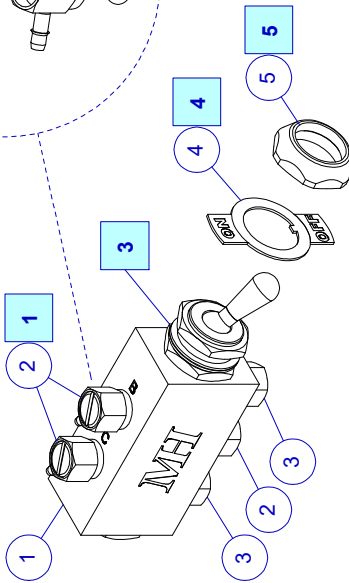
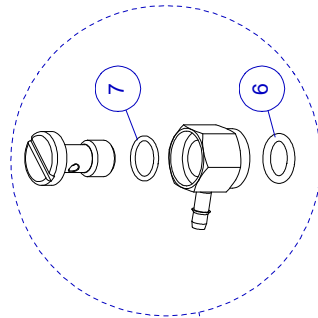
- [1] Banjo-style tube-barb fittings (Item 2) may be reoriented as required. Loosen top portion of fitting with standard screwdriver, adjust orientation and re-tighten. Hex flats are 5/16" wrench size.
- [2] Connect pneumatic control switch to regulator as shown in table using 1/8" OD PolyUrethane tubing items (8)(9)(10).
- [3] Jam nut is optional in accordance with requirements and space available. Two lockwashers are supplied with switch.
- [4] As required, install Switch Plate (4) and orient "ON/OFF" legend as shown to maintain concordance with regulator operation.
- [5] Dress Nut (5) may be installed as preferred.
- 6. Spare/replacement parts may be ordered separately from MH per the part numbers indicated. Tubing (Items 8, 9, 10 not shown) is ordered by the foot.

Key

- 1 Item #
- 1 Note



A.COM



| Regulator Connection | | |
|----------------------|----------------|-------------|
| Tubing Color | Regulator Port | Switch Port |
| Yellow | "A" | "A" |
| Orange | "B" | "B" |
| Gray | "C" | "C" |

| Pneumatic Valve Kits | |
|----------------------|---|
| MH p/h | Description |
| APCR0-0117-00 | Valve and all fittings as shown |
| APCR0-0118-00 | Valve and all fittings as shown plus 20 ft each of items (8)(9)(10) PolyUrethane Tubing |

Replacement parts

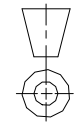
| Item | Part Number | Description |
|------|---------------|--|
| 1 | 19026-0007-01 | Pneumatic Valve/Switch |
| 2 | 19055-1002-00 | Banjo Fitting |
| 3 | 09025-0023-00 | Breather |
| 4 | 50001-0003-00 | Switch Plate, "On/Off" |
| 5 | 19027-0006-00 | Dress Nut |
| 6 | 09001-1516-70 | O-ring, Banjo Body, Silicone |
| 7 | 09001-1014-70 | O-ring, Banjo Stud, Silicone |
| 8 | 19600-0005-00 | PolyUrethane Tubing, 1/8" OD, Yellow [Order Qty: Feet] |
| 9 | 19600-0007-00 | PolyUrethane Tubing, 1/8" OD, Gray [Order Qty: Feet] |
| 10 | 19600-0006-00 | PolyUrethane Tubing, 1/8" OD, Orange [Order Qty: Feet] |

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. DIMENSIONS IN [] ARE MILLIMETERS (REF)

TOLERANCES ARE: ANGLES ±.3° FRACTIONS ±.164 DECIMALS ±.0015 0.XXX ±.0005

INTERPRET GD&T PER ASME Y14.5

THIRD ANGLE PROJECTION



DRAWN SGO 2020-07-21

CHECKED

ENGINEER

APPROVED

DO NOT SCALE DRAWING



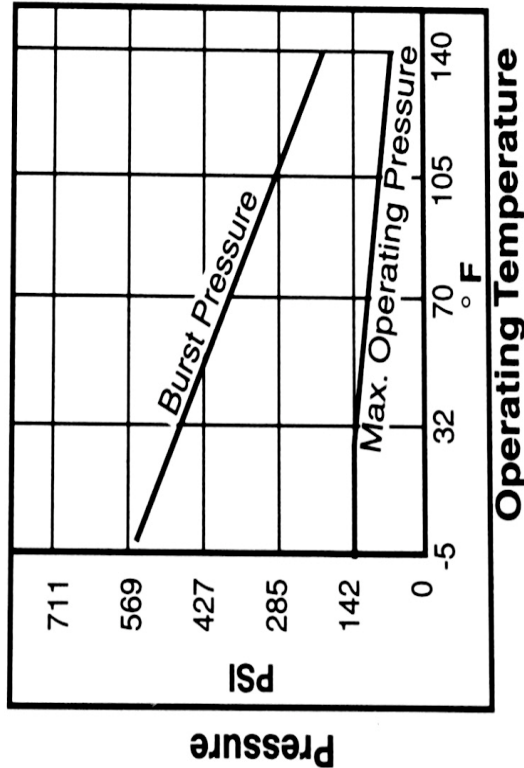
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Customer Drawing, Pneumatic Valve, 4-way [SCD]

