

deflation of the balloon. Disconnect the test fixture and connect breathing hoses to Facepiece. Remove the test key from the rear of the BioPak.

4. Failure to have Test Apparatus fully assembled. (Ready for use)

Note: Breathing hoses do not need to be in straps on test apparatus.

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STATEMENTS OF FACT BENCH BIOPAK 240-S CONTEST

1. Do not allow oil, grease or other combustible materials to come in contact with the oxygen cylinder or cylinder valve to prevent ignition.
2. The BioPak 240-S is approved for respiratory protection at temperatures above 15 degrees F.
3. The exhalation breathing hose is a flexible hose that will transfer user exhalation from the mask and into the breathing chamber.
4. The breathing chamber provides carbon dioxide absorption, positive pressure, and maintains system volumetric control through venting and adding oxygen.
5. The anti-anoxia valve is simply a plug that will restrict the exhalation hose connection to the breathing chamber in the event oxygen stores have not been installed or activated in the respirator.
6. The diaphragm and spring combine to form the counter-lung.
7. The demand valve is a mechanically actuated valve located at the upper end of the diaphragm inhalation travel stroke.
8. The demand valve insures that the respirator will supply the user with additional oxygen as required and will also insure against the respirator going into a negative pressure situation.
9. The flow restrictor admits a constant flow of oxygen at 1.78 Lpm.
10. The coolant canister is a housing that contains a frozen gel tube or pack.
11. Breathing gas enters the cooler at approximately 120 degrees F.

12. The frozen gel in the coolant canister will absorb much of the breathing gas heat to maintain the gas temperature below 90 degrees F.
13. The inhalation breathing hose is a flexible hose that will transfer carbon dioxide-free, cooled and condensed breathing air from the coolant canister into the inhalation port of the Facepiece.
14. The oxygen cylinder is a carbon composite wrapped, aluminum lined, DOT approved pressure vessel.
15. The oxygen cylinder will hold 21 cubic feet of oxygen compressed to 3000 psi when fully charged.
16. The oxygen cylinder requires hydrostatic testing every 5 years.
17. The oxygen cylinder shall only be charged with U.S.P. medical grade 100% oxygen.
18. The pressure regulating mechanism will reduce the high pressure of the oxygen cylinder to approximately 260 psig.
19. Low pressure plumbing includes the bypass valve, alarm whistle and associated small diameter tubing.
20. The alarm whistle will provide a 92 dB audible signal for 45-60 seconds whenever remaining oxygen stores are 25% of full capacity.
21. The Turn-Around Maintenance Tag provides an indication of completed procedures and inspections for user verification before BioPak uses.
22. Only use disinfectant agent that does not contain alcohol or chlorine that can deteriorate Facepiece lens and rubber components.
23. Do not totally submerge the breathing chamber into the disinfectant solution to avoid contact of solution with the demand housing flow restrictor.
24. Oxygen cylinders that have a pressure gauge reading of 0 psig must be purged and pulled into a vacuum to remove all traces of moisture before filling.
25. Oxygen cylinder storage temperature should be maintained as close as possible to 70 degrees F at all times.

26. The Gel Pac or Cool Tube is to be placed into a freezer for at least 8 hours at a temperature between 15 degree F (-10 C) and -15 degree F (-26 C).
27. When conducting a Flow Test verify a flow reading of at least 1.64 Lpm.
28. Use only LIMEPAC absorbent agent to refill the scrubber canister.
29. Do not expose the absorbent material to the ambient atmosphere for more than a total of 1 hour during recharging and/or servicing.
30. Carbon dioxide absorbent material has a shelf life of 5 years when sealed in its shipping container.
31. Once the shipping container seal is broken the shelf life of the absorbent is reduced to 1 year.
32. Replace any scrubber foam pad that is less than 1/8 inch thick over the absorbent coverage area or 1/32 inch thick on the outside diameter.
33. Any scrubber foam pad that does not overlap the outer edge of the canister body should be replaced.
34. The large o-ring located on the inside diameter of the breathing chamber should be lightly greased with Dow-111.
35. The large o-ring located on the outside diameter of the breathing chamber should be lightly greased with Dow-111.
36. Use anti-fog cloths to apply a heavy coat of anti-fog agent onto the exposed inside surface of the Facepiece lens and/or anti-fog lens.
37. The chest mounted pressure gauge should have the same reading as the cylinder gauge after 90 seconds.
38. The oxygen cylinder pressure should be between 2700 and 3000 psig for the BioPak 240-S to be ready for use.
39. Leak-Tec solution should be used to check plumbing connections on the BioPak 240-S.

