AERO SPECIALTIES

3-BOTTLE & 4-BOTTLE SERVICE CARTS:

OXYGEN

Including booster & regulator

Operation Manual

CE

Mailing and physical address:
11175 W. Emerald
Boise, ID 83713 USA

Phone: 208-378-9888
Fax: 208-378-9889
Email: staff@aerospecialties.com
Website: www.aerospecialties.com

Please take a moment and fill in the following information for convenience in parts ordering or service for the AERO Specialties equipment pertaining to this manual. The model and serial number are located on a placard on your equipment.

Model: _____

Serial Number: _____

Date Received: _____

Model: _____

Serial Number: _____

Date Received: _____

Table of Contents

OXYGEN SERVICE CARTS:

AERO SPECIALTIES 3-BOTTLE & 4-BOTTLE OXYGEN SERVICE CARTS INCLUDING BOOSTER AND REGULATORS

Oxygen Service Carts

This manual applies to the following models of AERO Specialties oxygen service carts:

3-BOTTLE O2 HANGAR
3-BOTTLE O2 REMOTE
4-BOTTLE O2 HANGAR
4-BOTTLE O2 REMOTE
4-BOTTLE O2-N2 COMBO

Introduction

Thank you for purchasing an AERO Specialties Oxygen Service Cart. When used properly, this cart will provide years of servicing pleasure for everyone who uses it, especially those experiencing shortness of breath.

AERO Specialties constructs all of its aircraft service carts from high-quality materials, and assembles them with durable and efficient components. As with any piece of ground support equipment, parts will need to be replaced occasionally because of normal wear-and-tear. Although AERO Specialties warranties its new service carts for one year (see Warranty section below for more information), we are dedicated to helping you keep your equipment in operation for many years. AERO stocks all replaceable parts for its service carts, and manufactures its own lav and water fill couplers and fittings. All parts are available for order through AERO's secure online store (www.aerospecialties.com) - with a credit card or a PO# if you have an account with us. Of course you can still order parts the old fashioned way by giving us a call.

Disclaimer

Servicing aircraft with high-pressure gas (e.g., oxygen or nitrogen) is inherently dangerous. Use of any equipment or components described in this manual is entirely the responsibility of the owner/operator of the equipment. AERO Specialties assumes no liability whatsoever regarding the use of equipment or components covered by this manual. Thorough training of personnel, careful, regular maintenance of aircraft servicing equipment, and proper usage procedures with such are entirely the responsibility of the owner/operator of such equipment. In the case of equipment which is unsafe to use, it is the exclusive responsibility of the owner/operator of such equipment to determine whether the equipment is in safe working order and whether it is safe to use for aircraft service. It is the responsibility of the owner/operator of this equipment to read and understand this manual prior to using related equipment. See the Safety section for more detailed information

Agreement of Confidentiality

This manual is, and shall remain, the property of AERO Specialties, Inc. This manual is provided for the use of AERO Specialties, Inc.'s customers to aid them in the operation and maintenance of equipment purchased from AERO Specialties, Inc. The material contained within this manual is strictly confidential and the distribution of this manual or revealing of its contents is expressly prohibited. The user's acceptance of this manual constitutes acknowledgment of these conditions and agreement to conform to them.

Any disclosure of the confidential material contained within this manual may result in the immediate repossession of this manual by AERO Specialties, Inc., and termination of all warranty coverage and technical support.

Warranty

Subject to the conditions stated herein, AERO Specialties, Inc. warrants that the equipment delivered to the original purchaser will be free from defects in material and workmanship for a period of twelve (12) months from the date of delivery. AERO Specialties, Inc. agrees, upon prompt notification of defect and confirmation that the equipment has been operated and maintained within the recommendations of AERO Specialties, Inc., to repair or replace any part or parts proven to our satisfaction to have been defective in materials or workmanship.

Replacement parts will be invoiced in the regular manner with invoices subject to adjustment after the parts claimed to be defective are examined at our factory. No material or parts will be accepted at our factory for in-warranty repairs or credit without previous authorization from AERO Specialties, Inc. If inspection by AERO Specialties, Inc. does not verify defects in material or workmanship, our regular charges will apply.

No warranty is made or implied with respect to equipment accessories, component parts, or auxiliary equipment not warranted by their respective manufacturers, and these warranties are passed along to purchaser. AERO Specialties, Inc. shall in no event be responsible or liable for modifications, alterations, misapplication, or repairs made to its equipment by purchaser or others without the authorization of AERO Specialties, Inc. This warranty does not apply to damage caused by negligence, improper maintenance, accident, overloading, or improper use by purchaser or others. AERO Specialties, Inc. shall not be liable for any special or consequential damages, such as loss of profits or revenue, loss of other equipment, down-time costs, costs associated with the removal of equipment from service, or claims of third parties against the purchaser.

Responsibility for damages incurred in transit will be borne by the user, and the user in turn must file any damage claim against the carrier. All warranty items are F.O.B. our factory, and freight charges are the responsibility of the user.

SAFETY

Read & Understand This Manual

Described below are general safety precautions and possible hazards involved in using AERO Specialties oxygen service carts. It is the user's responsibility to read and understand this operation manual prior to (and, of course, during) using any of the oxygen servicing equipment described herein. Information presented in this manual and on various labels on this unit pertains to equipment specifications, installation, operation, maintenance and trouble-shooting which should be read, understood, and followed for the safe and effective use of this equipment.

Local Regulations & Procedures

It is the owner/operator's responsibility to adhere to local procedures and regulations for use of oxygen servicing equipment. Users of this equipment are required to develop and/or adhere to appropriate procedures for use, including safety procedures, with the various aircraft intended to be serviced, in accordance with the technical regulations and requirements in force in the jurisdiction where this equipment is used.

High Pressure Oxygen Safety

The operation, maintenance, and trouble shooting of this unit requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable local codes.

Training

Read this entire manual prior to operation of the unit. All personnel using this oxygen cart should understand and follow this manual and receive training. We encourage our customers to call us to discuss any operating or testing requirements.

Pressures

Gases under pressure are a potential hazard in the form of stored energy. Accidents can occur when this energy is improperly handled. Be sure that all equipment used is compatible and designed to control the pressures encountered.

Oxygen

Oxygen is an oxidizing gas and is chemically stable and nonflammable. However oxygen does support combustion. High concentrations can accelerate the combustion of flammable materials up to and including an explosion. It is important to understand that spontaneous combustion of organic materials can occur in oxygen rich atmospheres.

Handling

Oxygen handling must be done with care to avoid any association with hydro-carbons. Especially where fuels and lubricants are present in aircraft service areas. It is imperative that oxygen systems be handled properly. Be sure to keep all protective caps in position on equipment as long as possible, and replace them as soon as possible.

Velocity

Oxygen flowing at a high velocity in a piping system can propel any foreign material particles with such force that the impact friction can raise the particles temperature to a possible ignition point. It is, therefore, imperative that a high degree of cleanliness be maintained in the oxygen system at all times.

Lubrication

The use of lubrication in an oxygen system shall be held to a minimum. No lubrication shall be applied in any area which will come into direct contact with oxygen during normal use.

WARNING! Only lubricants compatible with high pressure oxygen shall be used.

RISKS OF USE

(Cf. EN 1915-1, §6.2, EN ISO 12100-1, §6.5.1)

WARNING! TO AVOID SERIOUS INJURY OR DEATH OBSERVE THE FOLLOWING:

- Never leave operating oxygen servicing equipment unattended
- Always have a properly rated and charged fire extinguisher close at hand
- Do not use OB-30 Oxygen Booster on LOW PRESSURE aircraft systems. This is an UNREGULATED OXYGEN SOURCE equal to supply bottle pressure. The use of a supply bottle pressure regulator is required with this unit.
- Do not use to boost air or any gas other than Oxygen.
- Do not exceed 2,200 PSIG inlet Pressure.
- All Components used in the oxygen system or Shop air system shall be clean, dry and free of all contamination. Per Spec. ARP 1176
- Servicing and/ or maintenance of Oxygen systems shall be done by trained and qualified personnel using approved procedures per SAE Spec. ARP 1532
- All components in conjunction with the OB-30 booster shall comply with NFPA - 53 "Recommended Practice on Materials, Equipment, and Systems Used in Oxygen-Enriched Atmospheres" - 2004 Edition

SAE AIRCRAFT OXYGEN SPECIFICATION INFORMATION

For more information concerning specific SAE aircraft oxygen equipment specifications, contact: Society of Automotive Engineers 400 Commonwealth Drive, Warrendale, PA 15096-0001

Compliance

(Cf. EN 1915-1, §6.2, EN ISO 12100-1, §6.5.1)

AERO Specialties 3-Bottle and 4-Bottle Oxygen Servicing carts are constructed to comply with all regulatory requirements pertaining to aircraft oxygen servicing and equipment.

APPLICATIONS & MODELS

This manual addresses AERO Specialties oxygen servicing carts that are configured with the CE-marked OB-30 Oxygen Booster manufactured by Interface Devices (see Appendix for OB-30 Operation Manual) and either 3-bottle or 4-bottle oxygen regulator systems assembled and calibrated by AERO Specialties (see Appendix for regulator assembly manual and diagrams). All systems discussed in this manual are installed either on an AERO Specialties 3-bottle or 4-bottle cart. This manual applies to the following models of AERO Specialties Oxygen Service Carts (part numbers are in BOLD):

- **3-BOTTLE O2 HANGAR:** 3-bottle oxygen servicing cart for hangar use only; requires shop air (100psi) to drive O2 booster. Includes everything required to provide O2 service for aircraft (except for the bottles and gas): powder-coated tilting 3-bottle cart with heavy-duty wheels & pneumatic tires (accommodates standard "K" size bottles, 9" x 56"); OB-30 oxygen booster; 3-bottle oxygen regulator with 15' delivery hose and combination charge adapter (will fit either of the two standard aircraft connectors); and hose kits for connecting boosters, regulators, and bottles.
- **3-BOTTLE O2 REMOTE:** AERO Specialties 3-bottle oxygen servicing cart for remote (ramp) use; uses N2 to drive O2 booster. Includes everything required to provide O2 service for aircraft (except for the bottles and gas): powder-coated tilting 3-bottle cart with heavy-duty wheels & pneumatic tires (accommodates standard "K" size bottles, 9" x 56"); OB-30 oxygen booster; 2-bottle oxygen regulator with 15' delivery hose and combination charge adapter (will fit either of the two standard aircraft connectors); 1-bottle nitrogen low pressure regulator with booster and bottle lines; and hose kits for connecting boosters, regulators, and bottles.
- **4-BOTTLE O2 HANGAR:** AERO Specialties 4-bottle oxygen servicing cart for hangar use - uses shop air (100 psi) to drive O2 booster. Includes everything required to provide O2 service for aircraft (except for the bottles and gas): powder-coated 4-bottle cart with heavy-duty wheels & pneumatic tires (accommodates standard "K" size bottles, 9" x 56"); OB-30 oxygen booster; 4-bottle oxygen regulator with 15' delivery hose and combination charge adapter (will fit either of the two standard aircraft connectors); and hose kits for connecting boosters, regulators, and bottles.
- **4-BOTTLE O2 REMOTE:** AERO Specialties 4-bottle oxygen servicing cart for remote (ramp) or hangar use; uses either N2 or shop air to drive O2 booster. Includes everything required to provide O2 service for aircraft (except for the bottles and gas): powder-coated 4-bottle cart with heavy-duty wheels & pneumatic tires (accommodates standard "K" size bottles, 9" x 56"); OB-30 oxygen booster; 3-bottle oxygen regulator with 15' delivery hose and combination charge adapter (will fit either of the two standard aircraft connectors); 1-bottle nitrogen low pressure regulator with booster and bottle lines; and hose kits for connecting boosters, regulators, and bottles.
- **4-BOTTLE O2-N2 COMBO:** AERO Specialties 4-bottle oxygen-nitrogen combination system complete with O2 & N2 boosters, regulators, hoses, and aircraft connectors. Includes everything required to provide all O2 AND N2 service for aircraft (except for the bottles and gas): powder-coated 4-bottle cart with heavy-duty wheels & pneumatic tires (accommodates standard "K" size bottles, 9" x 56"); OB-30 oxygen and ENB-45 nitrogen boosters; 2-bottle oxygen regulator with 15' delivery hose and combination charge adapter (will fit either of the two standard aircraft connectors); 1-bottle nitrogen lo-hi pressure regulator with 15' delivery hose and aircraft Schrader valve adapter; 1-bottle low pressure regulator with quick disconnect to drive either O2 or N2 booster (no simultaneous use); two dual regulator mounting manifolds; hose kits for connecting boosters, regulators, and bottles.

Mechanical Dimensions of 3 Bottle Tilt Cart

Total Height: 52” or 132 cm (including latched towbar)

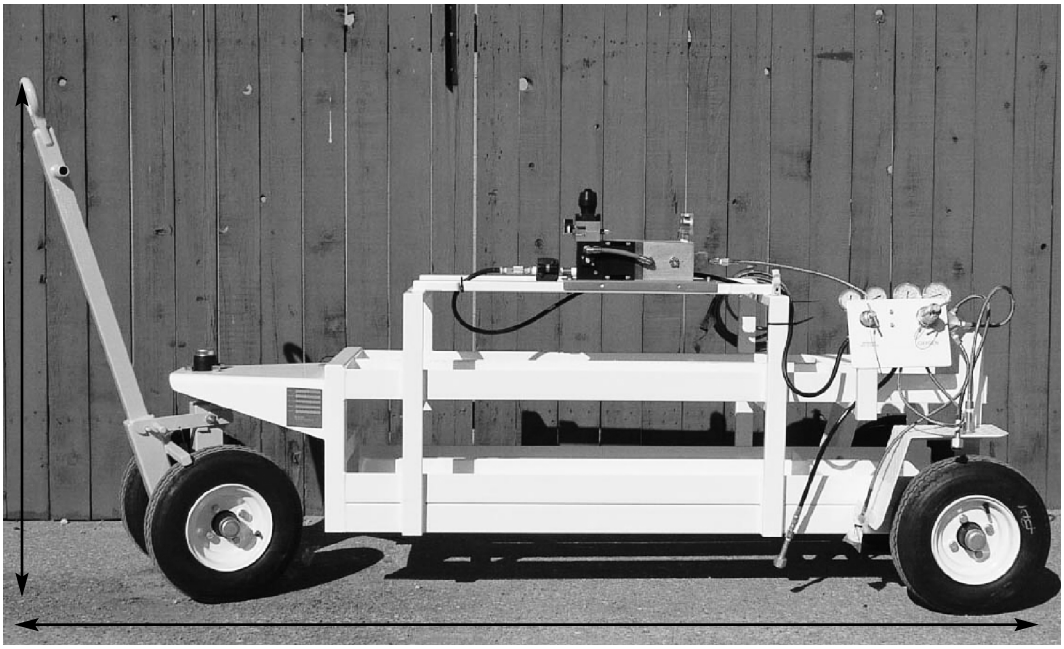
Height to top of Regulator Assembly: 49 1/4” or 125.3 cm