| | | | | | | | |
|---------------|-------------------|---------------|----------------------|-----------|-----------|--------|----------|
| DWG TITLE | DWG NUMBER | CAD FILE | DWG FORMAT: | DWG SCALE | DWG SHEET | 1 OF 1 | DWG SIZE |
| 51CR0-0118-00 | APCR0-0117-00\$-0 | APCR0-0118-00 | ESR-002 Rev H [23] | | | | 11x8 1/2 |
| REV. B3 | INV. PART NUMBER | PROD. NAME | PCR 4-Way Switch Kit | | | | |

Burst Pressure Characteristics Curve



1 2 3 4 5 6 Polyurethane Tubing

REVISION HISTORY

| REV | DA-MO-YR | E. C. O. / APPR. | NOTES |
|-----|------------|------------------|--|
| A | 04-07-00 | PLM | CHANGED TO NEW FORMAT & ADDRESS |
| B | 17-04-13 | PLM | ADDED IMAGES |
| C | 18-08-14 | PLM | ADDED DUROMETER COLUMN |
| D | 2019-12-03 | SGO | Dwg# was E-930005, is 51930-0001-00; Add O2 compatibility info |

General Specifications

MATERIAL: POLYURETHANE

COLOR: > See Table

MAX. OPERATING PRESSURE: > See Chart

BURST PRESSURE: > See Chart

Outside Diameter, O.D.: > See Table

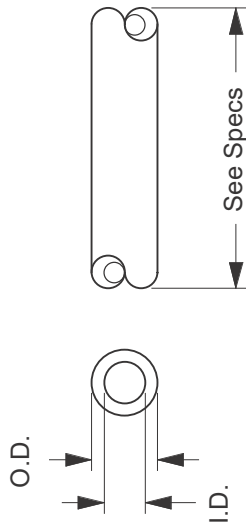
Inside Diameter, I.D.: > See Table

MIN. BENDING RADIUS: > See Table

TEMP RANGE: > See Chart

LENGTH & PACKAGE: By the Foot or 20 or 30' Roll

OXYGEN COMPATIBILITY: YES



| Li | MH Item Number | O.D. | I.D. | COLOR | Durometer | Min. Bend Radius |
|----|----------------|----------------|---------------|----------|-----------|------------------|
| 1 | 19600-0009-00 | (0.250) 6.35mm | (0.125) 3.2mm | CLR | 85 | (0.590) 15mm |
| 2 | 19600-0003-00 | (0.236) 6.0mm | (0.157) 4mm | CLR Blue | 95 | (0.590) 15mm |
| 3 | 19600-0002-00 | (0.157) 4mm | (0.098) 2.5mm | CLR Red | 95 | (0.394) 10mm |
| 4 | 19600-0005-00 | (0.125) 3.2mm | (0.079) 2mm | Yellow | 95 | (0.394) 10mm |
| 5 | 19600-0007-00 | (0.125) 3.2mm | (0.079) 2mm | Slate | 95 | (0.394) 10mm |
| 6 | 19600-0006-00 | (0.125) 3.2mm | (0.079) 2mm | Orange | 95 | (0.394) 10mm |

UNLESS OTHERWISE SPECIFIED DIMS ARE IN INCHES.
TOLERANCES ARE:

0.X ±0.015 ANGLES FRACTIONS
0.XX ±0.010 ± 0.5°
0.XXX ±0.005

INTERPRET GD&T DIMS AND TOLS PER ASME 14.5

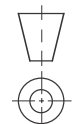
ISSUED: 04-26-00

DRAWN: PLM

ENGINEER:

APPR:

THIRD ANGLE
PROJECTION.



