

**PANTHER™/COUGAR™/PUMA™**  
**SELF-CONTAINED BREATHING APPARATUS (SCBA)**  
**30 MINUTE LP SERIES**  
**30/45/60 MINUTE HP SERIES**  
**OPERATION MANUAL**



**WARNING**

***DO NOT USE this SCBA until you completely read and understand this instruction manual. You are required to inspect your SCBA prior to putting it into field service. Please refer to the inspection procedures in this manual. DO NOT USE this SCBA unless you are properly trained and this SCBA has been properly maintained. Failure to comply with this Warning may lead to personal injury, illness, or death.***

## WARRANTY AND LIMITATION OF LIABILITY

**LIMITED WARRANTY:** SPERIAN warrants this product to be free from defects in materials and workmanship for 12 years from the date of purchase, with the exception of the Puma hood, which is warranted for 2 years; the compressed air cylinder, which is warranted for 15 years; and the first stage regulator, which is warranted for the life of the product. If the SCBA is equipped with a Heads-Up Display, the HUD electronics are warranted for 2 years. During these periods, SPERIAN will repair or replace defective parts, at SPERIAN's option.

Freight charges to and from the SPERIAN factory shall be paid by the purchaser.

**EXCLUSIONS:** NOTWITHSTANDING ANY CONTRARY TERM IN THE PURCHASER'S PURCHASE ORDER OR OTHERWISE, THE ONLY WARRANTY EXTENDED BY SPERIAN IS THE EXPRESSED LIMITED WARRANTY DEFINED ABOVE. THIS WARRANTY IS EXCLUSIVE AND IN LIEU OF ANY IMPLIED WARRANTY OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.

**CONDITIONS:** To maintain this warranty, this product must be used, maintained, and inspected as prescribed in the owner's instruction manual, including prompt replacement or repair of defective parts, mandatory flow tests and overhauls, and such other necessary maintenance and repair as may be required. Normal wear and tear; parts damaged by abuse, misuse, negligence, or accidents; batteries; and installed accessories which have separate warranties are specifically excluded from this warranty.

**LIMITATION OF LIABILITY:** No other oral warranties, representations, or guarantees of any kind have been made by SPERIAN, its distributors, or the agents of either of them, that in any way alter the terms of this warranty. **EXCEPT AS HEREIN PROVIDED, SPERIAN SHALL HAVE NO LIABILITY FOR ANY LOSS OR DAMAGE, WHETHER DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL, TO ANY PURCHASER OR USER OF THIS PRODUCT ARISING FROM THE SALE, USE, OR OPERATION OF THIS PRODUCT.**



### **WARNING**

*The failure to use and maintain this equipment in strict conformance with the applicable instruction manual may result in personal injury, illness, or death. The equipment's use in any manner that is not expressly authorized pursuant to the applicable instruction manual may result in severe adverse impacts to human health.*

# Panther/Cougar/Puma SCBA Operation Manual

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## I. INTRODUCTION

This manual provides operating instructions as well as cleaning, maintenance, and storage procedures for the SPERIAN Panther™/Cougar™/Puma™ high and low pressure SCBA. You must read and understand these instructions and be properly trained before using the SCBA in a hazardous atmosphere.

### NOTE

All SPERIAN-certified technicians are required to remain current on new procedures and parts through SPERIAN's published

Technical Bulletins, technical manual revisions, and certification seminars.

## II. SAFETY PRECAUTIONS

<b>▲ WARNING</b>
<b><i>Maintenance or operating procedures and techniques that may result in personal injury, illness, or death if not carefully followed.</i></b>

<b>CAUTION</b>
<b><i>Maintenance or operating procedures and techniques that may result in damage to equipment if not carefully followed.</i></b>

The Warnings, Cautions, and Notes contained in this manual have the following significance:

### NOTE

Maintenance or operating procedures and techniques or information considered important enough to emphasize.