Total Length: 85” or 217.3 cm

Total Width: 48 1/2” or 123.2 cm

Ground to top of enclosure in loading position: 70 1/2” or 179 cm

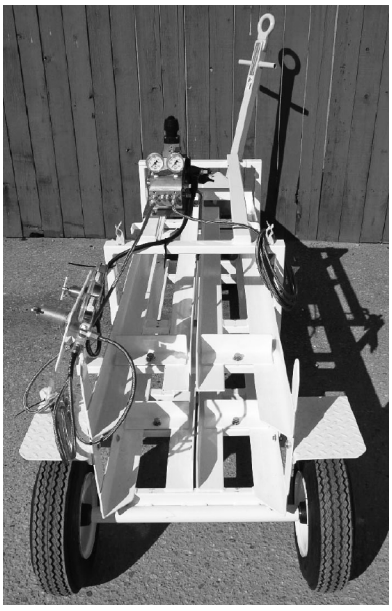
Mechanical Dimensions of 4 Bottle Cart



Height to top of (Optional) Booster Assembly: 42.5" or 108 cm

Total Height: 53 1/8 " or 135 cm (including latched towbar)

Total Length: 107" or 272 cm



Total Width: 33" or 83.8cm

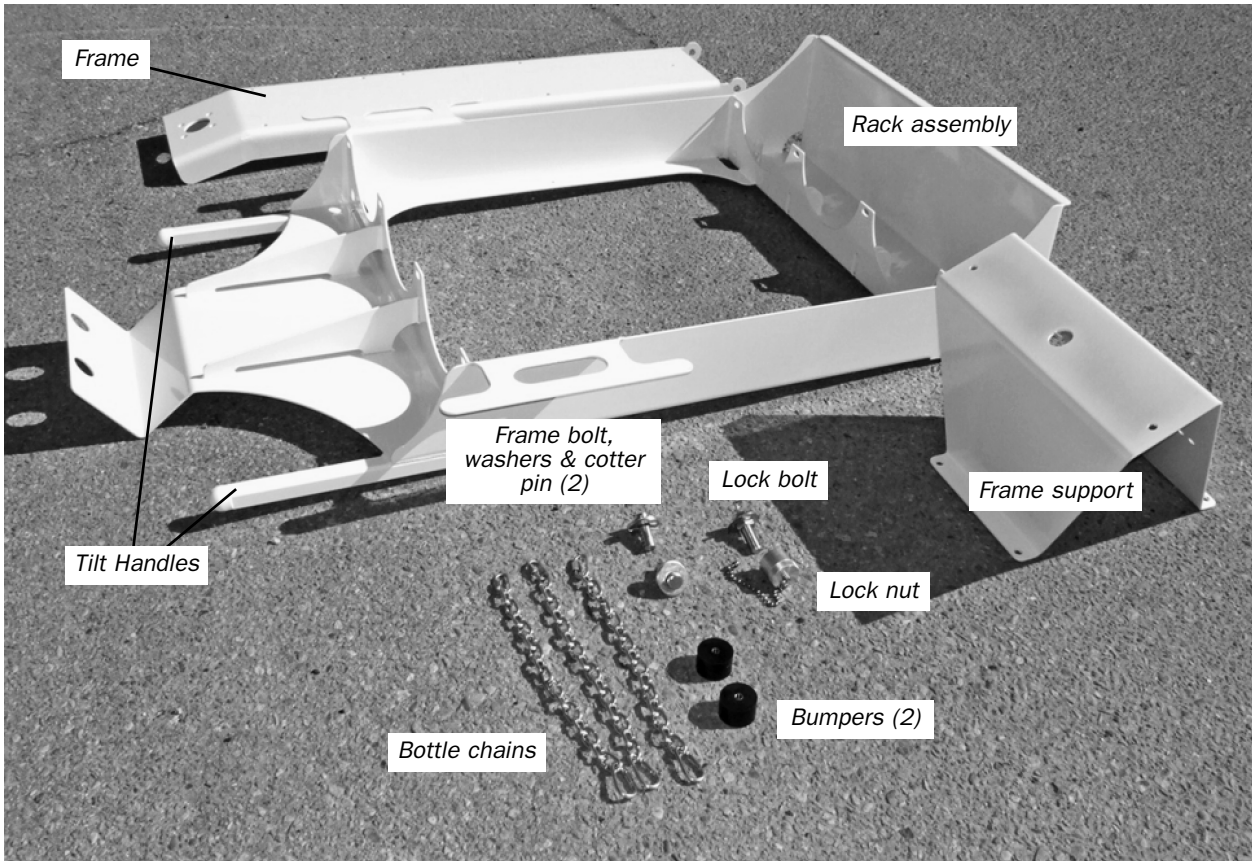
DIAGRAMS & ILLUSTRATED PARTS

3-BOTTLE CART DIAGRAMS

(Most units come pre-assembled)

3-bottle cart in operation mode

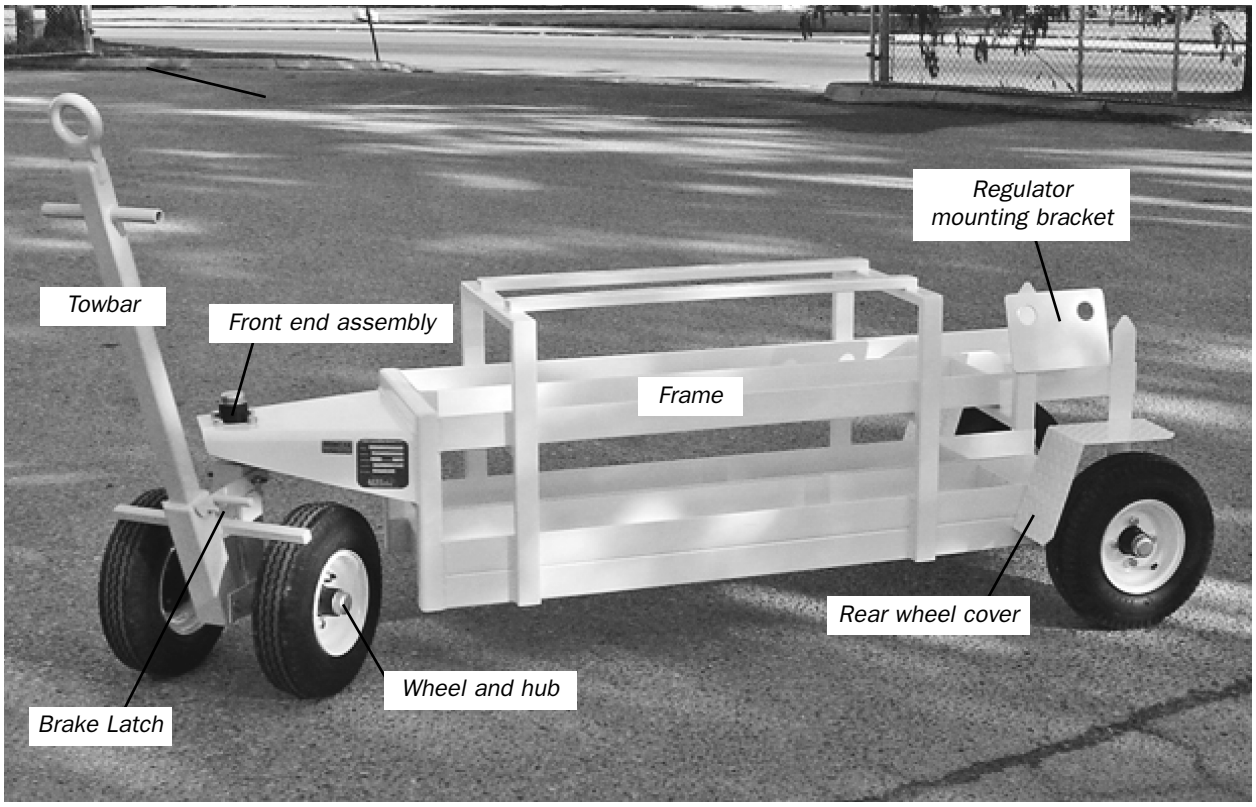
3-bottle cart in loading mode



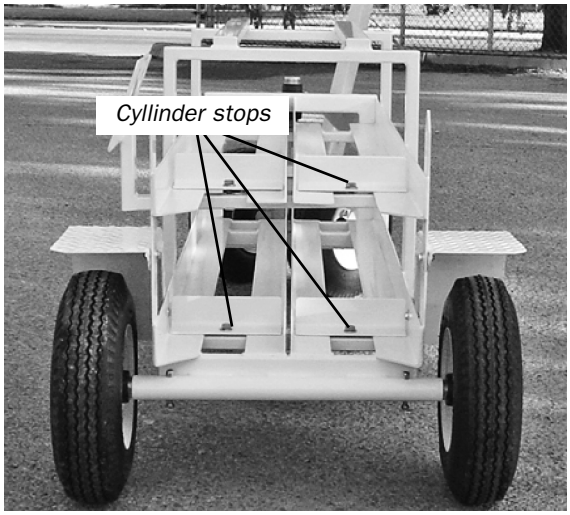
3-bottle cart parts breakdown

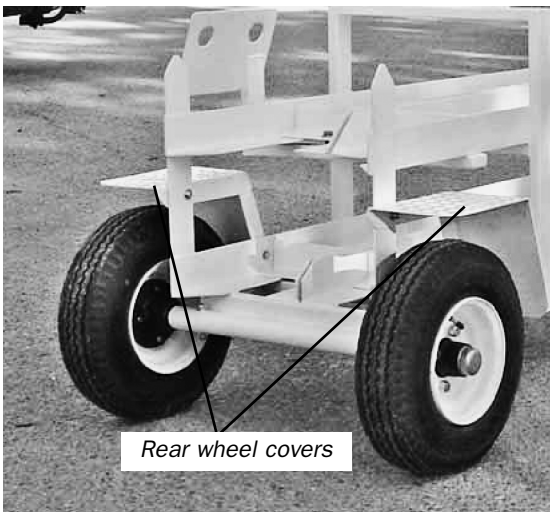
4-BOTTLE CART DIAGRAMS

(Most units come pre-assembled)



4-bottle cart parts breakdown

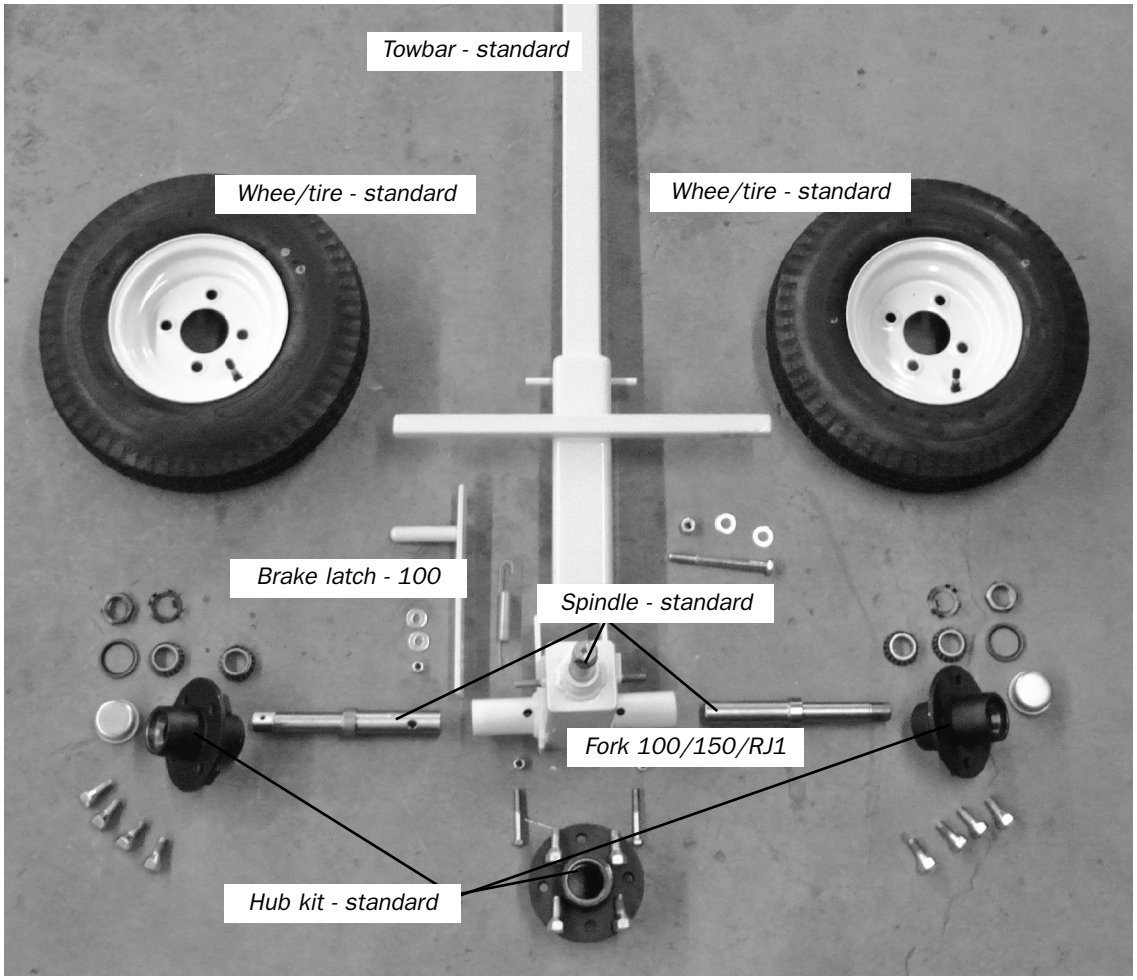




3-BOTTLE & 4-BOTTLE CART ASSEMBLY

(Most carts come fully assembled)

The AERO Specialties 3-Bottle and 4-Bottle service carts are constructed with the same running gear components. The towbar, front steering assembly, and wheels/tires/spindles are the same on both 3-Bottle and 4-Bottle carts.