<CR> KEY CHARACTERISTICS NO.
<MA> PER CORP. DOC: ESR-001

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

LP POLYURETHANE TUBING, SCD

DWG. #: 51930-0001-00

REV D

SIZE A SHEET 1 OF 1

DO NOT SCALE DRAWING

1

2

3

4

| REV | ECO | Release | Drawn | REVISION HISTORY |
|-----|----------|------------|-------|------------------|
| -3 | 2019-023 | 2019-05-28 | SGO | Customer Drawing |

High Pressure Copper Tubing and Compression Tube Fittings

This application note provides information about High Pressure Copper Tubing and Compression Tube Fittings available from Mountain High Equipment & Supply (MH) for use in aviation oxygen systems, as well as general procedures and guidelines for Copper Tubing preparation and Compression Tube Fitting assembly and installation.

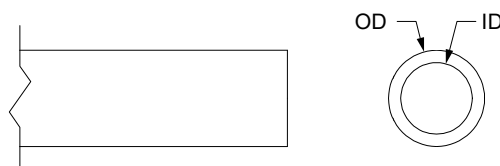
Copper Tubing - GENERAL SPECIFICATIONS

Material: UNS C12200, ASTM-B68
(99.9% Cu, 0.02% P)

Working Pressure Rating: 3074 PSIG @ 100°F
Temperature Range: -25°F to 125°F [-32°C to 52°C]

Package: Coiled Roll, 1-foot increments,
Cleaned & Capped or Crimped

| MH p/n | Description |
|---------------|---|
| 19605-0002-00 | 1/8 inch OD, Soft Copper Tubing Bulk (per ft.) |
| 19606-0003-00 | 3/16 inch OD, Hard-Drawn Copper Tubing Bulk (per ft.) |



1/8" OD Soft Copper Tubing

MH Item #: **19605-0002-00**

OD: 1/8" (.125") [3.175 mm]
ID: 0.065" [1.651 mm]
Wall Thickness: 0.030" [0.762 mm]
Weight: 0.035 Lbs / Ft [0.052 Kg / m]

Cleaned for Oxygen Service per MH ESR-008

3/16" OD Hard-Drawn Copper Tubing

MH Item #: **19606-0003-00**

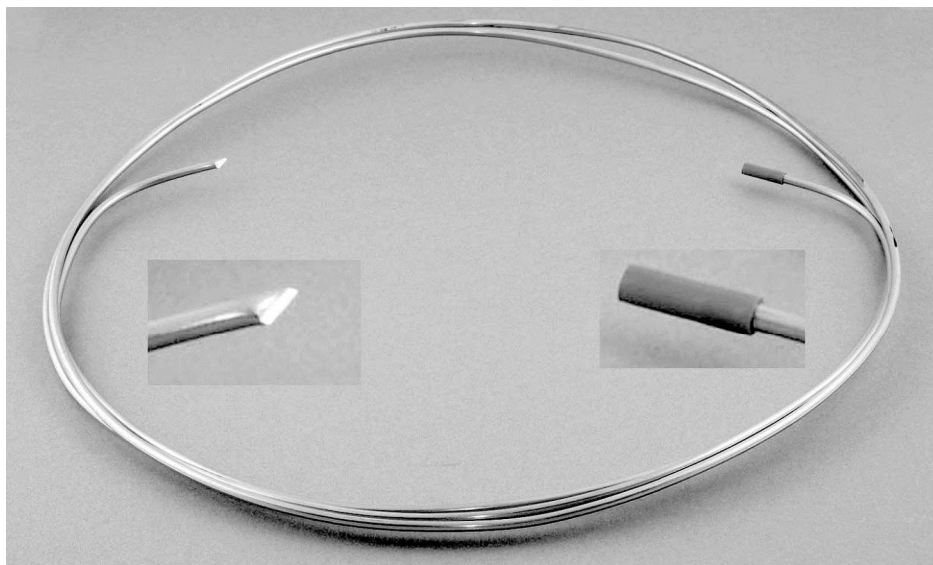
OD: 3/16" (0.1875") [4.763 mm]
ID: 0.1275" [3.329 mm]
Wall Thickness: 0.030" [0.762 mm]
Weight: 0.058 Lbs / Ft [0.085 Kg / m]

Cleaned for Oxygen Service per MH ESR-008

Packaging

Copper tubing is sold by the foot and unless otherwise specified will be shipped in a 12" dia. coil with the ends either crimped (left inset) or capped (right inset) or capped *and* crimped.

Contact Mountain High E&S for special packaging.