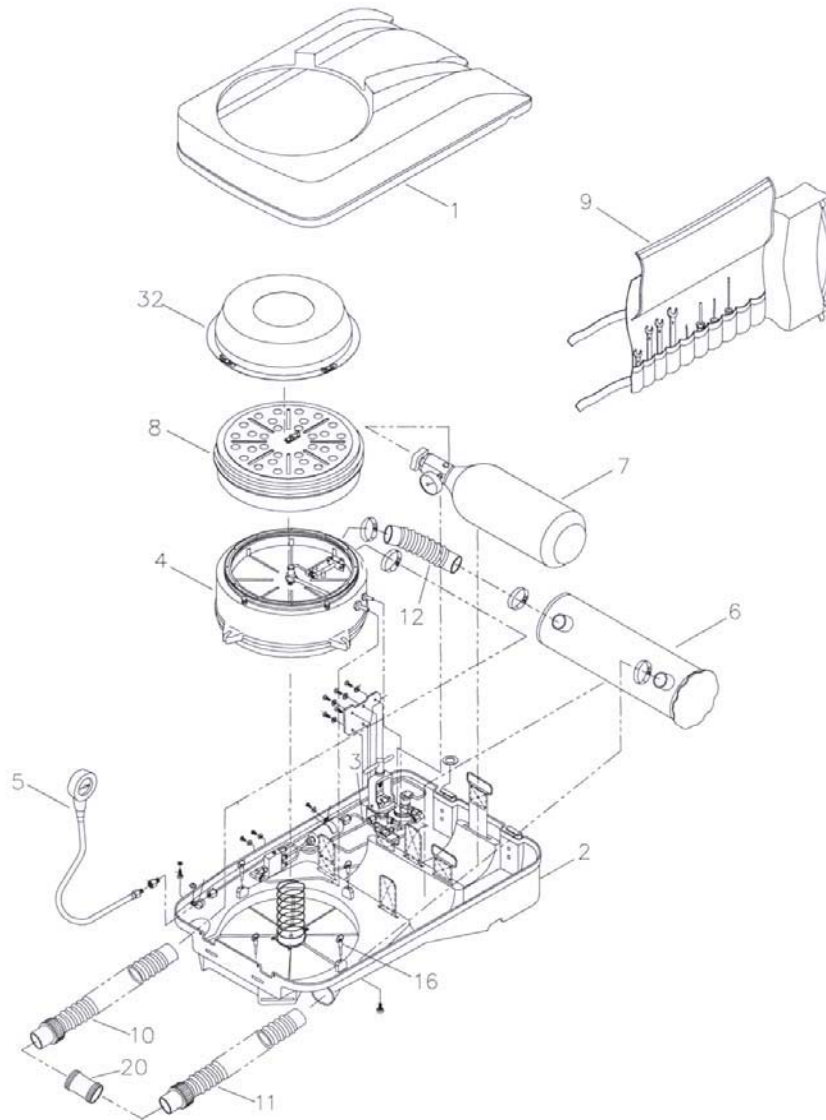
40. When performing High Pressure Leak Testing Leak-Tec solution should be allowed to sit for a minimum of 1 minute then visually inspected for signs of constant bubble formation.
41. Severe over inflation of the test balloon can cause damage to the balloon itself and to the vent valve of the breathing chamber.
42. If the test key is left in the BioPak 240-S it will result in excessively high breathing resistance, improper function and may damage the diaphragm of the breathing chamber.
43. The Carbon Dioxide Scrubber Foam Pad should be replaced after 20 uses.
44. The Facepiece Anti-Fog insert should be replaced after 20 uses.
45. The Oxygen Cylinder Sealing Washer should be replaced after 50 uses.
46. The Breathing Chamber ID O-Ring should be replaced after 50 uses.
47. The Breathing Chamber OD O-Ring should be replaced after 50 uses.
48. The Coolant Canister End Cap O-Ring should be replaced after 50 uses.
49. Do not attempt to lubricate an o-ring while it remains in its seat.
50. Although the oxygen cylinder sealing washer serves the same purpose as an O-ring, it should never be lubricated.
51. The BIOPAK 240-S breathing apparatus has several Facepiece assemblies approved for their unit.
52. Only use Cristo-Lube on the o-rings located in the following locations:
 - Bypass Valve
 - Alarm Whistle Assembly
 - Flow Restrictor O-Ring Seal
 - Connector Tube O-Ring Seal
53. The regulator assembly can not be serviced or repaired in the field.
54. The BioPak 240-S weighs 35 pounds when fully charged and ready for use.

55. Red visual indication on chest mounted pressure gauge to indicate 25% of rated duration, approximately 1 hour remaining.
56. Lower housing style must match upper style in terms of latch type.
57. The 1/8 inch Tube Quick Disconnect Fitting-Red shall have release mechanism locked into position with a cable tie.
58. The 5/32inch Tube Quick Disconnect Fitting-Brass shall have release mechanism locked into position with a cable tie.
59. The vent valve primary spring is silver in color.
60. The vent valve secondary spring is red in color.
61. One keg of carbon dioxide absorbent will provide approximately 11 fills.
62. The inhalation hose is marked with a nylon 8 inch green cable tie.
63. The exhalation hose is marked with a nylon 8 inch red cable tie.
64. The oxygen cylinder has a standard or extended handle option.
65. All users of the BioPak 240-S must be trained by qualified instructors in donning, operation, inspection and emergency use procedures.
66. Prior to using the BioPak 240-S it must be determined that the user is medically fit.
67. Use the BioPak 240-S with adequate skin protection when worn in gases or vapors that poison by skin absorption.
68. Metabolic consumption rate of oxygen at a moderate work load is 1.0 to 1.5 lpm.
69. Before removing the oxygen cylinder, verify that the cylinder valve is closed, chest gauge reads 0 psi, and depress bypass valve to relieve any internal pressure.
70. The breathing chamber is held in place with 4 pushpins.
71. Parts should remain in the disinfecting solution for a minimum of 10 minutes.

72. Do not wash and disinfect the carbon dioxide scrubber components until after washing all other components to avoid contact of absorbent granules.
73. Cuts in the outer wrapping of the oxygen cylinder require hydrostatic testing at a test facility.
74. Special effort should be made to prevent oxygen cylinders from being drained below 500 psig to reduce the possibility of external contamination migration into the cylinder.
75. Probable causes of the Facepiece fogging during use are the Anti-Fog lens insert not installed or damaged, or Anti-Fog agent not applied or applied incorrectly.
76. Probable cause of apparatus not achieving 4-hour duration could be a poor or leaking Facepiece seal.
77. Probable cause of apparatus not achieving 4-hour duration could be a Pressure Reducer Failure.
78. Probable cause of apparatus not achieving 4-hour duration could be a leak in the BioPak 240-S.
79. Probable cause of high breathing resistance during exhalation could be Facepiece exhalation valve sticking closed.
80. Probable cause of high breathing resistance during exhalation could be the diaphragm spring in breathing chamber is not properly seated or damaged.
81. Probable cause of high breathing resistance during exhalation could be the vent valve in the breathing chamber not opening properly.
82. Probable cause of high breathing resistance during inhalation could be Facepiece inhalation check valve sticking closed.
83. Probable cause of high breathing resistance during inhalation could be diaphragm spring in breathing chamber is missing or damaged.
84. Probable cause of high breathing resistance during inhalation could be demand valve in breathing chamber has failed.
85. If the Anti-Anoxia valve in the breathing chamber is not operating properly it could cause high breathing resistance during exhalation or inhalation.
86. Probable cause of breathing gas uncomfortably warm during use could be frozen coolant insert has not been installed into the coolant canister.