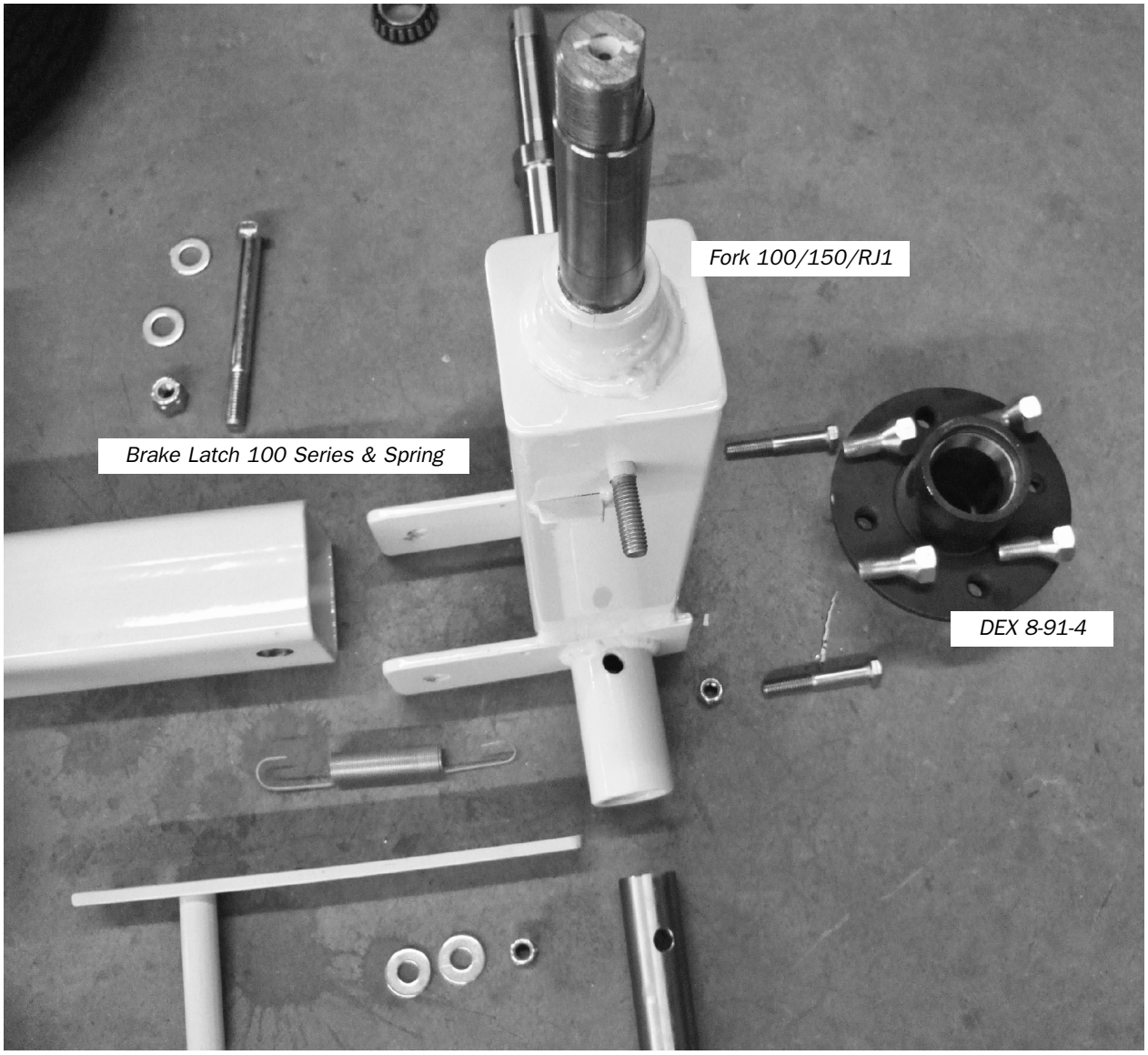


Complete front end assembly (same for 3-bottle and 4-bottle carts)

Part Number	Description
Towbar - Standard	Towbar for all AERO Lav and Water carts (100-series through RJ3) Standard 21'' wide towbar
Wheel - Tire Standard	Wheel/Tire for 100/150/RJ1/Q7000 carts. 4:80x4x8 on 4 on 4 rim
Brake Latch 100 Series	Brake latch and Spring for 100/150/RJ1 carts. Spring available
Spindle - Standard	Machine 1.25 Spindle for 100/150/RJ1/Q7000 carts
Hub Kit Standard	Hub Kit for 100/150/RJ1/Q7000 carts. Includes: (1) Hub, (2) bearings, (1) seal, (1) nut & retainer, (4) bolts, (1) Hub cap
Fork 100/150/RJ1	Steering fork assembly for 100/150/RJ1 carts

FRONT END ASSEMBLY

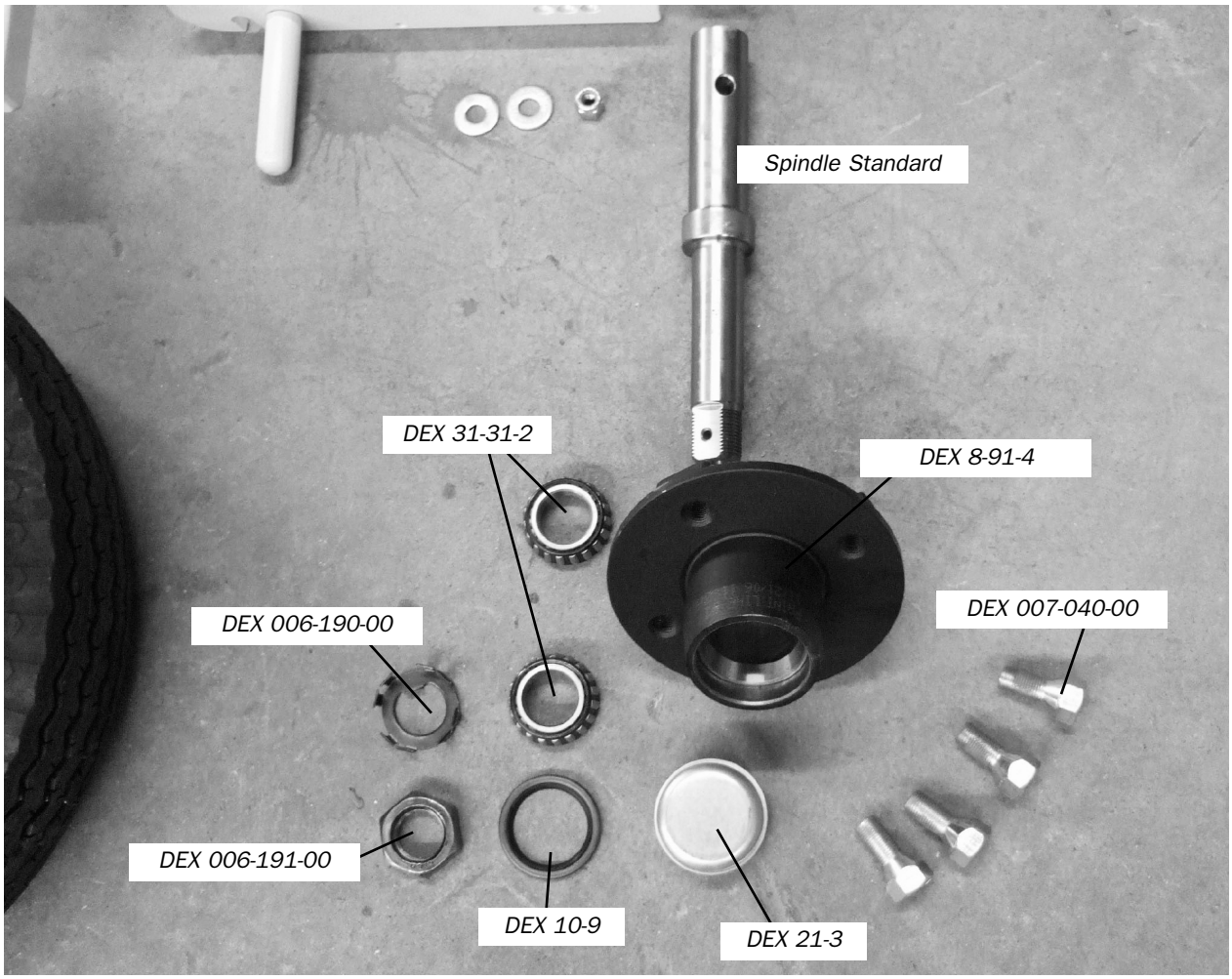
(same for 3-bottle and 4-bottle carts)



Part Number	Description
FORK 100/150/RJ1	Steering fork assembly for 100/150/RJ1 & O2/N2 carts
Brake Latch 100 Series	Brake latch and Spring for 100/150/RJ1 carts. Spring available separately
DEX-8-91-4	Hub

WHEEL HUB ASSEMBLY

(same for 3-bottle and 4-bottle carts)

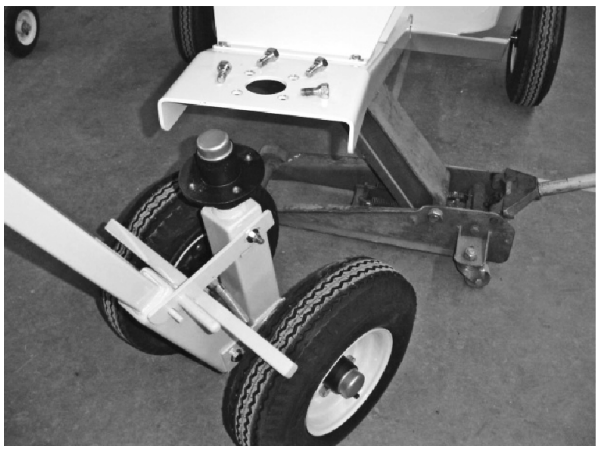


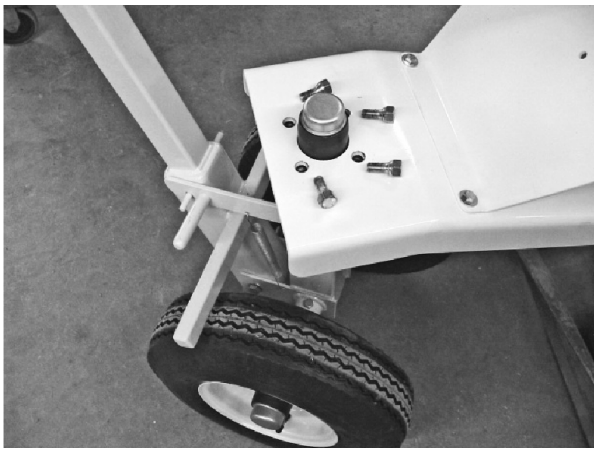
Part Number	Description
Spindle Standard	Machine 1.25 Spindle for 100/150/RJ1/Q7000 carts
DEX-8-91-4	Hub
DEX 007-040-00	Hub bolts- 4ea required (sold per 1)
DEX 21-3	Hub cap
DEX 10-9	Hub seal
DEX 006-191-00	Nut, Hex jam, 1-14. (New style; requires retainer, not cotter pin)
DEX 006-190-00	Retainer, spindle nut. Secures hex jam nut.
DEX 31-31-2	Bearings - 2ea required (sold per 1)

FRONT END ASSEMBLY INSTALLATION

(Most carts are shipped fully assembled)

To install the front end assembly on either the 3-Bottle or 4-Bottle carts, assemble all subcomponents first, then insert steering fork hub through the hole and secure with the 4 bolts as pictured below.





PREPARING CART FOR USE

Once the cart is assembled, check the air pressure on the tires and adjust accordingly. Also, check that the brake latch and spring are working correctly in applying pressure to the front end tires to hold the cart in place when not in use.

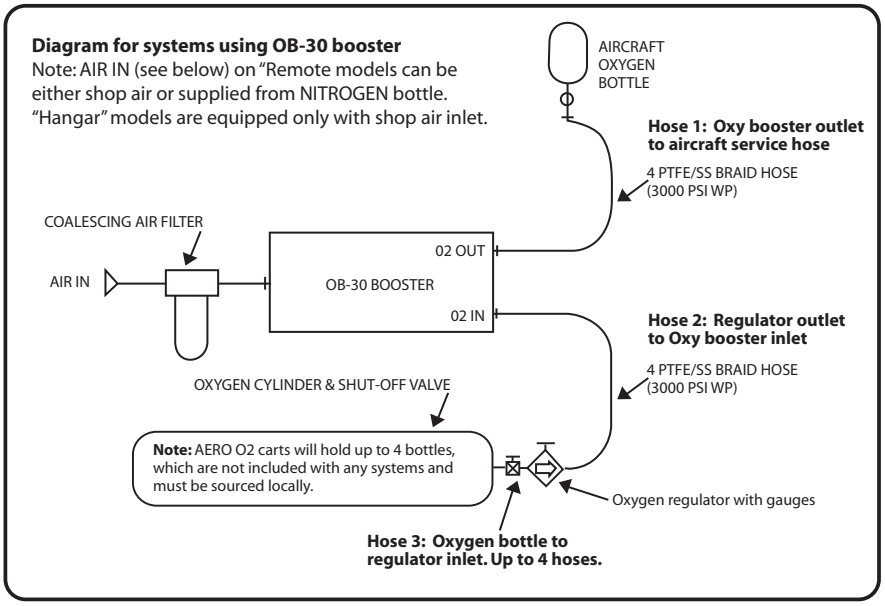
NOTE: The 3-Bottle and 4-bottle carts, even when fully loaded, are easily moved by hand. We recommend the 4-bottle cart be moved by hand when possible. The carts can be towed by vehicle if necessary, but should not exceed 8 miles per hour.

PREPARATION FOR USE: Complete System Connections

(Cf. EN 1915-1, §6.2, EN ISO 12100-1, §6.5.1)

Unless requested by the customer, all AERO Specialties oxygen servicing carts come with all ordered components installed and plumbed, with minimal assembly required upon unpacking. Depending on particular model configurations and shipping considerations (crating, palletizing, air, ocean, etc.), carts/systems might require more or less assembly. Where required, clear unpacking and assembly instructions are provided.

The diagram below illustrates the basic configuration of the 3-Bottle or 4-Bottle carts with booster and regulator.



UNPACKING

The oxygen cart's manifold system and oxygen booster have been thoroughly cleaned and inspected prior to packaging and shipment. After opening the shipping container and removing the unit, inspect it thoroughly for shipping damage. Oxygen equipment should be kept clean, dry, and free from contaminants. It is imperative that all installation, inspection, maintenance, testing, and servicing of oxygen system components be done by trained and qualified personnel using approved procedures.

Most AERO oxygen cart systems are shipped fully assembled, but if any components are not connected or installed, follow the assembly instructions below.

ASSEMBLY

1. Inspect all connections for contaminants before installation and tightening. Remove any foreign materials. Be sure all oxygen system components are clean per SAE specification AIR 1176.
2. Install Hose 1 (from Oxygen Booster to aircraft service hose) per SAE spec. ARP 1532, being careful not to contaminate the system during installation.
3. Install Hose 2 (Regulator outlet to oxy booster inlet) per SAE specification ARP 1532, being careful not to contaminate the system during installation.
4. Install and rotate the oxygen supply bottles so that the manifold inlet hoses may be easily connected to the bottles. Tighten Hose 3 (hoses from bottle(s) to regulator manifold). Make sure the hoses are not kinked or damaged. Recheck all fittings for tightness.
5. Turn regulator T-handle counter-clockwise to minimum setting and carefully wind outlet hose(s) on hose retainer rails on the cart.

PREPARATION FOR OPERATION

WARNING! If there are any differences between the following instructions and the aircraft maintenance manual, the aircraft maintenance manual will take precedence.

WARNING! Be sure fill line is secured prior to purging the unit. This will prevent the hose from "whipping" if too much oxygen is allowed to flow through the unit.