<b>▲ WARNING</b>
<ul style="list-style-type: none"> <li>• <b><i>The user is responsible for establishing that this equipment is suitable for the user's application.</i></b></li> <li>• <b><i>For respiratory protection, this SCBA must be worn and used as specified in SPERIAN's instructions. No protective equipment can provide complete protection from all conditions. Use extreme care for all emergency operations. DO NOT USE THE COUGAR OR PUMA SCBA FOR INTERIOR STRUCTURAL FIRE FIGHTING OR IN OTHER APPLICATIONS INVOLVING EXPOSURE TO HIGH HEAT OR DIRECT FLAME. Do not use the Panther SCBA alone for any fire fighting or hazardous materials operations; additional protective clothing and equipment are required for protection. This SCBA may cease to provide protection if used during excessive heat or flashover conditions harsher than those in which it has been tested. This SCBA must be utilized under suitable thermal protective garments during exposure to excessive heat or flashovers. Users must clean and maintain this SCBA only in accordance with SPERIAN's instructions. Accessories or replacement components not certified for use with this SCBA may degrade performance or make this SCBA unsafe, or void NIOSH certification, and must not be used without SPERIAN's written</i></b></li> </ul>

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### **▲ WARNING—Continued**

consent. The user must read, understand, and follow the accessory installation and operation instructions before using this SCBA in a hazardous environment. Only SPERIAN components shall be used with this SCBA. Failure to comply shall void the warranty and NIOSH approval.

- Your SPERIAN respirator has been constructed of materials selected after careful consideration for their performance, safety, and durability. However, all materials have exposure limitations to flame, extremes of heat and cold, or to the many chemicals in use today. No materials exist that can be used safely in all of these environments.
- Our engineers cannot predict what will happen to this equipment in every potential environment. Materials can be chemically attacked if exposed to the wrong environment and may exhibit excessive corrosion or other forms of damage. Permeation of gases and liquids through the materials could be excessive. Flame or extremes of temperature might cause thermal degradation. Each of these things, or a combination of them, could create conditions in which this SPERIAN equipment would be dangerous to use.
- This respirator will reduce, but will not eliminate the inhalation of contaminants. Before allowing anyone to enter a hazardous environment while wearing SPERIAN equipment, you must conduct safe, scientific tests to determine if the environment could render the equipment unsafe. Results of this testing should be well documented. Seek the help of a certified safety professional or industrial hygienist. **DO NOT USE** this equipment if the user would be endangered in any way through environmentally induced degradation of the materials in the apparatus.
- All persons using this SPERIAN breathing apparatus must be made aware of its limitations. We cannot be responsible for any damage to property, personal injury, or death in which environmental exposure is a contributing factor.
- This respirator does not protect exposed areas of the body. Some contaminants can be absorbed directly through the skin while others may irritate exposed areas.

### **▲ WARNING—Continued**

- Visual indications of material degradation may be identified by charring, blistering, cracking, crazing, pitting, chalking, rust, and significant color changes, all of which can result in a weakened structure, prohibiting extended useful service life.
- Do not wear this respirator if a satisfactory fit, as determined by a qualitative or quantitative fit test, cannot be obtained. See ANSI Z88.2 latest edition and OSHA Respirator Standard (29 CFR 1910.134).
- Beards and sideburns will prevent a good facepiece seal. Do not use this respirator unless you are clean shaven.
- This respirator must be used in conjunction with a written respirator program meeting the requirements of the OSHA Standard for Respiratory Protection, 29 CFR 1910.134, available from the U.S. Department of Labor, Occupational Safety and Health Administration. The program must include, but not be limited to procedures for evaluating air contaminants and selecting appropriate respirators, procedures for testing the facepiece-to-face fit of respirators, procedures for cleaning, disinfecting, inspecting, maintaining, and storing respirators, procedures for determining if workers are physically and medically capable of wearing respirators, and procedures for training employees in the use of respirators and in recognizing the hazards associated with contaminants in the workplace.
- Do not use this respirator underwater or for abrasive blasting.
- Before use in welding operations, the SCBA must be equipped with a black facepiece, a welding shield, and upper and lower bibs.
- This SCBA is designed for storage in temperatures from -30°F to +160°F.
- SPERIAN respirators, accessories, and associated equipment should not be used in atmospheres which may contain contaminant concentrations above the lower explosive level (LEL). Intrinsic safety certification of electronic components does not eliminate potential danger from ignition in these atmospheres.