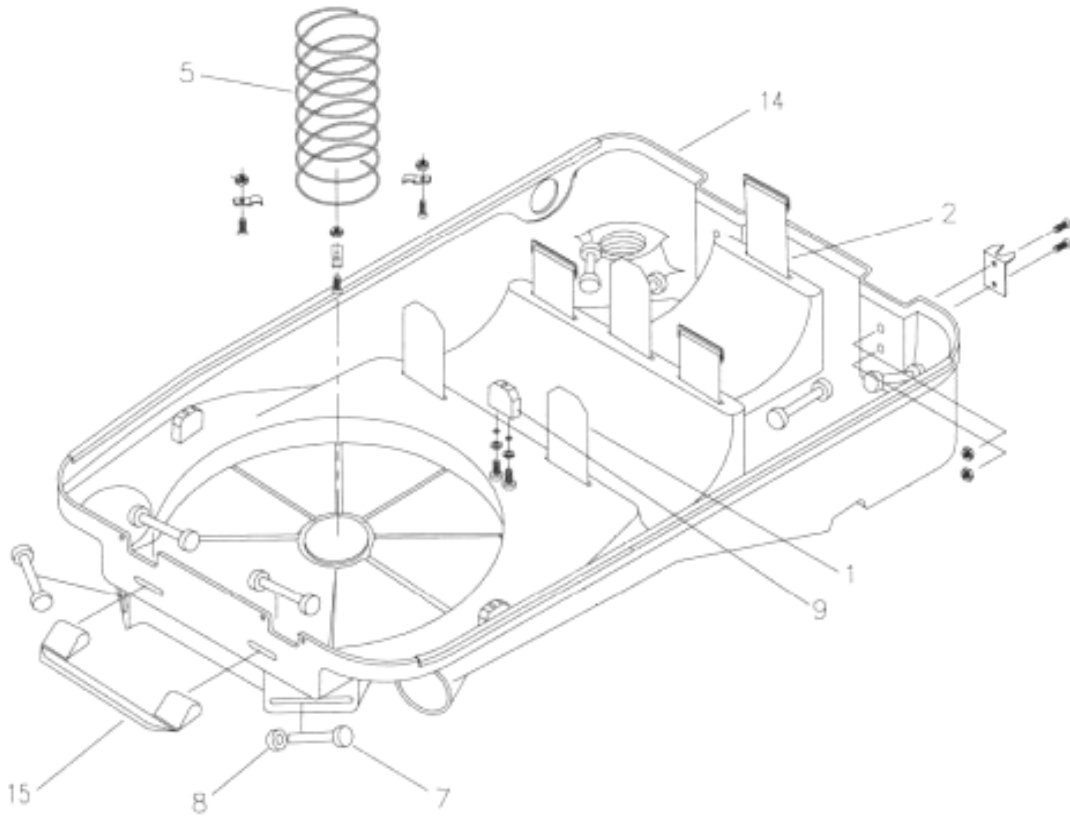
87. Probable cause of Facepiece failing positive and/or negative testing during user donning could be inhalation or exhalation check valve failure in the Facepiece.
88. Probable cause of BioPak 240-S failing leak testing could be component connections loose.
89. Probable cause of BioPak 240-S failing leak testing could be a system leak.
90. Probable cause of BioPak 240-S failing flow test could be the flow restrictor in the breathing chamber has clogged.
91. Probable cause of BioPak 240-S failing flow test could be the demand valve of the breathing chamber has failed.
92. Probable cause of BioPak 240-S failing flow test could be the pressure regulator has failed.
93. Probable cause of sounds of escaping gas heard during use could be poor Facepiece fit.
94. Probable cause of sounds of escaping gas heard during use could be that the sealing washer between the oxygen cylinder and the pressure regulator is missing or damaged.
95. Probable cause of sounds of escaping gas heard during use could be that the BioPak 240-S has a leak in the breathing loop or the high or low pressure plumbing systems.
96. Probable cause of alarm indications of remaining service time not functioning correctly could be the chest mounted pressure gauge has failed or pressure line has been severed.
97. Probable cause of alarm indications of remaining service time not functioning correctly could be that the alarm whistle requires tone adjustment.
98. Probable cause of alarm indications of remaining service time not functioning correctly could be that the alarm whistle has failed.
99. Probable cause of breathing gas uncomfortably warm during use could be that the user is working in high ambient temperatures.
100. Probable cause of apparatus not achieving 4-hour duration could be that the bypass valve is utilized to clear Facepiece lens or used excessively.