References

For more information about hardware and accessories available from MH:

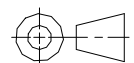
- 5SHDW-0100-00
High Pressure Copper Tubing and Compression Tube Fittings
- 5SHDW-0300-00
High Pressure NPT Pipe Fittings
- 5SHDW-0500-00
High Pressure Adapter Fittings

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES ARE:
0.X ±.015
0.XX ±.010
0.XXX ±.005

ANGLES ±3°
FRACTIONS ±1/64

INTERPRET GD&T PER ASME 14.5

THIRD ANGLE PROJECTION



DO NOT SCALE DRAWING

DRAWN SGO
2017-03-07
CHECKED EAM
2017-03-15
ENGINEER PLM
2017-03-16
APPROVED HBS
2017-03-16

MH

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| | | | |
|---|-----------------------------------|---------------------|----------------------------|
| DWG TITLE High Pressure Copper Tubing and Compression Tube Fittings [SCD] | | | |
| DWG NUMBER 5SHDW-0100-00 | | | DWG REV. -3 |
| CAD FILE 5SHDW-0100-00\$-3 | INV. PART NUMBER 00HDW-0xxx-xx | PROD. NAME | |
| DWG FORMAT: ESR-002 Rev H [20] | DWG SCALE | DWG SHEET 1 OF 4 | DWG SIZE A 8 1/2"x11 |

Copper Tubing

Copper tubing supplied by Mountain High Equipment & Supply (MH) is warranted as "cleaned for oxygen service" provided both ends are sealed, crimped or capped.

Handling

Handle copper tubing carefully as scratches or burrs on the tubing could interfere with sealing. Pinched or out-of-round tubing may not fit the ID of the Ferrules or Body bore and could also lead to leakage.

Cutting

Copper tubing should be cut with a fine-tooth saw (jeweler's coping saw) with at least 32 teeth per inch in order to minimize residual burrs. Use a cut-off guide or miter-box to assure a square cutoff.

Use of a conventional tubing cutter is not recommended as it will result in a reduced inner diameter as well as a slight flare at the outer diameter. The reduction in inner diameter can be as much as 50% which would compromise proper oxygen flow. The tube opening must therefore be restored to the original inner diameter with a drill bit or a small jeweler's reamer. The flared outer diameter may also need to be corrected as it may interfere with assembly and the proper seating of the tubing in the fitting body.

Deburring

Remove burrs from the cut end of the tubing. Burrs on the ID of the tubing can restrict flow or break loose and clog or damage the oxygen system, and pose a **safety hazard** (see "**Cleaning**"). Burrs on the OD of the tubing can interfere with the proper seating of the tubing in the fitting body. Do not over-deburr the OD of the tubing.

Tubing must be purged prior to assembly in order to remove any metal particles that could contaminate the system.

Cleaning

High pressure oxygen systems must be free of grease, oil or other unapproved lubricants or cleaning agents, as well as any metal particles. Such contaminants, aside from having the potential to clog or damage critical orifices or filters in the system, pose an **extreme safety hazard** with the potential of fire or explosion. Therefore, cleanliness in the preparation and assembly of oxygen system components is critical.

Tubing used in oxygen systems must be examined internally just prior to final assembly and re-cleaned if necessary (NFPA 99). FAA Advisory Circular **AC 43.13-2B** also specifies the cleaning of oxygen lines and fittings that have not been previously cleaned and sealed and lists several approved methods for doing so (Paragraph 608d),

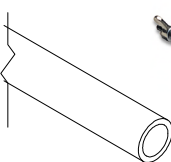
Tubing and Fittings obtained from MH have been cleaned for oxygen service and should not need to be re-cleaned so long as proper hygiene has been maintained in the assembly process. Tubing and Fittings obtained elsewhere (even if the *same* part) may therefore not be suitable for use in oxygen systems unless it is known for certain that they have been properly cleaned.

Purging

Just prior to final assembly to any associated equipment, tubing must be purged with air to remove any contaminants. Contaminants include not only metal particles generated in tubing preparation, but any cleaning fluid residue that may be present from previous cleaning procedures.

Use clean, dry compressed air to purge system tubing and fittings as required. Introduce the air in such a way that any contaminants present are completely ejected from the system rather than displaced into adjacent components.

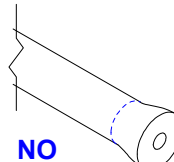
Caution: Conventional "Shop Air" systems may have lubricating oil introduced into the system and therefore would not be suitable for the purging of oxygen system components.