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### **▲ WARNING—Continued**

- *The pressure within the SPERIAN facepiece remains positive under most working conditions, but as with all SCBAs, negative pressure excursions are possible. Conditions when an SCBA can experience negative facepiece pressures include, but are not limited to: 1) the SCBA is improperly worn, 2) the SCBA is not used in accordance with the instructions, 3) the SCBA is improperly maintained, or 4) the SCBA is over-breathed during heavy work rates. The SCBA will provide reduced protection when operated in a negative pressure mode.*
- *Some sensitive individuals may experience health problems when exposed to even minute amounts of contaminants. This SCBA will not prevent health problems for those individuals.*
- *Persons sensitized can have a severe reaction to chemicals at levels well below accepted health levels such as the OSHA Permissible Exposure Limit (PEL), ACGIH® Threshold Limit Value (TLV®), or NIOSH Recommended Exposure Limits (REL). Do not use this SCBA if you have been sensitized from previous exposure or believe that you may be sensitive or allergic to any chemical (e.g., isocyanates, latex, etc.).*
- *Do not alter or modify this SCBA in any manner. Modifying this SCBA will void NIOSH certification and may create a condition in which the SCBA would not provide the intended protection.*
- *Some individuals are sensitive to chemicals (e.g., isocyanates, latex, oil mists, etc.) or may have some type of respiratory disorder (e.g., asthma, chronic obstructive airway disease, etc.). If you are sensitive to any chemical or have a respiratory disorder, you may have a severe reaction at contaminant levels well below accepted health levels, such as the OSHA Permissible Exposure Limit (PEL), ACGIH® Threshold Limit Value (TLV®), or the NIOSH Recommended Exposure Limits (REL). Many chemicals (e.g., isocyanates, mercury, etc.) have no physical warning properties and you cannot taste or smell the contaminants even though they may be present in the facepiece. This SCBA will reduce, but will not eliminate, the possibility of contaminants entering the facepiece and causing a severe reaction. Do not use this respirator under these conditions.*