OPERATION

FILL PROCEDURE

1. After the oxygen booster has been properly connected, slowly and fully open the O2 supply bottle shut off valve. Adjust the gas supply bottle pressure regulator to the required Aircraft O2 system pressure. Wait until the bottle pressure and the aircraft system pressure are equal.
2. Note: If the bottle pressure is lower than the required aircraft oxygen system pressure, be careful not to over adjust the supply bottle pressure regulator once the maximum supply bottle pressure has been achieved. Increasing the oxygen pressure regulator beyond this point will not increase output, and may damage the regulator spring.
3. Adjust the booster's air pressure regulator to attain a pressure slightly lower than the final required O2 pressure (divide this oxygen pressure by 30 to find the initially required regulated air pressure setting). Example: 2,200 psi final pressure minus 100 psi equals 2,100 psi, divided by 30 equals 70 psi regulated air pressure. If non-standard ambient temperatures are present at the time of oxygen system recharging, refer to Table 1 to determine the proper filling pressure for oxygen cylinders.
4. Turn the booster's "pump run" toggle switch to "on" to further pressurize aircraft oxygen system. Note: Because the Oxygen Booster pump operates at a theoretical ratio, actual boosted oxygen pressures may vary slightly due to different physical conditions. The oxygen outlet pressure gauge will show the aircraft system pressure developed by the oxygen booster. When the set pressure that has been achieved (i.e.: booster stops pumping), increase the pressure of the air regulator to obtain the required final aircraft system pressure. Turn off the booster's air toggle switch when the booster has stopped running.

Table 1: Temperature/Pressure Correction

At Temperature Degrees F	Fill to Working Pressure x Figure Below	At Temperature Degrees F	Fill to Working Pressure x Figure Below
110°	1.1000	70°	1.0000
105°	1.0875	65°	0.9875
100°	1.0750	60°	0.9750
95°	1.0625	55°	0.9625
90°	1.0500	50°	0.9500
85°	1.0375	45°	0.9375
80°	1.0250	40°	0.9250
75°	1.0125		

Example: Ambient Temp = 90° F. Working pressure is 1800 PSIG
Charge Pressure = 1800 PSIG * 1.0500 = 1890 PSIG

DISCONNECT PROCEDURE

WARNING! When the aircraft fill line is pressurized or when oxygen is flowing through the system, the fill line hose will “whip” if not secured.

1. Close the oxygen bottle shut off valve.
2. Decrease both the air inlet pressure regulator and the oxygen supply bottle pressure regulator to their respective minimum settings.
3. Disconnect booster's air (or nitrogen) supply line.
4. Slowly loosen, bleed down, and disconnect oxygen hose at the aircraft. Disconnect the supply hose.
5. Cap both hoses to prevent contamination.

TO READ INDIVIDUAL BOTTLE PRESSURE

1. Close high pressure oxygen gas output valve by turning regulator T-handle CCW to minimum
2. Open a bottle shutoff valve
3. Read pressure on regulator inlet pressure gauge
4. Close bottle shutoff valve
5. Repeat procedure for other bottles

EFFICIENT USE OF SYSTEM

Maximum oxygen may be removed from supply bottles if aircraft are serviced from the lowest pressure bottle first. In this manner, the most oxygen may be removed from each bottle. Even bottles with relatively low pressures may be used to service aircraft if the aircraft has a depleted system (250 psi minimum).

MAINTENANCE

The operation, maintenance, and trouble shooting of this unit requires practices and procedures which ensure personal operator safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable local codes. Maintenance is only to be done by qualified persons. All maintenance personnel must be familiar with the cautions and warnings associated with high pressure oxygen and high pressure oxygen systems as outlined in the Safety section of this manual prior to performing any maintenance on the unit.

- The gauges on this unit should be inspected and calibrated annually to maintain and ensure accuracy.
- The inlet shop air filter should be inspected annually or when a drop in performance is noted. The filter restriction indicator will change from green to red when service is required.
- Maintain 45-50 PSI tire pressure.
- Service wheel bearings annually.
- Inspect oxygen hoses prior to each use for condition or kinking, replace as necessary.
- Generally keep the entire unit clean and free from contaminants. Visually inspect for any system leaks or damage. Correction of any problems prior to unit operation is imperative for safe operation.

TRANSPORTATION, HANDLING & STORAGE

(Cf. EN 1915-1, §6.2, EN ISO 12100-1, §6.5.1)

AERO Specialties 3-Bottle and 4-Bottle oxygen carts are designed for ease of transport, movement, and storage.

- All 3-Bottle and most 4-Bottle carts are shipped either crated or palletized and can be easily fork-lifted to load or unload. If shipped “loose,” care must be taken when loading and unloading to protect the booster and regulators from damage. 3-bottle carts must NOT be fork-lifted when loose and must be towed by hand or vehicle no faster than 8 miles per hour (12.8 kph). 4-bottle carts can be fork-lifted when loose, or towed with the same restrictions as the 3-bottle carts.
- Store the unit in a clean, dry area when not in use.
- Be sure that all hoses are capped and the unit is covered with a lint free covering for the duration of unit storage to ensure complete oxygen system cleanliness for future aircraft system recharging.

SAFE DISPOSAL/DECOMMISSIONING

(Cf. EN 1915-1, §6.2, EN ISO 12100-1, §6.5.1)

AERO Specialties 3-Bottle and 4-Bottle oxygen carts contain no hazardous material and can be recycled. For more information, contact AERO Specialties at 208-378-9888.

Safety, Warning & Operation Labels

The labels pictured below are used on all 3-Bottle and 4-Bottle AERO Specialties Oxygen service carts. Replacement labels are available from AERO Specialties.

READ OPERATION MANUAL PRIOR TO OPERATING THIS EQUIPMENT
SEE OPERATION MANUAL FOR CONNECTION & COMPONENT DIAGRAMS

Unit Specifications	3-Bottle	4-Bottle
Unladen mass (Kg/lbs)	233 kg/513 lbs.	233 kg/513 lbs.
Max. total mass (Kg/lbs)	437 kg/963 lbs.	501 kg/1103 lbs.
Tire pressure (bar/psi)	3.45 bar/50 psi	3.45 bar/50 psi

Model No. _____

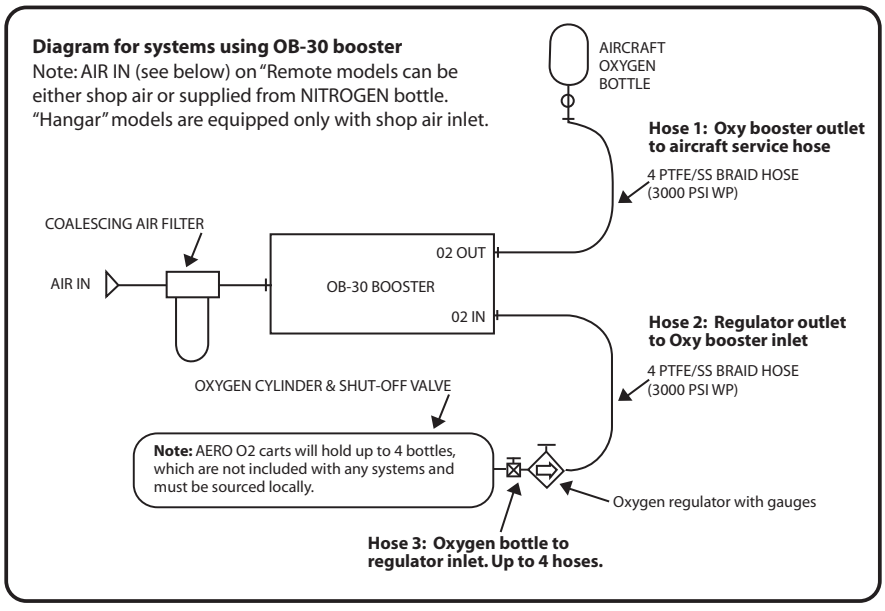
Serial No. _____

Date of Manufacture _____

AERO SPECIALTIES

CE

11175 W. Emerald, Boise, Idaho 83713 • 208-378-9888 • www.aerospecialties.com



OPERATING PROCEDURES

FILL PROCEDURE

1. After the oxygen booster has been properly connected, slowly and fully open the O2 supply bottle shut off valve. Adjust the gas supply bottle pressure regulator to the required Aircraft O2 system pressure. Wait until the bottle pressure and the aircraft system pressure are equal.

2. Note: If the bottle pressure is lower than the required aircraft oxygen system pressure, be careful not to over adjust the supply bottle pressure regulator once the maximum supply bottle pressure has been achieved. Increasing the oxygen pressure regulator beyond this point will not increase output, and may damage the regulator spring.

3. Adjust the booster's air pressure regulator to attain a pressure slightly lower than the final required O2 pressure (divide this oxygen pressure by 30 to find the initially required regulated air pressure setting). Example: 2,200 psi final pressure minus 100 psi equals 2,100 psi, divided by 30 equals 70 psi regulated air pressure. If non-standard ambient temperatures are present at the time of oxygen system recharging, refer to Table 1 to determine the proper filling pressure for oxygen cylinders.

4. Turn the booster's "pump run" toggle switch to "on" to further pressurize aircraft oxygen system. Note: Because the Oxygen Booster pump operates at a theoretical ratio, actual boosted oxygen pressures may vary slightly due to different physical conditions. The oxygen outlet pressure gauge will show the aircraft system pressure developed by the oxygen booster. When the set pressure that has been achieved (i.e.: booster stops pumping), increase the pressure of the air regulator to obtain the required final aircraft system pressure. Turn off the booster's air toggle switch when the booster has stopped running.

At Temperature Degrees F	Fill to Working Pressure x Figure Below	At Temperature Degrees F	Fill to Working Pressure x Figure Below
110°	1.1000	70°	1.0000
105°	1.0875	65°	0.9875
100°	1.0750	60°	0.9750
95°	1.0625	55°	0.9625
90°	1.0500	50°	0.9500
85°	1.0375	45°	0.9375
80°	1.0250	40°	0.9250
75°	1.0125		

Example: Ambient Temp = 90° F. Working pressure is 1800 PSIG
Charge Pressure = 1800 PSIG * 1.0500 = 1890 PSIG

DISCONNECT PROCEDURE

WARNING! When the aircraft fill line is pressurized or when oxygen is flowing through the system, the fill line hose will "whip" if not secured.

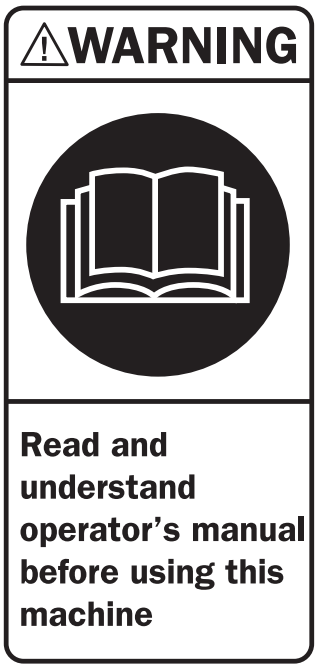
1. Close the oxygen bottle shut off valve.

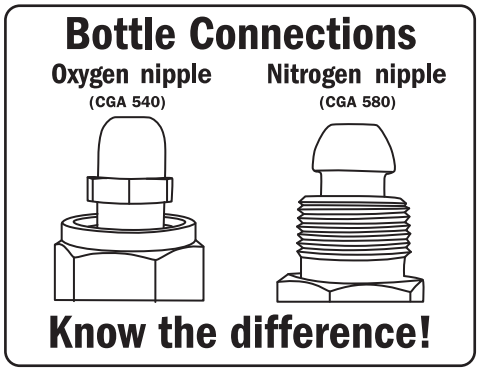
2. Decrease both the air inlet pressure regulator and the oxygen supply bottle pressure regulator to their respective minimum settings.

3. Disconnect booster's air (or nitrogen) supply line.

4. Slowly loosen, bleed down, and disconnect oxygen hose at the aircraft. Disconnect the supply hose.

5. Cap both hoses to prevent contamination.


⚠WARNING
Read and understand operator's manual before using this machine

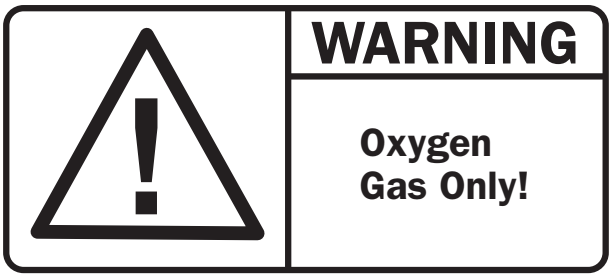

Bottle Connections
Oxygen nipple
(CGA 540)
Nitrogen nipple
(CGA 580)
Know the difference!


⚠WARNING
Crush hazard.
Keep feet clear.


⚠CAUTION
Do not sit or ride


⚠CAUTION
No smoking or open flame


BE CAREFUL
Heavy platform
500 lbs/204 kg
Lift and lower with care when bottles are loaded


WARNING
Oxygen
Gas Only!

DECLARATION OF CONFORMITY CE

Manufacturer: AERO Specialties, Inc.
11175 W. Emerald
Boise, ID 83713
208-378-9888

The undersigned hereby declares, on behalf of AERO Specialties, Inc., that the below-referenced products, to which this declaration relates, are in conformity with the provisions of the following European directives pertaining to mechanical and functional safety:

EN1915-1:2001, EN1915-2:2001, EN1915-3:2004, EN1915-4:2004, EN12312-18:2005

Testing was conducted by TÜV SÜD America, Inc., Industrial Machinery Group, 7800 SW Durham Rd., Suite 200, Portland, OR 97203, USA
Phone: 971-732-0702
Project Manager: Frank West

OXYGEN & NITROGEN SERVICE CART MODELS:

- 3-BOTTLE O2 HANGAR
- 3-BOTTLE O2 REMOTE
- 4-BOTTLE O2 HANGAR
- 4-BOTTLE O2 REMOTE
- 4-BOTTLE O2-N2 COMBO
- 3-BOTTLE N2 COMPLETE
- 4-BOTTLE N2 COMPLETE

The Technical Report No. **095-801871-000**, Revision 01, dated 2008-05-08, required by this Directive, is maintained at the corporate headquarters of AERO Specialties, 11175 W. Emerald, Boise, ID 83713.

By:

Bob McMichael
VP of Sales & Marketing

Date: April 4, 2008

Technical Report No. 095-801871-000, Revision 01

Issue Date: 2008-05-08

Client: / Applicant:	AERO Specialties Inc. 11175 W. Emerald Boise, ID. 83713 Attn.: Bob McMichael E: bob@aerospecialties.com T: 208 378 9888
Responsible Manufacturer:	AERO Specialties Inc. 11175 W. Emerald Boise, ID. 83713 Attn.: Bob McMichael E: bob@aerospecialties.com T: 208 378 9888
Manufacturing location(s):	AERO Specialties Inc. 11175 W. Emerald Boise, ID. 83713 Attn.: Bob McMichael E: bob@aerospecialties.com T: 208 378 9888
Test subject:	Product: O_2 and N_2 Service Cart Model: 3 Bottle Cart, 4 Bottle Cart (2 models) S/N: 301419, 301448
Test specifications:	EN 12312-18:2005, EN 1915-1:2001, EN 1915-2:2001 EN 1915-3:2004, EN 1915-4:2004
Purpose of examination:	Test according to the requirements of the Machinery Directive 2006-42-EC for self certification by the manufacturer.
Test result:	The above equipment complies with the test specification.