YES



Jeweler's Saw - Preferred



NO



Tubing Cutter - Not Recommended

Compression Tube Fittings - GENERAL SPECIFICATIONS

Material: UNS C36000 (CDA-360) Brass
 Pressure Rating: 3300 PSIG Working Pressure
 Temp Range: -50°F to +130°F [-45°C to +55°C]

Cleaned for Oxygen Service

Compression Tube Fittings

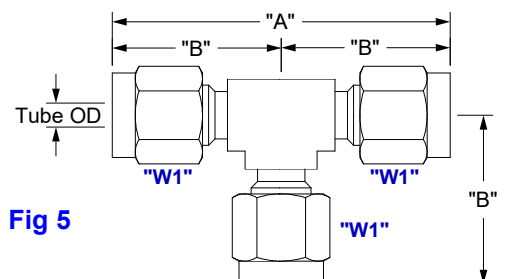
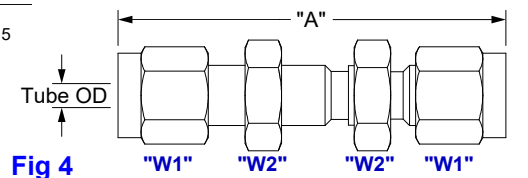
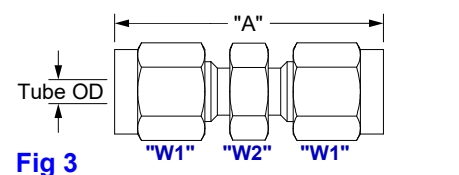
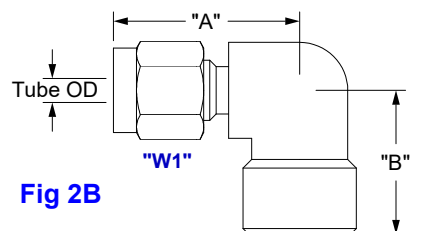
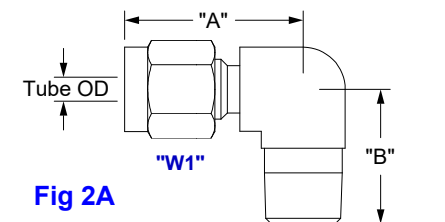
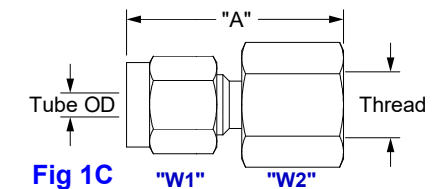
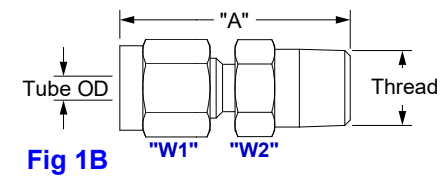
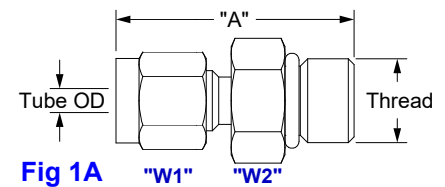
| MH p/n | Fitting | Tube OD | Thread | Weight Oz. [g] | Dim "A" | Dim "B" | Wrench "W1" | Wrench "W2" | Fig. |
|---------------|----------------------|---------|----------------------|----------------|-------------|------------|-------------|-------------|------|
| 00HDW-0104-00 | Straight | 1/8 | 5/16-24 UNF (SAE-2M) | 0.44 [13] | 1.18 [30.0] | | 7/16 | 7/16 | 1A |
| 00HDW-0108-00 | Straight | 1/8 | 7/16-20 UNF (SAE-4M) | 0.88 [25] | 1.24 [31.5] | | 7/16 | 9/16 | 1A |
| 00HDW-0108-05 | Straight (w/ filter) | 1/8 | 7/16-20 UNF (SAE-4M) | 0.90 [26] | 1.24 [31.5] | | 7/16 | 9/16 | 1A |
| 00HDW-0110-00 | Straight | 3/16 | 7/16-20 UNF (SAE-4M) | 0.98 [28] | 1.30 [33.0] | | 1/2 | 9/16 | 1A |
| 00HDW-0110-05 | Straight (w/ filter) | 3/16 | 7/16-20 UNF (SAE-4M) | 1.00 [28] | 1.30 [33.0] | | 1/2 | 9/16 | 1A |
| 00HDW-0118-00 | Straight | 1/8 | 1/8-27 MNPT | 0.64 [18] | 1.20 [30.5] | | 7/16 | 7/16 | 1B |
| 00HDW-0120-00 | Straight | 1/8 | 1/8-27 FNPT | 0.81 [23] | 1.13 [28.7] | | 7/16 | 9/16 | 1C |
| 00HDW-0122-00 | Straight | 3/16 | 1/8-27 MNPT | 0.69 [20] | 1.23 [31.2] | | 1/2 | 7/16 | 1B |
| 00HDW-0124-00 | Straight | 3/16 | 1/8-27 FNPT | 0.89 [25] | 1.17 [29.7] | | 1/2 | 9/16 | 1C |
| 00HDW-0134-00 | Straight | 1/8 | 1/4-18 MNPT | 0.99 [28] | 1.40 [35.6] | | 7/16 | 9/16 | 1B |
| 00HDW-0138-00 | Straight | 3/16 | 1/4-18 MNPT | 1.23 [35] | 1.43 [36.3] | | 1/2 | 9/16 | 1B |
| 00HDW-0145-00 | Straight | 3/16 | 1/4-18 FNPT | 1.58 [45] | 1.35 [34.3] | | 1/2 | 3/4 | 1C |
| 00HDW-0150-00 | Elbow | 1/8 | 1/8-27 MNPT | 0.88 [25] | .93 [23.6] | .70 [17.8] | 7/16 | --- | 2A |
| 00HDW-0152-00 | Elbow | 1/8 | 1/8-27 FNPT | 1.48 [42] | .97 [24.6] | .75 [19.0] | 7/16 | --- | 2B |
| 00HDW-0174-00 | Union | 1/8 | --- | 0.80 [23] | 1.40 [35.6] | | 7/16 | 7/16 | 3 |
| 00HDW-0176-00 | Union | 3/16 | --- | 1.00 [28] | 1.47 [37.3] | | 1/2 | 7/16 | 3 |
| 00HDW-0182-00 | Bulkhead Union | 1/8 | --- | 1.15 [33] | 2.02 [51.3] | | 7/16 | 1/2 | 4 |
| 00HDW-0204-00 | Tee | 1/8 | --- | 1.32 [37] | 1.76 [44.7] | .88 [22.4] | 7/16 | --- | 5 |
| 00HDW-0206-00 | Tee | 3/16 | --- | 1.84 [52] | 1.92 [48.8] | .96 [24.4] | 1/2 | --- | 5 |