Biopak - 240-S



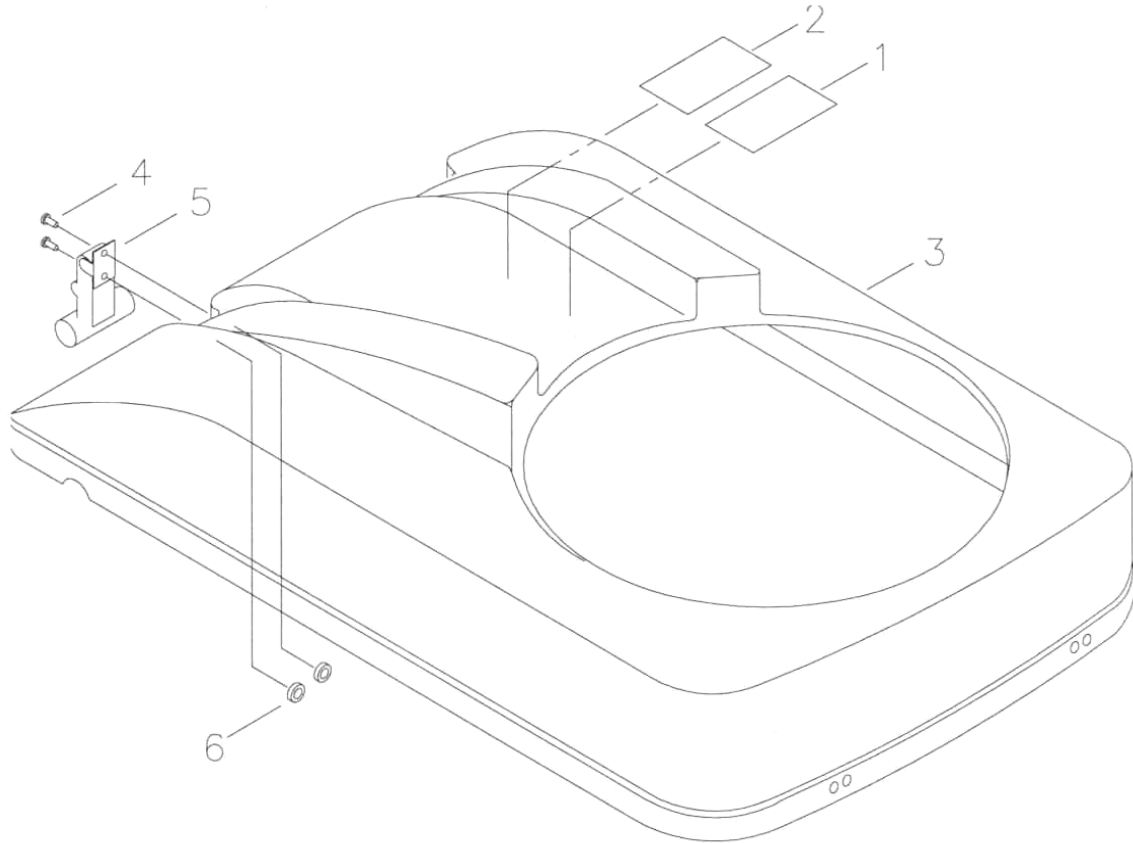
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1	Upper Housing Assembly	9	Toolkit Assembly
2	Lower Housing Assembly	10	Exhalation Breathing Hose Assembly
3	Pneumatics Assembly	11	Inhalation Breathing Hose Assembly
4	Breathing Chamber Assembly	12	Connection Hose Assembly
5	Chest Mounted Pressure Gauge Assembly	16	Breathing Chamber Push Pin
6	Coolant Canister Assembly	20	Breathing Hose Coupler Fitting
7	Oxygen Cylinder Assembly	32	Breathing Chamber Cover
8	Carbon Dioxide Scrubber Assembly		

Lower Housing Assembling



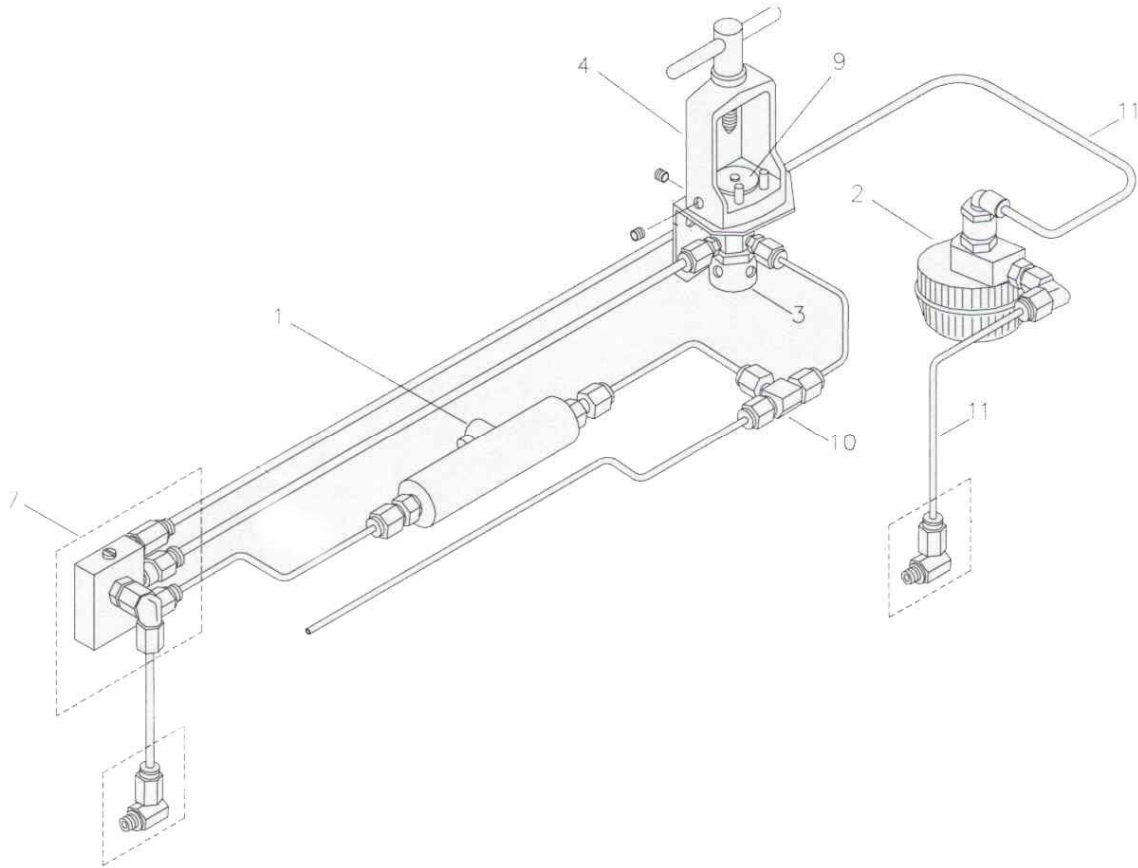
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1	Coolant Canister Hold-down Strap	8	Harness Retainer Pin Cap
2	Oxygen Cylinder Hold-down Strap	9	Breathing Chamber Mounting Block
5	Diaphragm Spring	14	Lower Housing with Hardware
7	Long Harness Retaining Pin	15	Carrying Handle Strap