APPENDIX I: OB-30 Oxygen Booster Manual

The following pages contain the manufacturer's manual for the OB-30 Oxygen Booster.

OB-30 OXYGEN BOOSTER

INSTALLATION, OPERATION
& MAINTENANCE MANUAL

IMPORTANT! FILE THIS MANUAL IN A SAFE PLACE FOR FUTURE SERVICE & PARTS NEEDS

ALWAYS REFERENCE THE SERIAL NUMBER FOR SERVICE & PARTS REQUESTS

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by these signal words ** Warning and **Caution ** to denote different levels of hazard.**

Warning: denotes practices, which if not carefully followed, could result in property damage, **SERIOUS** personal injury and /or **DEATH**
Caution: denotes practices which if not carefully followed, could result in minor personal injury or damage to equipment.

OB-30 Serial Number:_____

Parts & Repairs: (Use the space below to document service history)

****WARNING****

Limitation of Liability

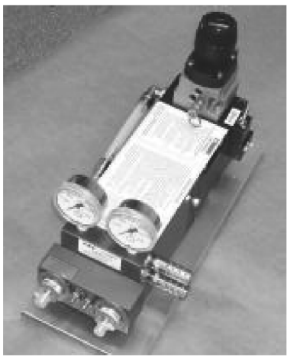
There is an inherent risk associated with pressurized oxygen systems. Failure to follow the Manual's instructions or other safety procedures increases the risk of an ignition source being introduced into the oxygen flow stream that could result in a fire, explosion, property damage, serious personal injury or death. In addition to following the OB-30 safety precautions, remember to take appropriate safety measures with all components in the oxygen system. In no event shall Interface Devices, Inc. be held liable for any property damage, injury or death in the event the OB-30 booster is NOT installed, operated or maintained in strict accordance with this manual and other published oxygen service guidelines.

Table of Contents

INTERFACE DEVICES, INC
- OB 30 OXYGEN BOOSTER -

1.0 General Description

- 80 psi drive pressure produces 2,200 psi oxygen pressure.
- Shop air powered for use in and around the hanger.



Designed for Maximum Safety:

- Oxygen wetted components are principally brass – the best material for oxygen service far surpassing stainless steel for oxygen service
- Other materials are optimized for oxygen service
- All Oxygen wetted parts have been cleaned per Spec. ARP 1176

Features:

- No inlet air valve, air regulator or air lubricator required.
- Dual 5 micron filters, one each for oxygen in and out.
- Integrated circuit design. No external tubing and fittings to leak.
- Integral cut-in and cut-out pressure switches. Pump will not run if oxygen-in pressure is below 250 psi or oxygen-out pressure is above 2,400 psi.
- Polymeric seals and bearings for long life and high efficiency.
- Totally sparkless operation.
- Twin rod seals with vent between to atmosphere prevents air/oxygen migration
- Integral subplate mounted air regulator with pump on/off air toggle switch
- Allows bottle pressure to be used down below 300 psi.
- May be nitrogen powered for remote operation

1.1 Optional equipment available to enhance unit

1) Three bottle Oxygen or Oxygen service cart.
   - Low center of gravity for safe maneuvering.
   - Booster Mount and fire extinguisher are optional.

2) Cart mount and protection guard for Oxygen or Oxygen Booster.
   - Mounts to the front of virtually any cart.

**** Warning ****

To Avoid Serious Injury, Property Damage or Death

1. **Never** operate the OB-30 unattended
2. **Always** have a properly rated and charged fire extinguisher close at hand
3. **Do not** use on **LOW PRESSURE** aircraft systems. This is an **UNREGULATED OXYGEN SOURCE** equal to supply bottle pressure. The use of a supply bottle pressure regulator is required with this unit.
4. **Do not** use to boost air or any gas other than Oxygen.
5. **Do not** exceed 2,200 PSIG inlet Pressure.
6. All Components used in the oxygen system or Shop air system shall be clean, dry and free of all contamination. Per Spec. ARP 1176
7. Servicing and/ or maintenance of Oxygen systems shall be done by trained and qualifies personnel using approved procedures Per SAE Spec. ARP 1532
8. All components in conjunction with the OB-30 booster shall comply with NFPA – 53 "Recommended Practice on Materials, Equipment, and Systems Used in Oxygen-Enriched Atmospheres" - 2004 Edition

2.0 Specifications / Features

Dimensions: 14” long, 9.4” high and 8.9” wide.
Weight: 42 lbs complete.

Input & Output Hoses required: Stainless steel/Teflon® -4 rated to 3,000 psi.
Booster output Rating = 2,200 psig.
Oxygen Booster Ratio: 30:1.

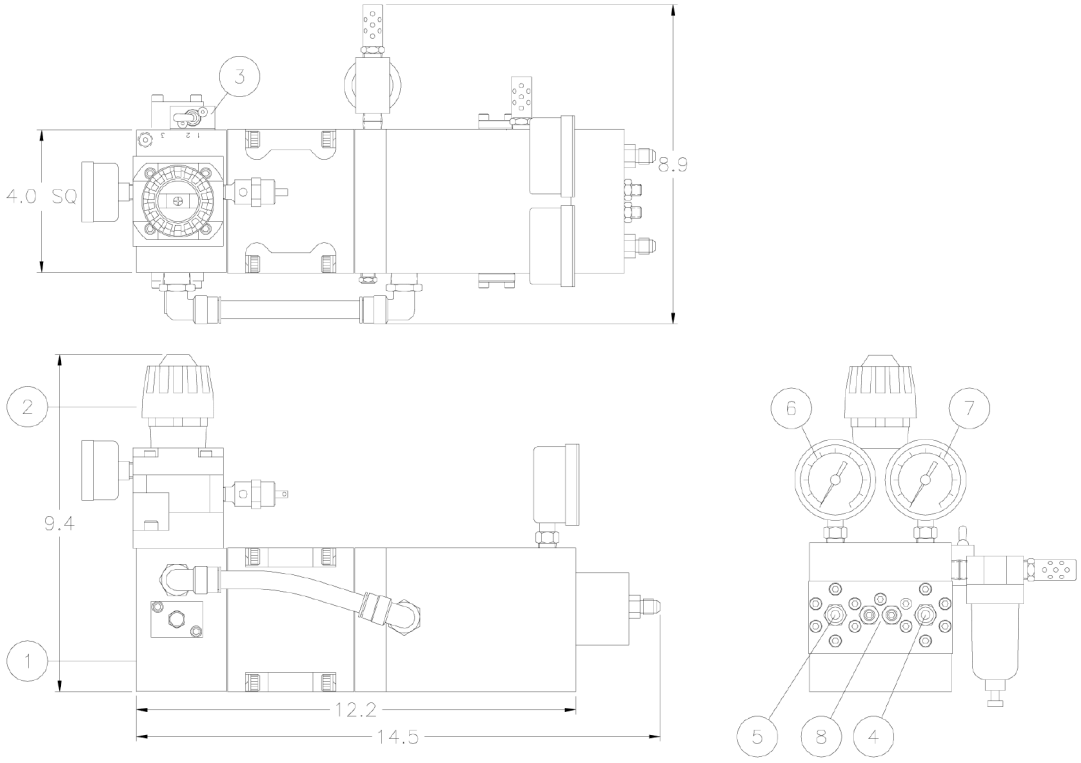


Fig 1a

2.1 Component Description (Refer to Fig. 1a. for component location.)

1. Air or Nitrogen inlet Port (1/2 npt).
2. Air Regulator & Gauge.
   (Sets O2 Boost Pressure: 80 PSIG air in = 2,200 +psi oxygen out).
3. Pump On / Off Air Toggle Switch.
4. Oxygen Out Port –4 JIC Fitting 2,200 psig Max.
5. Oxygen In Port –4 JIC Fitting 2,200 psig Max.
6. Oxygen In (Supercharge) Pressure Gauge.
7. Oxygen Out Pressure Gauge.
8. Cut in/cut out pressure switches (factory preset).

Application: Fill aircraft oxygen system, or similar operations that require high pressure Oxygen.

3.0 Preparation for use

**** Caution ****

It is mandatory that this instruction manual be read, understood and followed by all persons operating this high- pressure oxygen booster.

3.1 Safety Instructions

3.1.1 General: Information presented in this manual and on various labels, tags and plates on the unit pertains to equipment design, installation, operation maintenance and trouble shooting which should be read, understood and followed for safe and effective use of this equipment.

3.1.2 Safety: The operation, maintenance, and trouble shooting of this high pressure Oxygen Booster requires practices and procedures which ensure personal operator safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable local codes.

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by these signal words ** Warning** and Caution ** to denote different levels of hazard.

Warning: denotes practices, which if not carefully followed, could result in property damage, **SERIOUS** personal injury and /or **DEATH**
Caution: denotes practices which if not carefully followed, could result in minor personal injury or damage to this equipment.

3.1.3 Training: Read through this entire manual prior to any Oxygen booster operation. All personnel using this Oxygen Booster should understand and follow this manual and receive training. We encourage our customers to call Interface Devices, Inc to discuss any operating or testing requirements. All operators of the OB-30 should be familiar with high pressure oxygen service per the NFPA-53 publication: "Oxygen System Recommended Practices and Materials"

3.2 General Safety Precautions

3.2.1 Pressures: Gasses under pressure are a potential hazard in the form of stored energy. Accidents can occur when this energy is improperly handled. Be sure that all equipment used is compatible and designed to control the pressures encountered.

3.2.2 Velocity: Oxygen flowing at a high velocity in a piping system can propel any foreign material particles with such force that the impact friction can raise the particles temperature to a possible ignition point. It is therefore imperative that a high degree of cleanliness be maintained in the oxygen system at all times and instructions for initializing oxygen flow be closely followed.

3.2.3 Oxygen: Oxygen is an oxidizing gas, chemically stable, and non-flammable but will, combined with other elements support combustion.

**** Warning ****
High oxygen concentrations can accelerate the combustion of flammable materials up to and including explosion.

It is important to understand that spontaneous combustion of organic materials such as oil can occur in oxygen rich atmospheres.

3.2.4 Lubrication: The use of lubrication in an Oxygen system should be kept to a minimum. The OB-30 itself requires no lubrication. An air line lubricator is not to be used.

**** Warning ****
Only lubricants compatible with high pressure oxygen systems shall be used.

No lubricant shall be applied in any area that will come into direct contact with Oxygen during normal use.

3.3 Assembly:

3.3.1 Although the Oxygen Booster is inspected prior to shipping, it could be damaged during shipping. Therefore, it should be carefully unpacked and placed on a clean level surface for inspection.

3.3.2 The bottom of the booster is furnished with three ¼-20 by ½" deep tapped holes for mounting to a bracket or cart.

3.3.2 Customer supplied parts (Oxygen components must be in accordance with NFPA-53):

1. Two stainless steel/PTFE –4 hoses rated to 3,000 psi working pressure.
2. Aircraft pressurization attachment fitting.
3. Coalescing inlet air filter rated to 125 psi at 40 SCFM
4. Oxygen Shut-off valve (mounted away from the booster)

3.3.3 Remove protective caps from "O_2 in" and "O_2 out" fittings.

3.3.4 With oxygen supply regulator closed, connect both -4 Hoses to the Oxygen in and out fittings on the booster.

**** Caution ****

The customer supplied oxygen supply must be complete with shutoff valves, pressure gauges, pressure regulators and Stratoflex® -4 hose. All components must be rated for 3,000 psi working pressure and conform to NFPA-53 Guidelines.

3.3.5 Attach aircraft pressurization fitting to the far end of the -4 hose coming from the oxygen out hose.

3.3.6 Check all components for integrity. If all is well, you are ready to use the OB 30.

4.0 Operation:

**** Warning ****

Always inspect unit before use, damaged, contaminated or oily equipment should never be used.

4.1 Preparation for Operation

4.1.1 Be sure all valves and controls are in the closed position.

4.1.2 Decrease item 2 (fig 1a) inlet pressure regulator to minimum pressure setting.

4.1.3 Inspect all connections for contaminants before installation and tightening. Remove any foreign materials. Be sure all oxygen components are clean per SAE specifications and comply with NFPA-53 publication: "Oxygen System Recommended Practices and Materials".

4.1.4 Connect the output of the gas supply bottle to the gas inlet connection of the Oxygen Booster (See figure 1a).

4.1.5 Decrease the gas supply bottle or shop supply gas regulator to the minimum pressure setting.

4.1.6 Connect the oxygen fill line loosely to the aircraft and purge line by SLOWLY cracking open gas supply bottle shutoff valve and adjusting the supply bottle pressure to a low flow setting.

> **** Warning ****
> Be sure fill line is secured prior to purging the unit. This will prevent the hose from whipping about if too much O_2 is allowed to flow through the unit.

4.1.7 Tighten the O_2 fill line connection at the aircraft.

4.1.8 The high pressure O_2. Booster is ready to charge an aircraft O_2 System.

4.2 Charging the Aircraft Oxygen System

4.2.1 After the oxygen booster has been properly connected, slowly and fully open the O_2 supply bottle shut off valve. Adjust the gas supply bottle pressure regulator to the required Aircraft O_2 system pressure. Wait until the bottle pressure and the aircraft system pressure are equal.

4.2.2 Note: If the bottle pressure is lower than the required aircraft oxygen system pressure, be careful not to over adjust the supply bottle pressure regulator once the maximum supply bottle pressure has been achieved. Increasing the oxygen pressure regulator beyond this point will not increase output, and may damage the regulator spring.

4.2.3 Adjust the booster's air pressure regulator to attain a pressure slightly lower than the final required O_2 pressure (divide this oxygen pressure by 30 to find the initially required regulated air pressure setting). Example: 2,200 psi final pressure minus 100 psi equals 2,100 psi, divided by 30 equals 70 psi regulated air pressure.

Note: If the ambient temperature at the time of oxygen system recharging is above or below 70 degrees Farenheite, refer to Table 1 to determine the correct final pressure.

4.2.4 Turn on the booster's "pump run" toggle switch to "on" to further pressurize aircraft oxygen system. Note: Because the Oxygen Booster pump operates at a theoretical ratio, actual boosted oxygen pressures may vary slightly due to different physical conditions. The oxygen outlet pressure gauge will show the aircraft system pressure developed by the oxygen booster. When the set pressure that has been achieved (i.e.: booster stops pumping), increase the pressure of the air regulator to obtain the required final aircraft system pressure. Turn off the booster's air toggle switch when the booster has stopped running.

4.3 Disconnecting Oxygen Booster From Aircraft

4.3.1 Close the oxygen bottle shut off valve.

4.3.2 Decrease both the air inlet pressure regulator and the oxygen supply bottle pressure regulator to their respective minimum settings.

4.3.3 Disconnect booster's air (or nitrogen) supply line.

4.3.4 Slowly loosen, bleed down, and disconnect oxygen hose at the aircraft. Disconnect the supply hose.

4.3.5 Cap both hoses to prevent contamination.

5.0 Maintenance

**** Warning ****

Maintenance should be undertaken by qualified personnel only.