| Compression Fittings Spare Parts | MH Part Number | |
|----------------------------------|----------------|---------------|
| | 1/8 OD Tube | 3/16 OD Tube |
| Ferrule and Nut Set, Brass | 00HDW-0212-00 | 00HDW-0214-00 |
| Back Ferrule, Brass | 00HDW-0212-BB | 00HDW-0214-BB |
| Front Ferrule, Brass | 00HDW-0212-FB | 00HDW-0214-FB |
| Nut, Brass | 00HDW-0212-NB | 00HDW-0214-NB |

Spare/replacement O-Ring for SAE-4M port-adaptor fittings

| Part Number | Description |
|---------------|----------------------------------|
| 09001-3904-70 | O-ring, EPDM, 3-904 (SAE-4), E70 |

(Applies to MH p/n's 00HDW-0108-xx, 00HDW-0110-xx [Fig 1A])



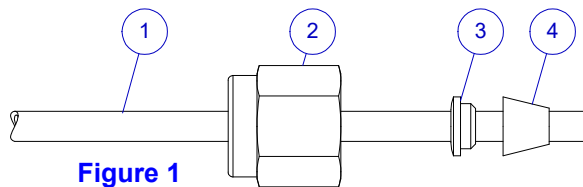


Figure 1

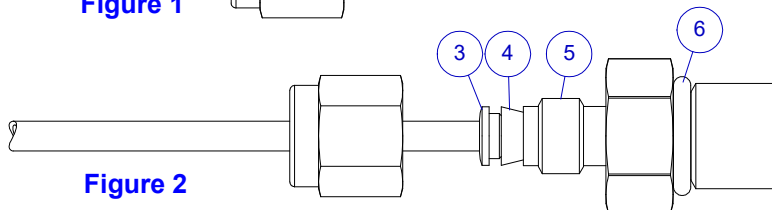


Figure 2

| REF | Description |
|-----|-------------------|
| 1 | Copper Tubing |
| 2 | Nut |
| 3 | Back Ferrule |
| 4 | Front Ferrule |
| 5 | Tube-Fitting Body |
| 6 | O-Ring |

Compression Fitting Assembly

The following instructions are applicable to all 1/16", 1/8" and 3/16" OD Compression Tube Fittings available from MH.

Note: Illustration depicts SAE-4M port-adaptor fitting (O-ring applies only to this type of fitting)

Note: Threaded port-adaptor fittings (SAE, NPT) must be installed into the port before the tubing connection is made

Note: Apply oxygen-compatible Teflon tape (e.g., MIL-SPEC T27730A) to NPT threads prior to installation (see 5SHDW-0300-00 "High Pressure NPT Pipe Fittings" for more information on installation of NPT fittings)

- 1) Remove the Nut from the Compression Tube Fitting and retain the 2 Ferrules
 - 2) Slide the Nut and 2 Ferrules over the end of the Tubing in the same order and orientation as shown [Figure 1]
 - 3) Push the Tubing into the fitting Body until the Tubing bottoms-out on the internal shoulder [Figure 2]
 - 4) Push the 2 Ferrules down against the fitting Body and turn the Nut to finger-tight, making sure that the Tubing remains seated against the shoulder and does not back out
 - 5) Holding the fitting Body steady, use a wrench to turn the Nut an additional 3/4 turn (turn the Nut only, not the Body)
- Note:** Rather than removing the Nut and disassembling the Fitting, it may be possible to merely loosen the Nut and push the Tubing through the Ferrules and into the Fitting until it bottoms-out on the shoulder. Turn the Nut finger-tight, and then an additional 3/4 turn.