### **▲ WARNING—Continued**

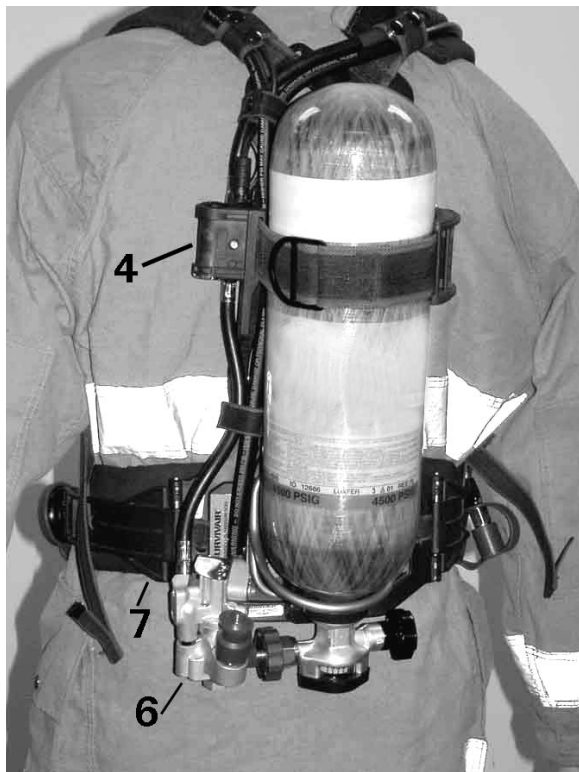
- *Discontinue use if you experience skin irritation or discoloration.*
- *You must read, understand, and follow all warnings, instructions, labels, Material Safety Data Sheets (MSDS), etc., for the materials you are using (e.g., paints, hardeners, insecticides, varnishes, etc.). You must also read, understand, and follow all warnings, instructions, etc., listed in the MSDS for any contaminants that may be or are present in the work area.*
- *An impact to the second stage regulator when the cylinder valve is open may inadvertently activate the First-Breath-On mechanism, causing air to flow from the regulator and diminishing the air in the cylinder.*
- *ONLY grasp the cylinder valve handwheel to open or close the valve; DO NOT pick up or carry a cylinder by the handwheel, drop a cylinder on the handwheel, or bump the handwheel, as this may cause the cylinder valve to inadvertently open, which may lead to the cylinder becoming airborne under the thrust of air released from the valve, causing injury or death. ALWAYS pick up and carry an air cylinder by the cylinder body.*
- *DO NOT over-torque the air cylinder valves. ALWAYS verify that the hydrostatic test facility performing your cylinder testing DOES NOT over-torque the cylinder valves when they reinstall them. SPERIAN SCBA air cylinder valves must be tightened with a torque wrench to a torque value of 70 ft-lb. The torque wrench must have a range of no more than 0 to 175 ft-lb and an accuracy of at least  $\pm 4$  ft-lb (a variation of no more than 6%).*
- *FAILURE TO COMPLY WITH THESE WARNINGS MAY LEAD TO PERSONAL INJURY, ILLNESS, OR DEATH.*

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**Puma Hood**

**TwentyTwenty Plus Facepiece Kit**



**Figure 1. Panther/Cougar SCBA**

## III. PARTS LIST (See Figure 1)

ITEM	P/N	DESCRIPTION
		Facepiece
		Size
		Color
		Nose Cup
1	252021	TwentyTwenty Plus Medium Blue Large
	252023	TwentyTwenty Plus Medium Black Large
	252010	TwentyTwenty Plus Small Blue Medium
	252011	TwentyTwenty Plus Small Blue Large
	252012	TwentyTwenty Plus Small Black Medium
	252013	TwentyTwenty Plus Small Black Large
	252020	TwentyTwenty Plus Medium Blue Medium
	252022*	TwentyTwenty Plus Medium Black Medium
	252030	TwentyTwenty Plus Large D. Gray Medium
	252031	TwentyTwenty Plus Large D. Gray Large
	252032	TwentyTwenty Plus Large Black Medium
	252033	TwentyTwenty Plus Large Black Large
	252038	TwentyTwenty Plus Small Blue Small
	252053	TwentyTwenty Plus Small Black Small
	252040	TwentyTwenty Plus Medium Blue Small
	252041	TwentyTwenty Plus Medium Black Small
	252042	TwentyTwenty Plus Large D. Gray Small
	252043	TwentyTwenty Plus Large Black Small
	968005	Hood-style (Puma) Standard Orange Small
	968006*	Hood-style (Puma) Standard Orange Medium
	968007	Hood-style (Puma) Standard Orange Large
2	961709	Cougar/Puma Second Stage Regulator, Standard
	961793	Cougar/Puma Second Stage Regulator, Buddy Breather
	968801*	Panther Second Stage Regulator, HUD
3	968802*	Intermediate Pressure Line, HUD
	961494	Buddy Breather Hose Assembly, Cougar/Puma
	965110	Over-the-Shoulder Buddy Breather Kit
4	968880	Heads-Up Display (HUD), 2216 psig
	968877	Heads-Up Display (HUD), 3000 psig
	968888*	Heads-Up Display (HUD), 4500 psig
5	980642	Gauge, L.P. (2216 psig) (Not Shown)
	980643	Gauge, L.P. (3000 psig) (Not Shown)
	980641	Gauge, H.P. (4500 psig) (Not Shown)
	968818	Accessory Gauge Hose, HUD (Not Shown)
ITEM	P/N	DESCRIPTION
6	961366	Cougar/Puma First Stage, Whistle, 2216 psig
	961372	Cougar/Puma First Stage, Warbling Whistle, 2216 psig
	961371	Cougar/Puma First Stage, Panther Bell, 2216 psig
	961359	Cougar/Puma First Stage, Whistle, 3000 psig
	961364	Cougar/Puma First Stage, Warbling Whistle, 3000 psig
	961363	Cougar/Puma First Stage, Panther Bell, 3000 psig
	961356	Cougar/Puma First Stage, Whistle, 4500 psig
	961358	Cougar/Puma First Stage, Warbling Whistle, 4500 psig
	961357	Cougar/Puma First Stage, Panther Bell, 4500 psig
	910099	Cougar/Puma First Stage, MARK 2 Bell, 2216 psig
	910071	Cougar/Puma First Stage, MARK 2 Bell, 3000 psig
	910001	Cougar/Puma First Stage, MARK 2 Bell, 4500 psig
	968830	Panther First Stage, Whistle, 4500 psig
	968831	Panther First Stage, Panther Bell, 4500 psig
	968832*	Panther First Stage, Warbling Whistle, 4500 psig
	968836	Panther First Stage, Whistle, 2216 psig
	968837	Panther First Stage, Panther Bell, 2216 psig
	968838	Panther First Stage, Warbling Whistle, 2216 psig
	968821	First Stage, Mark 2, 4500 psig
	968822	First Stage, Mark 2, 2216 psig
7	965801	Cougar/Puma Backpack
	965800*	Panther Backpack