The operation, maintenance and troubleshooting of this high pressure Oxygen Booster system requires practices and procedures which ensure personal operator safety and the safety of others. Therefore, this equipment is to be operated and maintained only by qualified persons in accordance with this manual and all applicable codes.

5.1 General

5.1.1 All maintenance performed on this high pressure Oxygen Booster shall be conducted in accordance with all applicable codes governing the handling, operation, installation and trouble shooting for high pressure gas operation. Maintenance is to only be done by qualified persons.

5.1.2 All maintenance personnel must be familiar with the cautions and warnings associated with high pressure gas systems as outlined in sections 3.1 and 3.2 of this manual prior to performing any maintenance on this unit.

5.1.3 The oxygen pressure gauges on this unit should be inspected and calibrated annually to ± 3/2/3 % of span (ASME B40.1 Grade B), to maintain and ensure accuracy.

5.2 Storage

5.2.1 Store the unit in a clean, dry and secure area when not in use.

5.2.2 Be sure all hoses are capped and the unit is covered with a lint free covering for the duration of unit storage to ensure complete O_2 system cleanliness for future aircraft system recharging.

5.3 Recertification

5.3.1 The OB-30 should be regularly inspected especially after periods of non-use. If after conducting your OB-30 inspection you believe it may have been compromised with suspect components or sub optimal operational or maintenance practices it can be returned to for a complete inspection, cleaning and recertification. Recertification is also strongly recommended for any OB-30 that has been in service for two years or longer since its last factory certification.

6.0 Oxygen System Specification Information

For more information concerning specific SAE Aircraft Oxygen Equipment Specification, contact:

Society of Automotive Engineers
400 Commonwealth Drive
Warrendale , PA 15096-0001 USA
Tel: +1 724 776 4841

For more information concerning specific Oxygen System Recommended Practices and Materials contact:

National Fire Protection Association
1 Batterymarch Park
Quincy, MA 02169-7471 USA
Tel: +1 617 770-3000

7.0 Trouble Shooting:

**** Warning ****

Troubleshooting should be undertaken by qualified personnel only.

Troubleshooting Chart

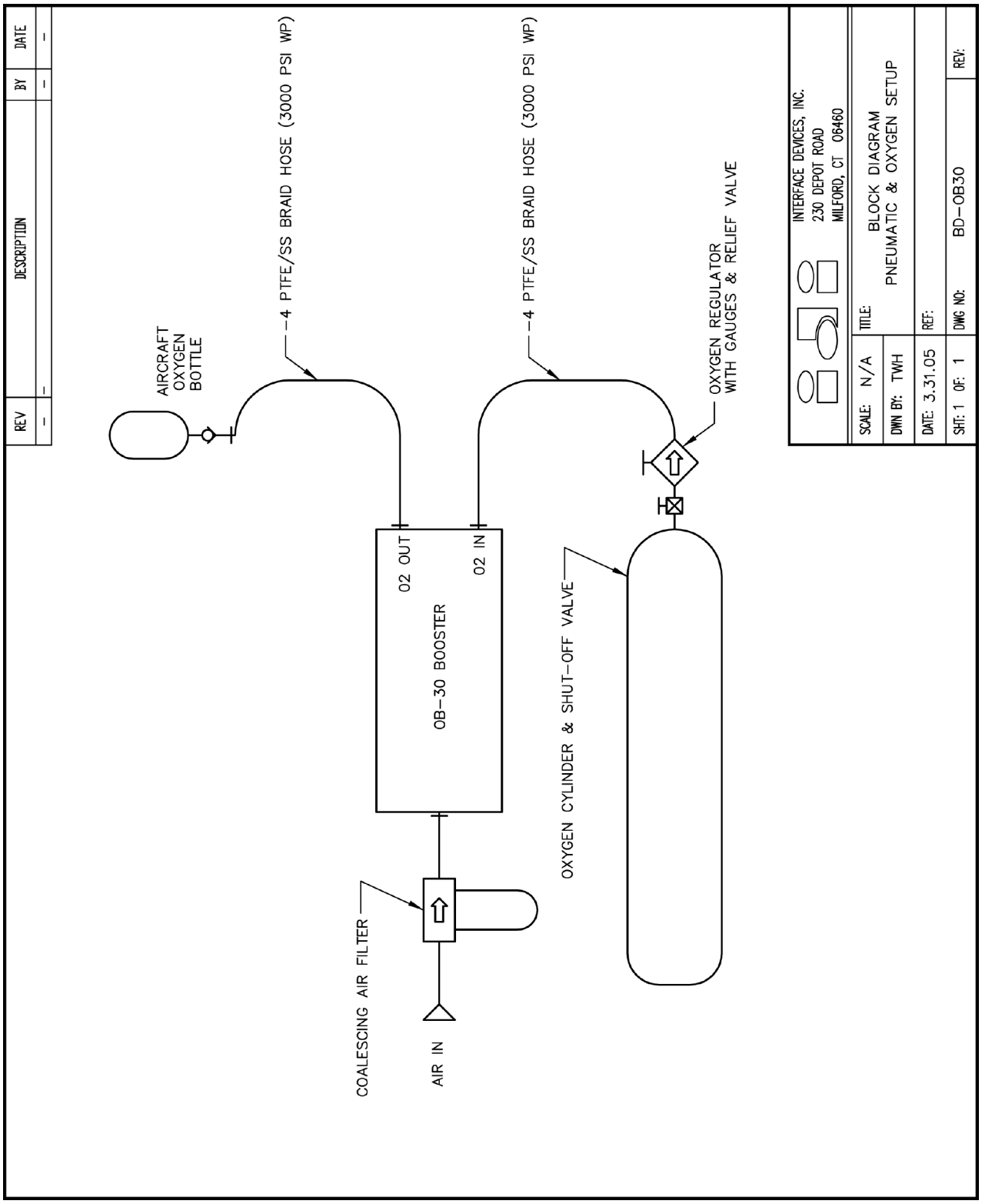
Symptom	Probable Cause	Remedy
Pump will not cycle (Only regulated oxygen Pressure at out put.)	No air supply to pump	Look for and fix
	Pump regulator set too low	Increase setting
	Four way air reciprocating valve spool stuck at mid position	Disconnect/ reconnect air supply (resets air spool to end position) If spool still sticks, manually push spool to far end with probe through hole in "spool stop cap". If stuck or requires excessive force, disassemble air valve assembly. Inspect for contamination or mechanical bind. Repair or replace, lubricate seals with Christo-Lube MCG-111 grease
Pump makes one cycle then stops	Faulty "2 way air Valve" (Broken, leaks or contaminated)	Repair or replace
Pump cycles constantly when Dead Headed	External leak at pump or down stream high pressure circuit	Look for and correct
	Contaminated or stuck open check valve cartridge	Clean or replace
	Internal leak in pump	Check all dynamic and static seals and gaskets

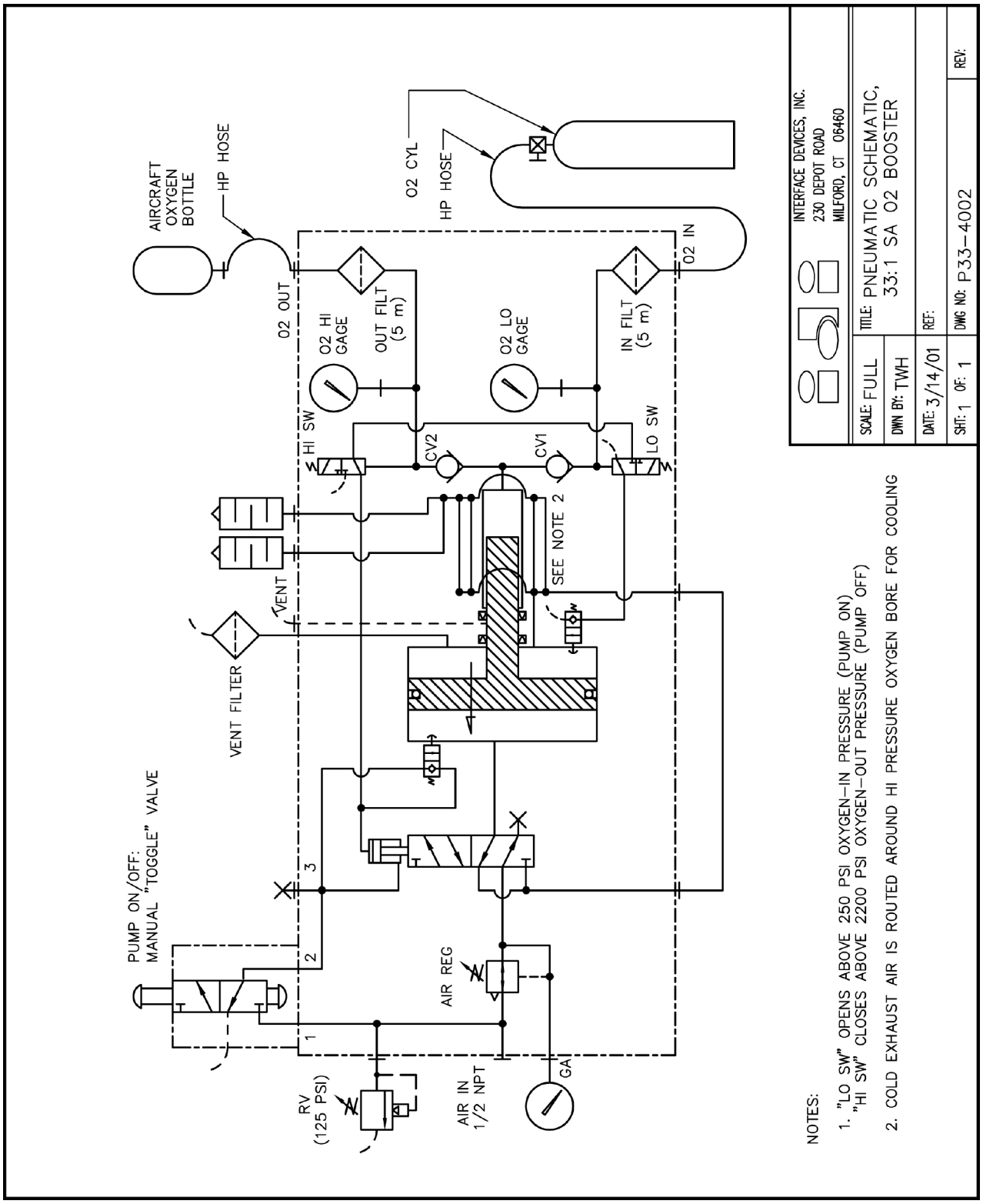
Table 1.
Temperature/Pressure Correction

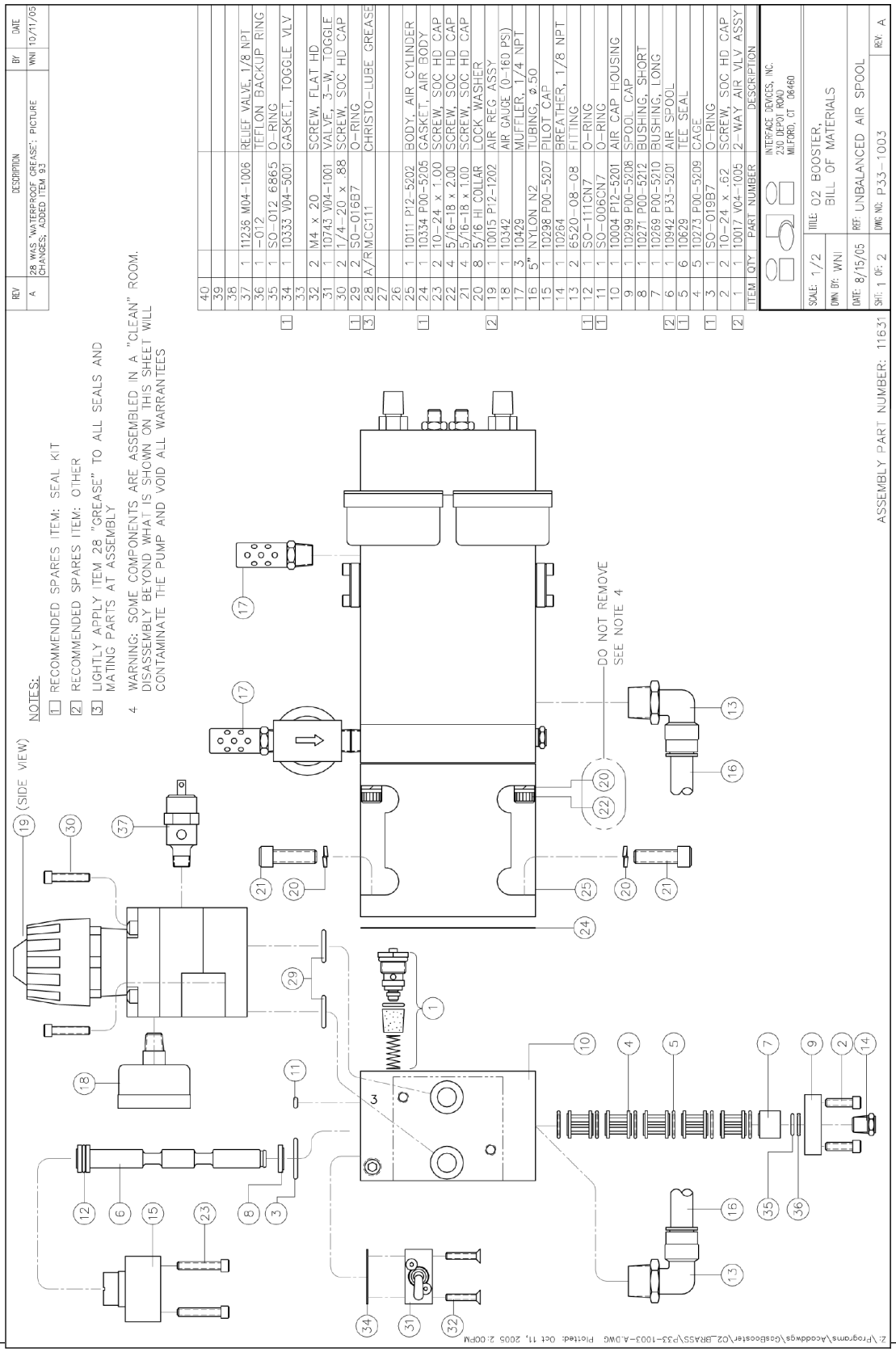
At Temperature Degrees F	Fill to Working Pressure x Figure Below
110°	1.1000
105°	1.0875
100°	1.0750
95°	1.0625
90°	1.0500
85°	1.0375
80°	1.0250
75°	1.0125
70°	1.0000
65°	0.9875
60°	0.9750
55°	0.9625
50°	0.9500
45°	0.9375
40°	0.9250