Upper Housing Assembling



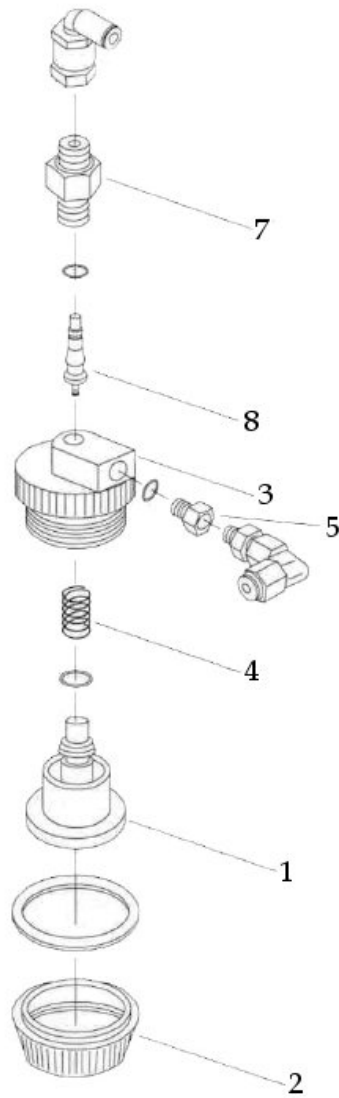
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1	Warning Label	4	Pan Head Screw
2	USA Label	5	Flexible T-Handle Draw Latch
3	Upper Housing with Hardware	6	Hex Nut

Pneumatic Assembly



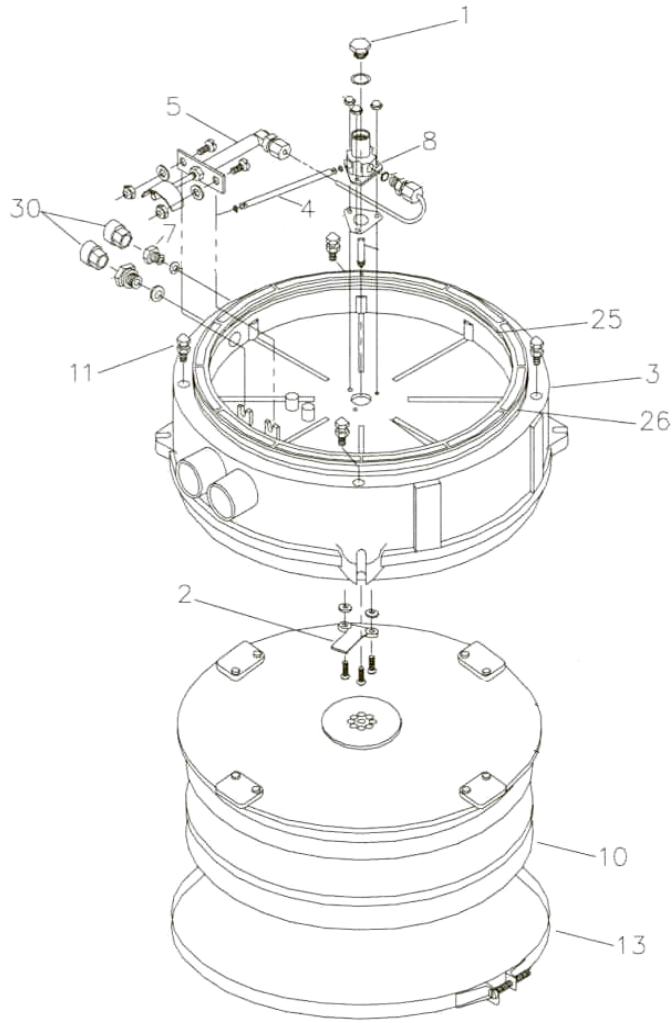
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1	Alarm Whistle Assembly	7	Manifold Block Assembly
2	By-pass Valve Assembly	9	Oxygen Cylinder Sealing Washer
3	Oxygen Cylinder Pressure Reg. w/fittings	10	High Pressure Tube Assembly
4	Oxygen Cylinder Yoke w/ Handle	11	1/8" Nylon Tubing