Re-assembly

Connections may be disassembled and reassembled as required, but re-assembly is subject to a different procedure. Initial assembly swages the Ferrules onto the Copper Tubing, and reassembling the connection with the same procedure (3/4 turn) would **over-compress the Tubing and Ferrules and compromise the connection.**

Caution: Always depressurize the system before disassembly

- 1) Before disassembly, mark the Tube at the back of the Nut, and also mark a line across the flats of the Nut and fitting Body. These reference lines will be used to confirm that the Tube has been fully seated and that the Nut has been returned to it's previous pulled-up position upon re-assembly.
- 2) Disassemble the fitting and make changes or adjustments as required
- 3) Re-insert the Tube (with pre-swaged Ferrules) into the Fitting until the front Ferrule seats against the fitting Body [Figure 2]. Engage the Nut and turn to finger-tight. Hold the fitting Body steady and turn the Nut with a wrench to the previous pulled-up position using the marks made prior to disassembly as references. There should be a significant increase in resistance at this point. Further tighten the Nut slightly.

Note: If the Tubing is being shortened and the pre-swaged Ferrules are cut off, then follow the directions for initial assembly. Cut, deburr and purge the tubing as previously directed. Do not attempt to re-use the previously swaged Ferrules - replacement Ferrules are available from MH. The Nut may be re-used.

SECTION 6: INSTRUCTIONS FOR CONTINUED AIRWORTHINESS & SERVICING DETAILS

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS:

EVERY 6 MONTHS:

- Verify delivery masks and cannulas are clean and unsoiled. Periodic replacement is recommended, because even with the best cleaning efforts, bacteria and such can contaminate the mask and pose a health risk.

ANNUALLY:

- Verify cylinder pressure is holding when closed.
- If the system is unused for an extended period of time, verify operation of the valve, PCR-2, and delivery equipment.
- Recommended replacement of batteries in EDS unit(s) if used.

EVERY (2) YEARS:

- Recommended service of EDS unit(s), if used.

EVERY (5) YEARS:

- Hydrostatic test of cylinder.
- Recommended service of PCR-2 and valve.
- Trim all tubing ends $\approx 1/8"$ - $1/4"$ that are installed in one-touch fittings.
- If using an electrical gauge, verify that it matches pneumatic gauges at the cylinder and fill station (if used), within 150psi.

EVERY (10) YEARS:

- Recommended fill-station service if used.
- Check for degradation of all polyurethane tubing and replace as needed.

PCR-2 SERVICING DETAILS:

The service interval for the PCR-2 is predicated on, among many factors, the time between service and frequency of use, i.e. number of on/off cycles the PCR-2 endures between servicing. The estimated number of on/off cycles the PCR-2 is good for, before a deviation of operating specifications are observed where servicing is recommended, approximately 2735 full-on flowing sustain then off cycles.

The best and most convenient time is to have the PCR-2 serviced at the same time the cylinder is hydro-tested, at a maximum interval of about five years. The PCR-2 should be sent to Mountain High Oxygen for service, as should any other components within the system that require repair.

The parts that have any appreciable wear would be the pneumatic control switch, the main seal on the on/off 'pop-up' piston valve and the main regulator seat in the PCR-2 itself. Parts that have a secondary wear factor are the O-rings associated with the 'pop-up' piston valve and the regulator piston.

The main regulator inlet seat, in time and usage, will wear in such a way the regulator's static / non-flowing 'lock-up' pressure may creep past the specified limits. In this case, the dynamic 'flowing' pressure may still be within the specified limits allowing the unit to supply the proper amount of oxygen to all stations in use. If the static pressure goes beyond ~ 70 - 80 psig. The LPRD will relieve the over pressure supply to ambient.