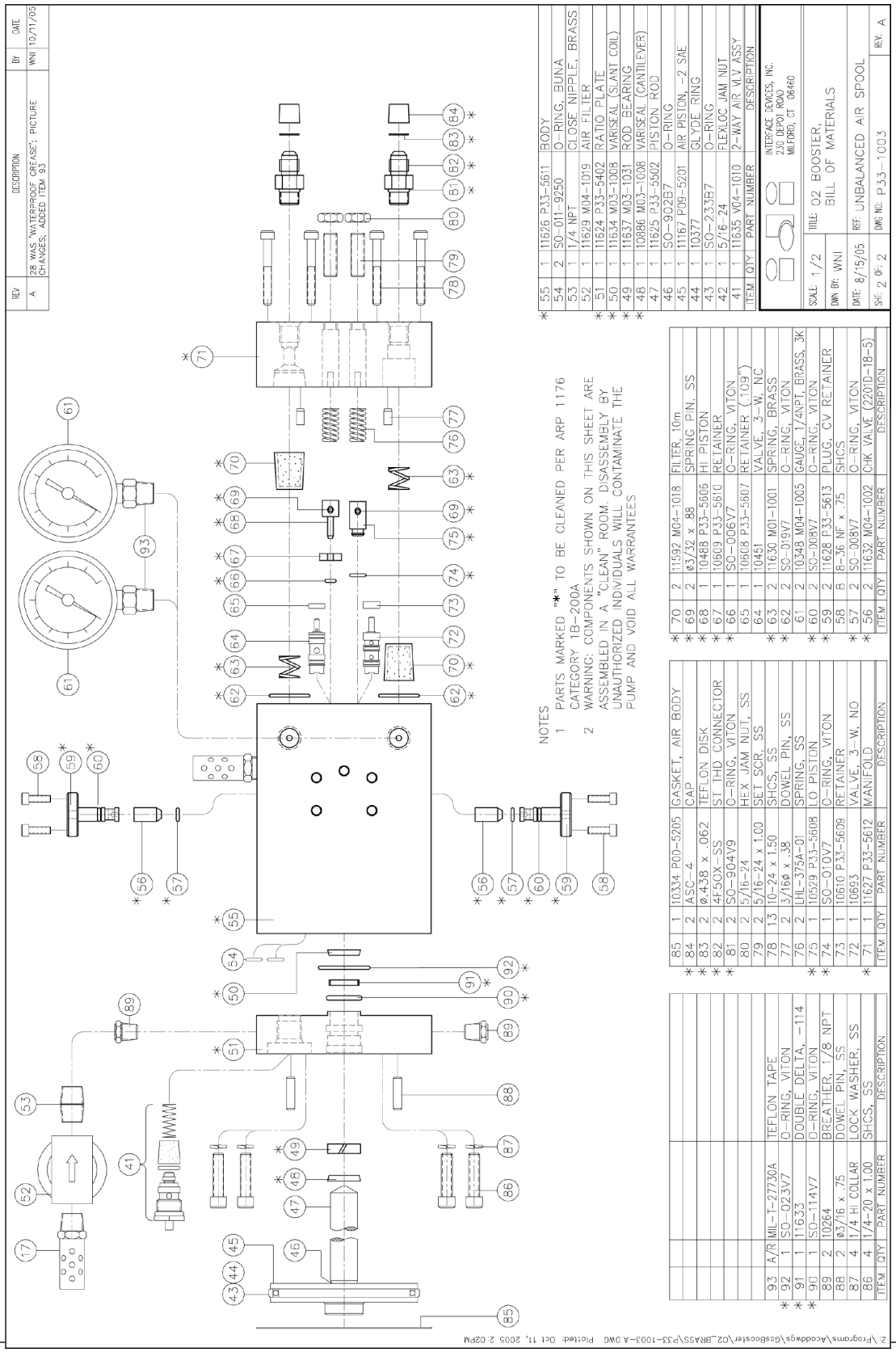
Example: Ambient Temp. = 90° F, Working pressure is 1800 PSIG

Charge Pressure = 1800 PSIG * 1.0500 = 1890 PSIG


REV
DESCRIPTION
BY
DATE
- - -
AIRCRAFT OXYGEN BOTTLE
-4 PTFE/SS BRAID HOSE (3000 PSI WP)
-4 PTFE/SS BRAID HOSE (3000 PSI WP)
OXYGEN REGULATOR WITH GAUGES & RELIEF VALVE
02 OUT
02 IN
OB-30 BOOSTER
OXYGEN CYLINDER & SHUT-OFF VALVE
COALESCING AIR FILTER
AIR IN
INTERFACE DEVICES, INC.
230 DEPOT ROAD
MILFORD, CT 06460
SCALE: N/A
DWN BY: TWH
TITLE:
BLOCK DIAGRAM
PNEUMATIC & OXYGEN SETUP
DATE: 3.31.05
REF:
SHT: 1 OF: 1
DWG NO: BD-OB30
REV:


AIRCRAFT OXYGEN BOTTLE
HP HOSE
O2 CYL
HP HOSE
O2 OUT
O2 HI GAGE
OUT FILT (5 m)
O2 LO GAGE
IN FILT (5 m)
O2 IN
HI SW
CV2
CV1
LO SW
SEE NOTE 2
VENT
VENT FILTER
PUMP ON/OFF: MANUAL "TOGGLE" VALVE
AIR REG
RV (125 PSI)
AIR IN 1/2 NPT
GA
1
2
3
NOTES:
1. "LO SW" OPENS ABOVE 250 PSI OXYGEN-IN PRESSURE (PUMP ON)
"HI SW" CLOSES ABOVE 2200 PSI OXYGEN-OUT PRESSURE (PUMP OFF)
2. COLD EXHAUST AIR IS ROUTED AROUND HI PRESSURE OXYGEN BORE FOR COOLING
INTERFACE DEVICES, INC.
230 DEPOT ROAD
MILFORD, CT 06460
SCALE: FULL
DWN BY: TWH
DATE: 3/14/01
SHT: 1 OF: 1
TITLE: PNEUMATIC SCHEMATIC, 33:1 SA O2 BOOSTER
REF:
DWG NO: P33-4002
REV:


REV | DESCRIPTION | BY | DATE
A | 28 WAS "WATERPROOF GREASE"; PICTURE CHANGES; ADDED ITEM 93 | WNI | 10/11/05
NOTES:
1 RECOMMENDED SPARES ITEM: SEAL KIT
2 RECOMMENDED SPARES ITEM: OTHER
3 LIGHTLY APPLY ITEM 28 "GREASE" TO ALL SEALS AND MATING PARTS AT ASSEMBLY
4 WARNING: SOME COMPONENTS ARE ASSEMBLED IN A "CLEAN" ROOM. DISASSEMBLY BEYOND WHAT IS SHOWN ON THIS SHEET WILL CONTAMINATE THE PUMP AND VOID ALL WARRANTEES
ITEM | QTY | PART NUMBER | DESCRIPTION
40 | | | |
39 | | | |
38 | | | |
37 | 1 | 11236 M04-1006 | RELIEF VALVE, 1/8 NPT
36 | 1 | -012 | TEFLON BACKUP RING
35 | 1 | SO-012 6865 | O-RING
34 | 1 | 10333 V04-5001 | GASKET, TOGGLE VLV
33 | | | |
32 | 2 | M4 x .20 | SCREW, FLAT HD
31 | 1 | 10743 V04-1001 | VALVE, 3-W, TOGGLE
30 | 2 | 1/4-20 x .88 | SCREW, SOC HD CAP
29 | 2 | SO-016B7 | O-RING
28 | A/R | MCC111 | CHRISTO-LUBE GREASE
27 | | | |
26 | | | |
25 | 1 | 10111 P12-5202 | BODY, AIR CYLINDER
24 | 1 | 10334 P00-5205 | GASKET, AIR BODY
23 | 2 | 10-24 x 1.00 | SCREW, SOC HD CAP
22 | 4 | 5/16-18 x 2.00 | SCREW, SOC HD CAP
21 | 4 | 5/16-18 x 1.00 | SCREW, SOC HD CAP
20 | 8 | 5/16 HI COLLAR | LOCK WASHER
19 | 1 | 10015 P12-1202 | AIR REG ASSY
18 | 1 | 10342 | AIR GAUGE (0-160 PSI)
17 | 3 | 10429 | MUFFLER, 1/4 NPT
16 | 5" | NYLON N2 | TUBING, ø.50
15 | 1 | 10298 P00-5207 | PILOT CAP
14 | 1 | 10264 | BREATHER, 1/8 NPT
13 | 2 | 6520-08-08 | FITTING
12 | 1 | SO-111CN7 | O-RING
11 | 1 | SO-006CN7 | O-RING
10 | 1 | 10004 P12-5201 | AIR CAP HOUSING
9 | 1 | 10299 P00-5208 | SPOOL CAP
8 | 1 | 10271 P00-5212 | BUSHING, SHORT
7 | 1 | 10269 P00-5210 | BUSHING, LONG
6 | 1 | 10942 P33-5201 | AIR SPOOL
5 | 6 | 10629 | TEE SEAL
4 | 5 | 10273 P00-5209 | CAGE
3 | 1 | SO-019B7 | O-RING
2 | 2 | 10-24 x .62 | SCREW, SOC HD CAP
1 | 1 | 10017 V04-1005 | 2-WAY AIR VLV ASSY
INTERFACE DEVICES, INC.
230 DEPOT ROAD
MILFORD, CT 06460
SCALE: 1/2
DWN BY: WNI
DATE: 8/15/05
TITLE: 02 BOOSTER, BILL OF MATERIALS
REF: UNBALANCED AIR SPOOL
SHT: 1 OF: 2
DWG NO: P33-1003
REV: A
ASSEMBLY PART NUMBER: 11631
(SIDE VIEW)
DO NOT REMOVE SEE NOTE 4
Z:\Programs\Acaddwgs\GasBooster\02_BRASS\P33-1003-A.DWG Plotted: Oct 11, 2005 2:00PM


REV
DESCRIPTION
BY
DATE
A
28 WAS "WATERPROOF GREASE"; PICTURE CHANGES; ADDED ITEM 93
WNI 10/11/05
NOTES
1 PARTS MARKED "*" TO BE CLEANED PER ARP 1176 CATEGORY 1B-200A
2 WARNING: COMPONENTS SHOWN ON THIS SHEET ARE ASSEMBLED IN A "CLEAN" ROOM. DISASSEMBLY BY UNAUTHORIZED INDIVIDUALS WILL CONTAMINATE THE PUMP AND VOID ALL WARRANTEES
ITEM QTY PART NUMBER DESCRIPTION
55 1 11626 P33-5611 BODY
54 2 SO-011-9250 O-RING, BUNA
53 1 1/4 NPT CLOSE NIPPLE, BRASS
52 1 11629 M04-1019 AIR FILTER
51 1 11624 P33-5402 RATIO PLATE
50 1 11634 M03-1008 VARISEAL (SLANT COIL)
49 1 11637 M03-1031 ROD BEARING
48 1 10886 M03-1008 VARISEAL (CANTILEVER)
47 1 11625 P33-5502 PISTON ROD
46 1 SO-902B7 O-RING
45 1 11167 P09-5201 AIR PISTON, -2 SAE
44 1 10377 GLYDE RING
43 1 SO-233B7 O-RING
42 1 5/16-24 FLEXLOC JAM NUT
41 1 11635 V04-1010 2-WAY AIR V.V ASSY
ITEM QTY PART NUMBER DESCRIPTION
85 1 10334 P00-5205 GASKET, AIR BODY
84 2 ASC-4 CAP
83 2 Ø.438 x .062 TEFLON DISK
82 2 4F50X-SS ST THD CONNECTOR
81 2 SO-904V9 O-RING, VITON
80 2 5/16-24 HEX JAM NUT, SS
79 2 5/16-24 x 1.00 SET SCR, SS
78 13 10-24 x 1.50 SHCS, SS
77 2 3/16Ø x .38 DOWEL PIN, SS
76 2 LHL-375A-01 SPRING, SS
75 1 10529 P33-5608 LO PISTON
74 1 SO-010V7 O-RING, VITON
73 1 10610 P33-5609 RETAINER
72 1 10693 VALVE, 3-W, NO
71 1 11627 P33-5612 MANIFOLD
ITEM QTY PART NUMBER DESCRIPTION
70 2 11592 M04-1018 FILTER, 10m
69 2 Ø3/32 x .88 SPRING PIN, SS
68 1 10488 P33-5606 HI PISTON
67 1 10609 P33-5610 RETAINER
66 1 SO-006V7 O-RING, VITON
65 1 10608 P33-5607 RETAINER (.109")
64 1 10451 VALVE, 3-W, NC
63 2 11630 M01-1001 SPRING, BRASS
62 2 SO-019V7 O-RING, VITON
61 2 10348 M04-1005 GAUGE, 1/4NPT, BRASS, 3K
60 2 SO-008V7 O-RING, VITON
59 2 11628 P33-5613 PLUG, CV RETAINER
58 B 8-36 NF x .75 SHCS
57 2 SO-008V7 O-RING, VITON
56 2 11632 M04-1002 CHK VALVE (2201D-18-5)
ITEM QTY PART NUMBER DESCRIPTION
93 A/R MIL-T-27730A TEFLON TAPE
92 1 SO-023V7 O-RING, VITON
91 1 11633 DOUBLE DELTA, -114
90 1 SO-114V7 O-RING, VITON
89 2 10264 BREATHER, 1/8 NPT
88 2 Ø3/16 x .75 DOWEL PIN, SS
87 4 1/4 HI COLLAR LOCK WASHER, SS
86 4 1/4-20 x 1.00 SHCS, SS
ITEM QTY PART NUMBER DESCRIPTION
INTERFACE DEVICES, INC.
230 DEPOT ROAD
MILFORD, CT 06460
SCALE: 1/2
TITLE: 02 BOOSTER, BILL OF MATERIALS
DWN BY: WNI
DATE: 8/15/05
REF: UNBALANCED AIR SPOOL
SHT: 2 OF: 2
DWG NO: P33-1003
REV: A
N:\Programs\Acadmgs\Gasbooster\02_BRASS\P33-1003-A.DWG Plotted: Oct 11, 2005 2:02PM

APPENDIX II: Oxygen Regulator Service Manual

The following pages contain the service manual for the oxygen regulators used on AERO Specialties oxygen service carts.