By-Pass Valve Assembly



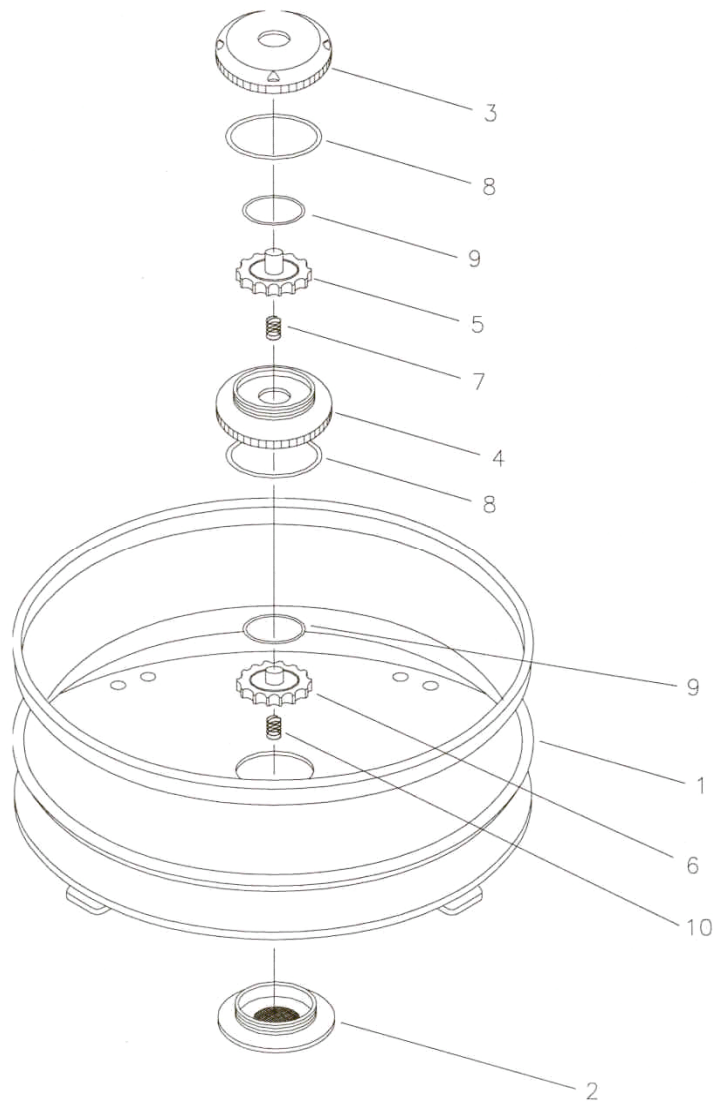
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Cons. No.	Designation	Cons. No.	Designation
1	Push Button	5	Bushing
2	Valve Guard	7	Valve Holder
3	Valve Body	8	Valve Core
4	Valve Spring		

Breathing Chamber Assembly



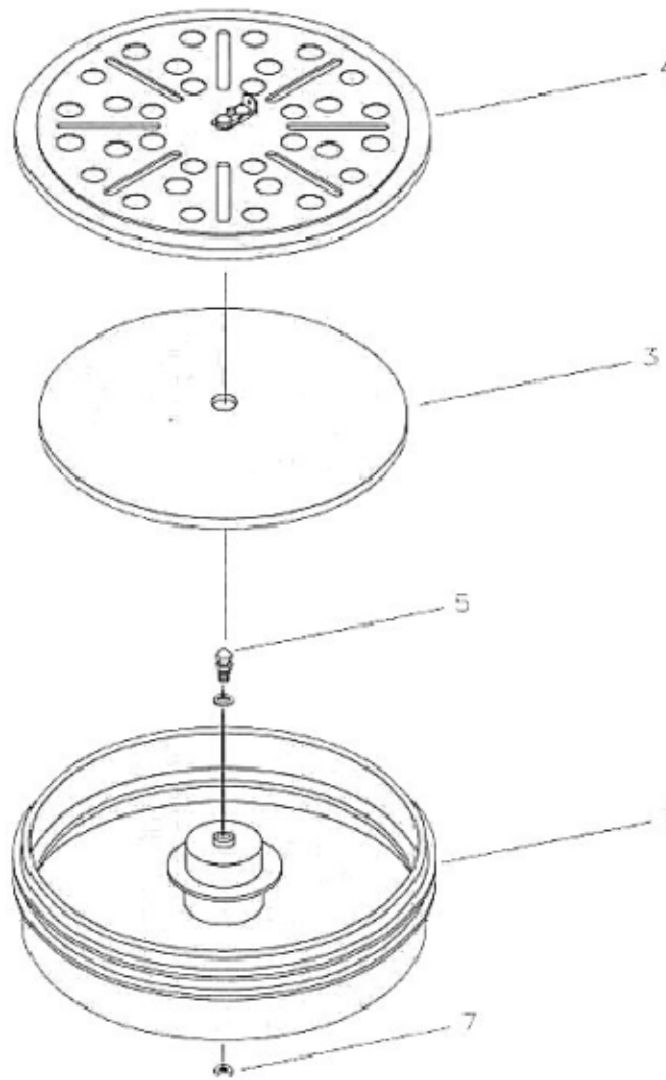
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Constant Flow Restrictor Fitting	10	Diaphragm Assembly
2	Add Valve Lever	11	Latch Stud
3	Center Section Housing	13	Diaphragm Worm Gear Clamp
4	Supply Connector Tube	25	O-Ring Seal
5	Anti-Anoxia Valve Assembly	26	O-Ring Seal
8	Demand Housing	30	Quick Connect Coupler Fitting

Diaphragm Assembly



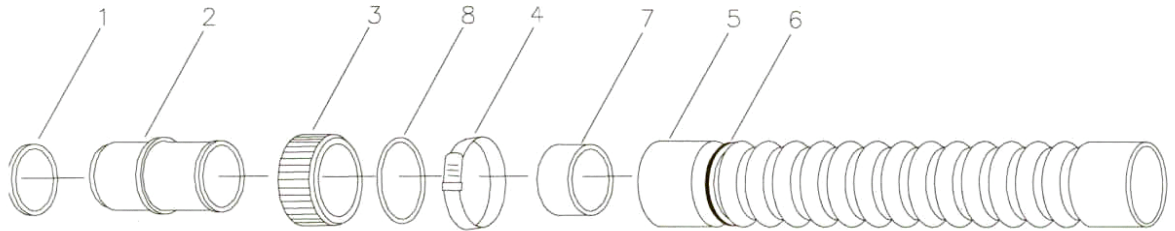
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1	Diaphragm with Hardware	6	Vent Valve Secondary Seat
2	Vent Valve Cap w/ Screen	7	Vent Valve Spring (Silver)
3	Vent Valve Primary Body	8	O-Ring Seal
4	Vent Valve Secondary Body	9	O-Ring Seal
5	Vent Valve Primary Seat	10	Vent Valve Spring (Red)