SECTION 7: SAFETY INFORMATION

SAFETY NOTICE FOR HIGH PRESSURE OXYGEN MANAGEMENT SYSTEMS

Important Safety Note:

Although Oxygen itself is not flammable, it is a powerful oxidizer, and can cause materials that would otherwise have a high ignition temperature or be self extinguishing in a standard atmosphere to burn vigorously when in an oxygen rich environment. Therefore, extreme caution should be taken when handling and using aviation oxygen systems. The following section describes factors that are recognized as having caused or contributed to fires in oxygen systems:

Temperature:

As the temperature of a material increases, the amount of energy that must be added to produce ignition for combustion decreases. Operating an Oxygen system at unnecessarily high temperatures, whether locally or generally, reduces this safety margin. The ignition temperature of the many materials commonly used in oxygen systems is lowered in materials that otherwise might be self-extinguishing.

Pressure:

As the pressure of oxygen in an oxygen system increases, the ignition temperatures of its components typically decrease, and the rates of fire propagation increases. Therefore, operating an oxygen system at unnecessarily high pressures increases the probability of a fire. It should be noted that a pure oxygen environment, even at atmospheric pressures, may still pose a significant hazard with materials that are not compatible such as hydrocarbon oils.

Contamination:

Inadequate cleanliness during assembly, installation or service may cause contamination of oxygen systems. Abrasion and deterioration of system components over time may also cause contamination. Contaminates can be highly flammable and easily ignited. They may be introduced as liquids, solids or gases. Hydrocarbon oils such as hydraulic or engine oil are good examples. Even normally inert contaminants such as rust may produce ignition through particle impacts, friction and resonance heating effects.

Particle impact:

Collisions of inert or ignitable solid particles in a high pressure oxygen enriched environment are associated with potential ignition. Such ignitions may result from the particle being flammable and igniting upon impact and, in turn, igniting other system materials. Ignition may also result from heating of the particles and subsequent contact with system polymers, from fine flammable particles produced during collision, or from the direct transfer of kinetic energy during collision. Absolute removal of particles is not possible, and systems can self generate some particles from normal operation. The PCR-2 system has been designed to minimize this potential and filters are present at all of the high pressure inlet ports. The hazard associated with particles increases with both heat and temperatures of the system and the kinetic energies of the particles. It should be noted that the quantity of particles in a system will tend to increase with time and usage.

Resonance:

Acoustic oscillations (whistling-chatter) within resonant cavities are associated with rapid heating. The temperature rises more rapidly and achieves higher values where particles are present or where there are high gas velocities. Resonance phenomena in oxygen systems are well documented, but there are few design criteria.

Static electric discharge:

Electrical discharge from static electricity, possibly generated by high fluid flow under certain conditions, may occur, especially where particle contaminants are present. Composite fiber wound cylinders do not present any static electricity hazards unless they are not electrically part of the metallic components of the system or have the internal envelope (liner) ungrounded. Make sure your installation includes grounding the composite cylinder at the metallic point of the neck to the common ground point of the aircraft system.

Heat from compression:

Heat is generated from the conversion of a gas going from a low pressure to a high pressure rate. This typically occurs during a system filling operation. In addition, it occurs when high pressure oxygen is released into a dead-ended tube or pipe quickly compressing the residual oxygen that was in the tube or pipe ahead of it. The elevated temperatures produced can ignite contaminants or elevate system components above their ignition point. The hazard of heat from compression increases with system pressure, pressurization rates and temperature.

Oxygen System Safety**Hazard Mitigation Tips:**

Never fill, store, or operate your oxygen cylinder at temperatures or pressures beyond those recommended by the cylinder manufacturer. Ensure attached oxygen system

components, such as pressure relief devices & regulators, are rated for the same pressures as the cylinder. Your PCR-2 comes pre-assembled and cleaned to aviation industry standards, however care must be taken to ensure all of your aircraft's oxygen system components are properly cleaned before assembly & installation to avoid introducing contaminants. When lubricating components during assembly, use only oxygen compatible lubricants (such as Cristolube™). Ensure continued cleanliness throughout the life cycle of your PCR-2 by occasionally checking your system during pre-flight inspections as well as every annual/ 100hr/ condition inspection. Verify that there are no visible contaminants in the transparent polyurethane oxygen tubes (if used for your oxygen system), and that the exterior surfaces of the PCR-2 itself as well as the peripheral components are free of contaminants such as excessive dust, grease, or hydraulic fluids. To avoid excessive heat generation due to compression or acoustic resonance within the system, always refill your oxygen tank at the appropriate reduced flow rate. Ensure your aircraft's oxygen system is properly grounded to avoid the possibility of static electric buildup and discharge. If a composite cylinder is used, make sure your installation includes grounding the composite cylinder at the metallic point of the neck to the common ground point of the aircraft system.

Responsibility:

It is the duty of the installer and user of the system to ensure that clean and proper practices are used to install, service and use the system.