CHART 1

Description	SR4F-320 SR4F-540 SR4F-580	SR4F-350	SR4G-346 SR4G-540 SR4G-580	SR4G-347 SR4G-680	SR4G-350	SR4J-346 SR4J-350 SR4J-540 SR4J-580
Body	0701-0038	0701-0038	0701-0038	0701-0037	0701-0038	0701-0038
L.P. Gauge	1424-0049	1424-0049	1424-0180	1424-0180	1424-0180	1424-0057
H.P. Gauge	1424-0057	1424-0057	1424-0057	1424-0296	1424-0057	1424-0057
Relief Valve	0600-0109	0600-0082	0600-0112	0600-0112	0600-0080	N/A
Description	**SR4J-347 SR4J-577 SR4J-680**	**SR4K-347 SR4K-680 SR4K-701**	**SR4F-250**	**SR4G-250**	**SR4J-250**	**SR4K-250**
Body	0701-0037	0701-0037	0701-0038	0701-0038	0701-0038	0701-0038
L.P. Gauge	1424-0057	1424-0296	1424-0049	1424-0180	1424-0057	1424-0296
H.P. Gauge	1424-0296	1424-0296	1424-0296	1424-0296	1424-0296	1425-0296
Relief Valve	N/A	N/A	0600-0109	0600-0112	N/A	N/A

CHART 2

Gas	CGA No.	Inlet Nut	Inlet Swivel	Retaining Ring	Inlet Washer
Oxygen	540 577 701	0967-0044 0977-0003 0988-0003	0967-0034 0977-0001 0988-0001	1406-0130 1406-0131 1406-0131	N/A N/A N/A
Inert Gas	580 680	0973-0003 0958-0003	0970-0005 0958-0001	N/A N/A	N/A N/A
Air	346 347	0972-0015 (Included)	0972-0010 0978-0001	N/A N/A	N/A N/A
Methane, Hydrogen	350	0983-0003	0983-0008	N/A	N/A
Carbon Dioxide	320	0985-0030	0985-0004	N/A	1408-0065

SERVICE INSTRUCTIONS

Recommended Tools and Supplies:

Cap Wrench RT-173(1420-0268)
Adjustable Open-End Wrench
Socket Wrench
9/16", 5/8", 11/16" Sockets
Torque Wrench
Inlet Swivel Ass'y Plug RT-81 (1420-0127) - CGA 320
Inlet Swivel Ass'y Plug RT-145 (1420-0220) - CGA 346
Inlet Swivel Ass'y Plug RT-166 (1420-0260) - CGA 347
Inlet Swivel Ass'y Plug RT-2 (1420-0009) - CGA 350
Inlet Swivel Ass'y Plug RT-4 (1420-0014) - CGA 540
Inlet Swivel Ass'y Plug RT-167 (1420-0261) - CGA 577
Inlet Swivel Ass'y Plug RT-85 (1420-0134) - CGA 580
Inlet Swivel Ass'y Plug RT-168 (1420-0262) - CGA 680
Inlet Swivel Ass'y Plug RT-169 (1420-0263) - CGA 701
Bench Vise
LOCTITE® #7931 (0028-0056)
TEFLON® Tape (0028-0028)
KRYTOX® #240 AC

NOTE: for additional information, refer to Apparatus Service and Testing procedures (Form No. 56-0886) and Repair Tools Manual (Form No. 56-0121).

Disassembly Procedure

1. Place the Inlet Swivel Assembly Plug in the Bench Vise. Attach the Regulator to it with the Gauges face up.
2. Remove the Adjusting Screw from the Housing Cap.
3. Remove the Housing Cap from the Body.
4. Remove the Spring Buttons, Adjusting Spring(s), Centralizer and Centralizer O-Ring from the Body. If necessary, remove the Piston from the Centralizer. Remove the O-Ring or Seal Ring Assembly from the Piston. Discard the O-Rings and Seal Ring Assembly.
5. Remove the Cartridge from the Body. Discard it and the Cartridge O-Ring.
6. Remove the Gauges and Outlet Connection from the Body.
7. Remove the Pipe Plug or Relief Valve from the Body.
8. **CGA 540, 577 and 701 only:** Remove the Retaining Ring from the Inlet Swivel.
9. Remove the Inlet Swivel from the Body. Remove the Inlet Nut and Filter from the Inlet Swivel. **Discard the filter.**
10. Inspect the Body for signs of damage or wear. Replace the Body if threads are damaged or if wear is apparent.

CAUTION: Discard the O-Rings, Seal Ring Assembly, Cartridge, and Filter. Replace them each time you reassemble a Regulator.

3

VICTOR®

SR4 Series Regulators

PARTS & SERVICE BULLETIN

FORM NO. 56-1173 EFFECTIVE 2/90

MODEL INFORMATION

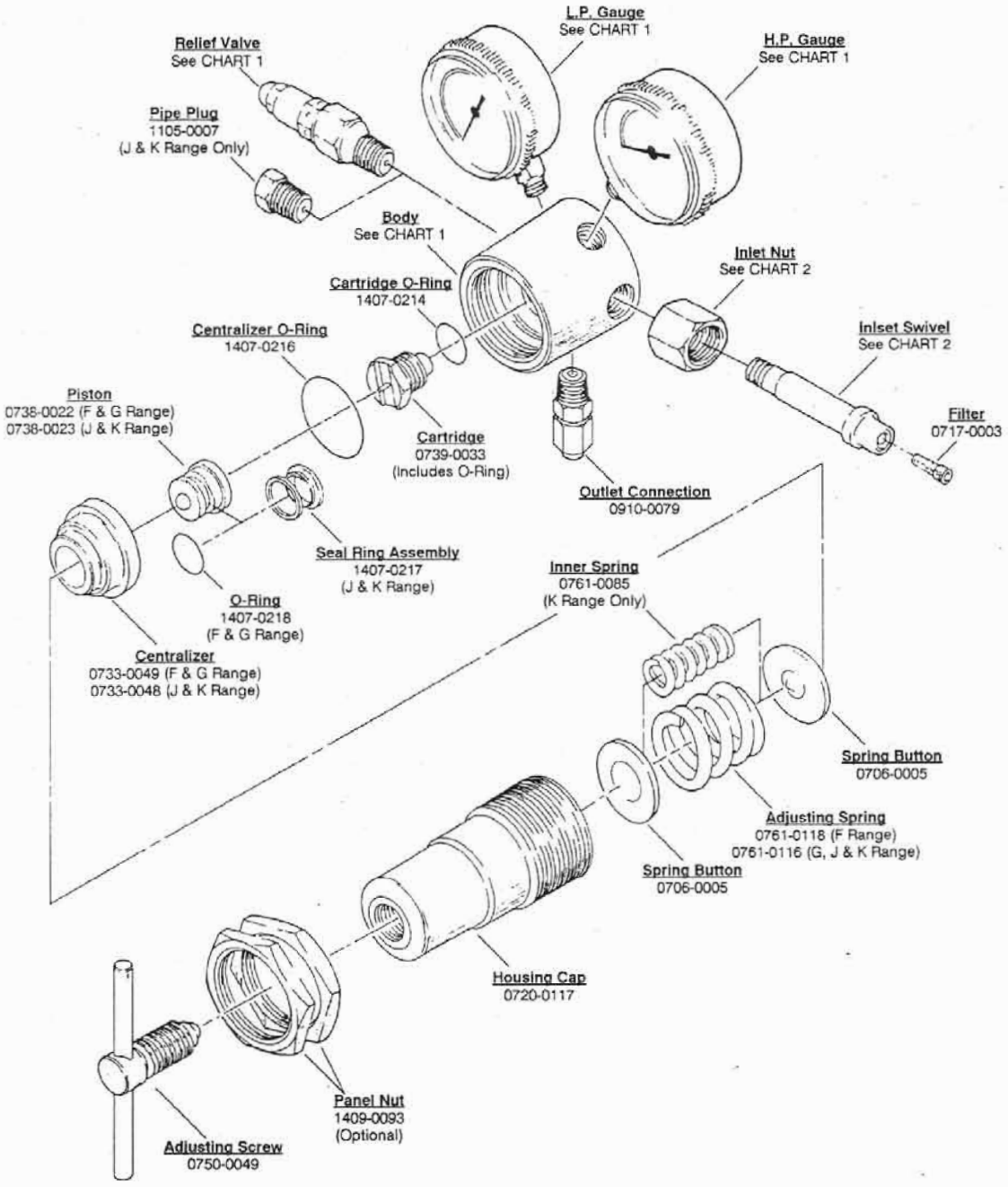
Gas Service	Model Number	Inlet Pressure	Delivery Range(PSIG)	CGA Inlet No.
Oxygen	SR4F-540	3000	50-750	540
	SR4G-540	3000	100-1500	540
	SR4J-540	3000	200-3000	540
	SR4J-577	4000	200-3000	577
	SR4K-701	5500	300-4500	701
Inert Gas	SR4F-580	3000	50-750	580
	SR4G-580	3000	100-1500	580
	SR4J-580	3000	200-3000	580
	SR4G-680	5500	100-1500	680
	SR4J-680	5500	200-3000	680
	SR4K-680	5500	300-4500	680
Air	SR4G-346	3000	100-1500	346
	SR4J-346	3000	200-3000	346
	SR4G-347	5500	100-1500	347
	SR4J-347	5500	200-3000	347
	SR4K-347	5500	300-4500	347
Methane, Hydrogen	SR4F-350	3000	50-750	350
	SR4G-350	3000	100-1500	350
	SR4J-350	3000	200-3000	350
Carbon Dioxide	SR4F-320	3000	50-750	320
Oxygen, Inert Gas, Air, Methane, Hydrogen, Carbon Dioxide	SR4F-250	6000	50-750	N/A
	SR4G-250	6000	100-1500	N/A
	SR4J-250	6000	200-3000	N/A
	SR4K-250	6000	300-4500	N/A

WARNING!

Welding apparatus improperly operated, maintained or repaired can be dangerous. Some parts and accessories manufactured by others may fit VICTOR apparatus but not conform to VICTOR's exacting standards. For your own protection, specify and use ONLY VICTOR-made parts and accessories with your VICTOR apparatus.

Service or repair of VICTOR apparatus should be performed only by a qualified technician. Improper service, repair or modification of the product could result in damage to the product or injury to the operator.

SR4 Series Regulators



2

Cleaning Regulator Parts

Clean all metal parts with a cleaner that is safe for use with high pressure oxygen. Contact a chemical/cleaning supply distributor for recommended cleaners for use with high pressure oxygen. Always use cleaning solvents in accordance with the manufacturer's instructions. **WARNING: DO NOT** allow nonmetal parts to come in contact with any cleaning solvent! Cleaning solvents cause elastomeric and plastic parts to swell and stress crack. If these parts require cleaning, use a mild soap solution, followed by thorough rinsing in water. Dry these parts completely before installing in the Regulator. REPLACE NONMETAL PARTS THAT HAVE COME IN CONTACT WITH OIL, GREASE OR ANY OTHER PETROLEUM BASED SUBSTANCE!

Assembly Procedure

1. Install the new Filter in the Inlet Swivel. Slide the Inlet Nut on the Inlet Swivel.
2. Clamp the Inlet Swivel Assembly Plug in the Bench Vise. Install the Inlet Swivel in the Inlet Swivel Assembly Plug.
3. Apply two or three drops of LOCTITE #7931 (no Teflon® tape) to the second and third Inlet Swivel threads. Install the Body on the Inlet Swivel. Tighten to 20 to 25 ft.-lbs. of torque.

   CGA 540, 577 and 701 Only: Install the Retaining Ring in the groove on the Inlet Swivel.
4. Apply two or three drops of LOCTITE #7931 and/or Teflon® tape to the second and third threads of the Pipe Plug or Relief Valve. Install the Pipe Plug or Relief Valve in the Body. Tighten to 14-18 ft.-lbs. of torque.
5. Apply two or three drops of LOCTITE #7931 and/or Teflon® tape to the second and third threads of the H.P. Gauge and L.P. Gauge. Install the Gauges in the Body. Tighten Gauges to 10 ft.-lbs. of torque minimum.
6. Remove the Body from the Inlet Swivel Assembly Plug.

   CAUTION: To remove any contaminants that could cause Regulator malfunction, connect the Inlet Swivel to a source of oil-free air or dry nitrogen. Slowly open and close the cylinder valve two or three times. Blow out the Body with pressurized oil-free air or dry nitrogen to remove debris.
7. Reattach the Regulator to the Inlet Swivel Assembly Plug. Install the new Cartridge in the Body. Tighten to 15-20 ft.-lbs. of torque.
8. Apply KRYTOX® #240 AC lubricant to the Piston O-Ring or Seal Ring Assembly. Install the O-Ring or Seal Ring Assembly on the Piston. (Note the orientation of the Seal Ring Assembly.)
9. Apply a thin film of KRYTOX® #240 AC to the inside of the Centralizer. Slide the Piston into the Centralizer as far as possible.
10. Apply KRYTOX #240 AC lubricant to the Centralizer O-Ring. Install the Centralizer O-Ring in the groove of the Body.
11. Place the Centralizer and one of the Spring Buttons (raised side up) in the Body.
12. Install the Adjusting Spring(s) in the Body. Place the second Spring Button (raised side down) on the Adjusting Spring.
13. Carefully place the Housing Cap over the Adjusting Spring. Screw the Housing Cap on the Body. Tighten Housing Cap to 50 to 60 ft.-lbs. of torque.
14. Apply a small amount of KRYTOX® #240 AC lubricant to the end and first few threads of the Adjusting Screw. Start the Adjusting Screw in the Housing Cap.
15. Remove the Regulator from the Inlet Swivel Assembly Plug.

Test Procedure

Recommended Tools and Supplies:

- High Pressure Test Gun, i.e. Whitey #3TF4 (quick opening on/off valve) with #55 (0.0520) restricting orifice
- 3500 PSIG source of Oil-free Air or Dry Nitrogen (3000 PSIG Inlet Regulators)
- 5000 PSIG source of Oil-free Air or Dry Nitrogen (4000 & 5500 PSIG Inlet Regulators)

WARNING: Always perform the following test procedure after assembling a Regulator. Test with oil-free air or dry nitrogen ONLY! **NEVER** stand directly in front of or behind a Regulator when opening the Cylinder Valve or Test Manifold. Always stand so that the Cylinder Valve or Test Manifold is between you and the Regulator.

1. Before attaching the Regulator to the Cylinder Valve or Test Manifold Valve, slowly open and close the valve two or three times to remove any contaminants that may enter the Regulator. Leave the valve closed.
2. Attach the Regulator to the Cylinder or Test Manifold. The Cylinder or Manifold must deliver 3500 PSIG (3000 PSIG Inlet Regulators) or 5000 PSIG (4000 & 5500 PSIG Inlet Regulators).
3. Attach the Test Gun, with #55 (0.0520) restricting orifice to the Outlet Connection.
4. **CREEP TEST/SLOW SHUT-OFF TEST**
   a. Slowly open the Cylinder or Manifold Valve to pressurize the Regulator.
   b. With the Test Gun closed, adjust the Regulator to deliver the appropriate pressure listed below:

F Range:	200 PSIG
G Range:	400 PSIG
J Range:	500 PSIG
K Range:	1000 PSIG

   c. Open and close the Test Gun several times to stabilize the Regulator. Leave the Test Gun closed.
   d. Observe the Gauge for five (5) minutes. During the first minute, slow shut-off (delivery pressure rise due to slow valve seating) must not exceed the appropriate pressure listed below:

F Range:	20 PSIG
G Range:	40 PSIG
J Range:	80 PSIG
K Range:	100 PSIG

      No further change in delivery pressure is allowed in the next four (4) minutes.
5. **DROP TEST**
   a. With the Test Gun closed, adjust the Regulator to deliver the appropriate pressure listed below:

F Range:	200 PSIG
G Range:	400 PSIG
J Range:	500 PSIG
K Range:	1000 PSIG

   b. Open the Test Gun and note the new Gauge reading. Drop (the difference in delivery from no-flow to flow-

11175 West Emerald
Boise, Idaho, 83713 USA

Phone: 208-378-9888
Fax: 208-378-9889

Email: sales@aerospecialties.com
Website: www.aerospecialties.com