Carbon Dioxide Scrubber Assembly



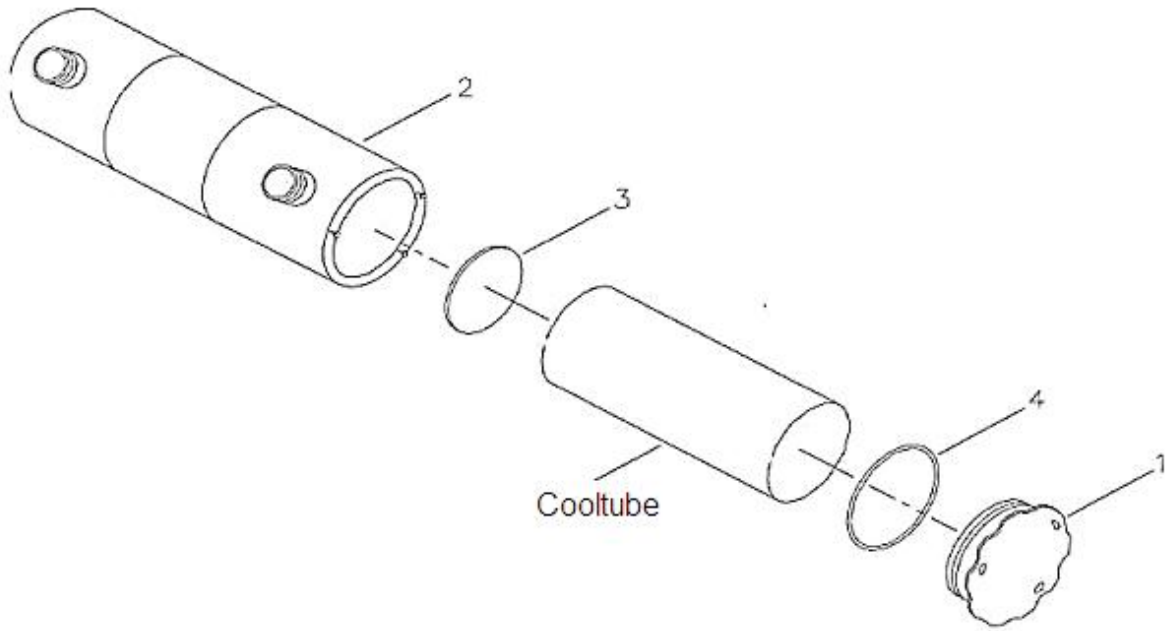
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Scrubber Housing	5	Latch Stud
3	Foam Pad	7	Hex Nut
4	Cover		

Hose Assembly



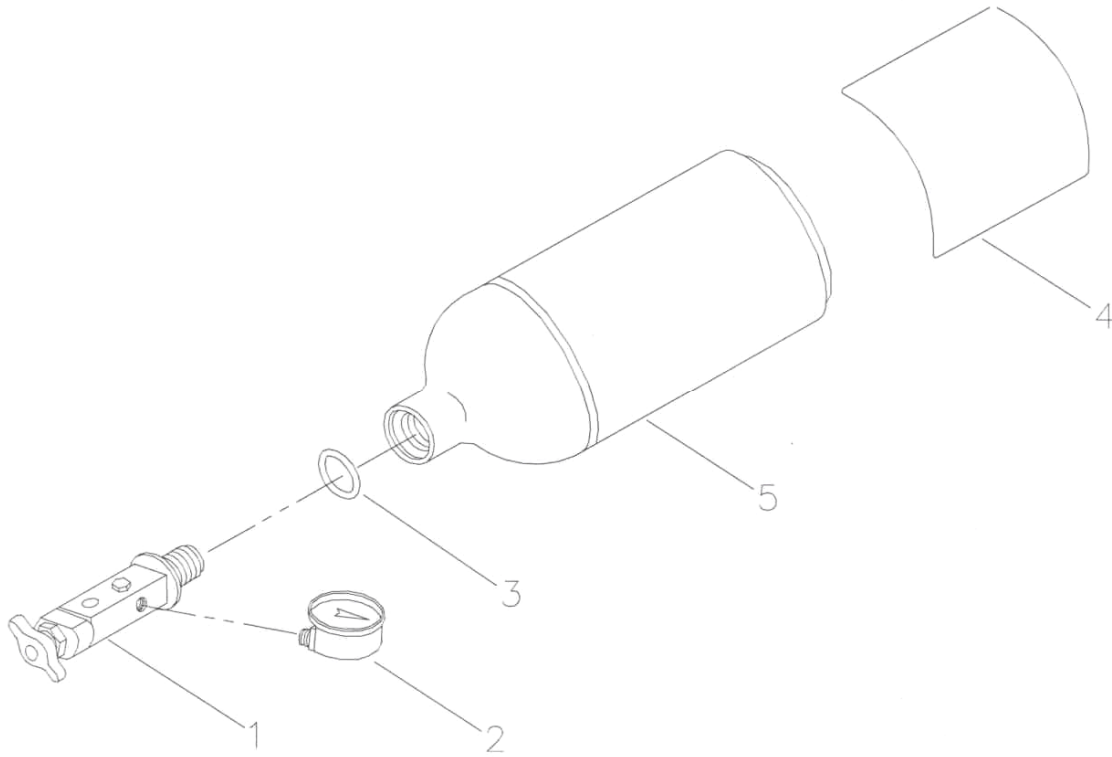
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Hose Connector Gasket	5	Breathing Hose
2	Hose Connector Body	6	Nylon Cable Tie
3	Hose Connector Nut	7	Hose Connection Cuff
4	Hose Clamp	8	Inhalation Hose ID Label

Coolant Canister Assembly



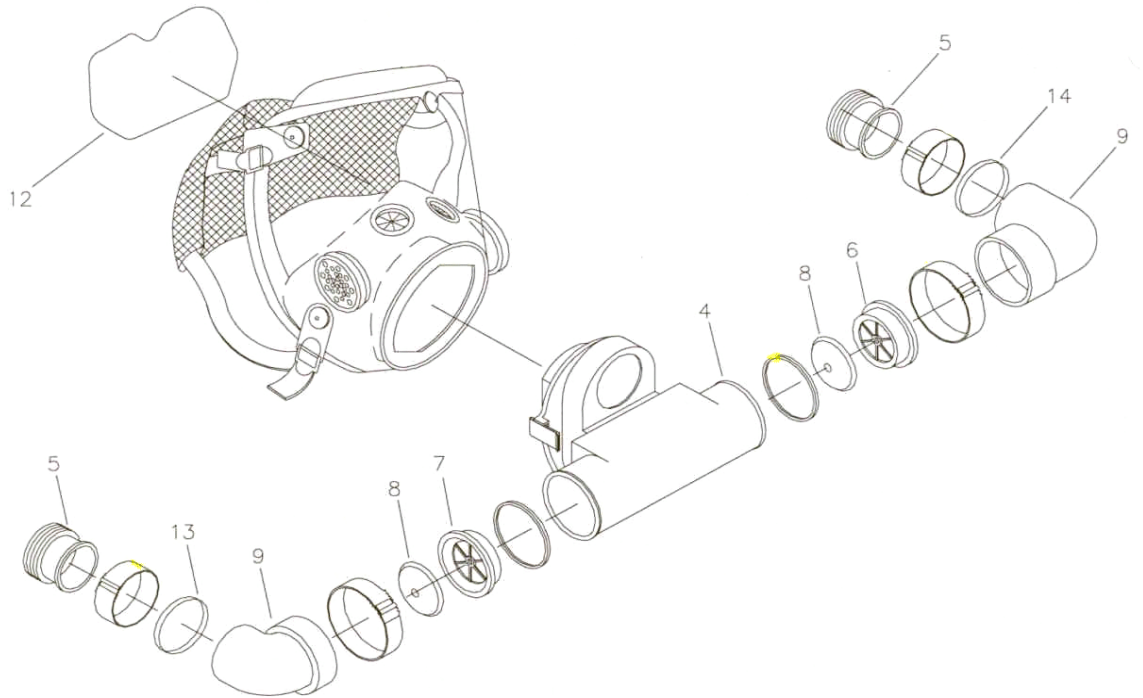
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1	Canister End Cap	3	Foam Moisture Absorbent Pad
2	Canister Body	4	O-Ring Seal

Oxygen Cylinder Assembly



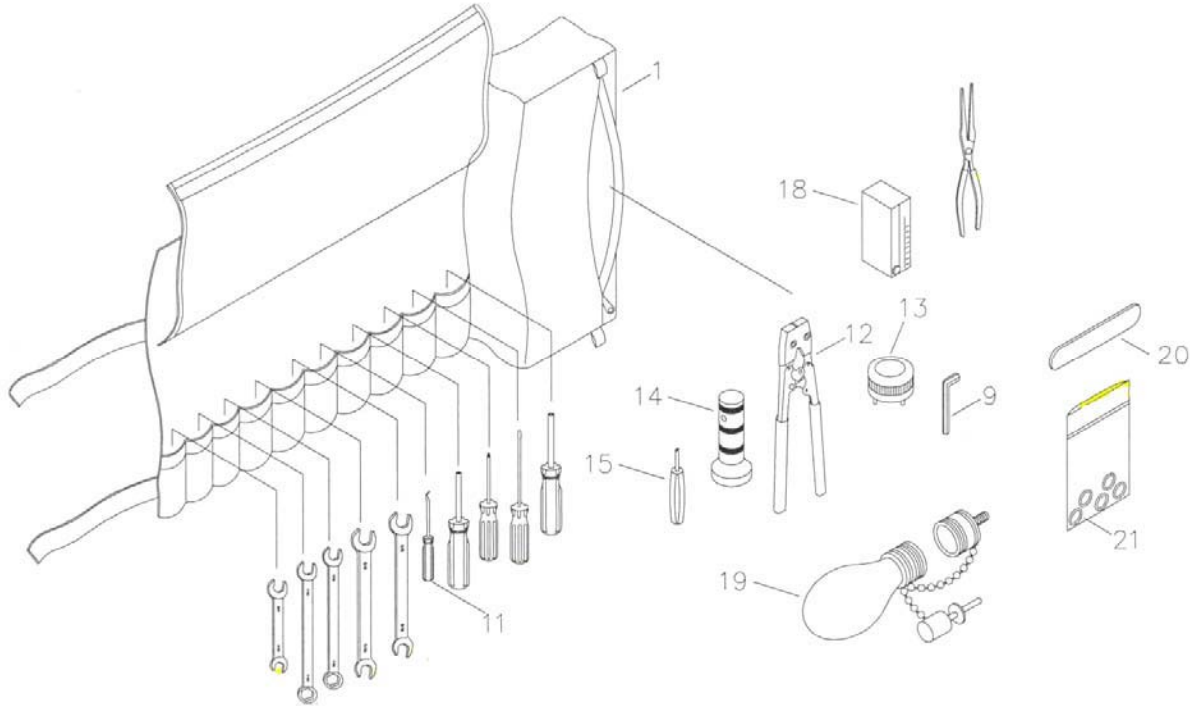
1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Oxygen Cylinder Valve	4	Identification Label
2	Pressure Gauge	5	Composite Pressure Cylinder
3	O-Ring Seal		

Face Piece Assembly



1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
4	Adapter Assembly	9	Elbow Connector
5	Hose Adapter Fitting	12	Anti-fog Lense Insert
6	Inhalation Check Valve Holder	13	Nylon Red Cable Tie
7	Exhalation Check Valve Holder	14	Nylon Green Cable Tie
8	Check Valve		

Tool Kit Assembly



1 Cons. No.	2 Designation	1 Cons. No.	2 Designation
1	Tool Kit Pouch	15	Valve Core Tool
9	1/16" Allen Key Wrench	18	Flow Test Flowmeter
11	Combination Pick Tool	19	Balloon Leak Test Fixture/Test
12	Hose Clamp Ratchet Pincher Tool	20	Key
13	Vent Valve Wrench	21	6" Tongue Depressor
14	Bypass Valve Wrench		Small Finger Cot