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ITEM	P/N	DESCRIPTION
CYLINDER/VALVE ASSEMBLY		
		Pressure (psig)      Duration (minutes)      Wrap      Material
916103		2216      30      Hoop      Glass
915140		2216      30      none      Aluminum
915170		2216      30      Full      Glass
915165		4500      30      Hoop      Glass
916173		4500      30      Full      Glass
916140		4500      45      Full      Glass
915182		4500      60      Full      Glass
916123		3000      30      Full      Carbon
917130		2216      30      Full      Carbon
917131		4500      30      Full      Carbon
917145		4500      45      Full      Carbon
917160		4500      60      Full      Carbon
TwentyTwenty Plus Facepiece Accessories		
962869		Neck Strap Kit
962900		Kit, APR Adapter
962260		Spectacles Kit
962266		Large Nose Cup Kit
962265		Medium Nose Cup Kit
962264		Small Nose Cup Kit
960038		Headnet™ Kit
964171		Radio Communication System
964172		SmallTalk® Plus Voice Amplification System
964173		Radio Communication/SmallTalk Plus Voice Amplification System
964165		Remote Push-to-Talk Kit
General Accessories		
940118		Protective Mask Bag
140096		Mask Wipes (100 ea.)
951015		Anti-fog Solution (1 oz.)
951016		Anti-fog Solution (16 oz.)
981806		Anti-fog Wipe
980200		Suit Pass-through Kit
946935		Cylinder Sleeve for LP Hoop-wrapped Cylinder
946937		Cylinder Sleeve for HP Hoop-wrapped Cylinder
941256		Cylinder Sleeve for LP Carbon Cylinder
941257		Cylinder Sleeve for 3000 psig Carbon Cylinder
941258		Cylinder Sleeve for HP 30 Minute Carbon Cylinder
941259		Cylinder Sleeve for HP 45 Minute Carbon Cylinder
941261		Cylinder Sleeve for HP 60 Minute Carbon Cylinder
968670		Chest Strap Kit
964867		Utility D-ring
930801/02/04/61/62/64/70		Air Supply Hoses, 3/8 inch
930810		Foster Coupler Kit
930820		Schrader Coupler Kit
930830		Hansen Coupler Kit
945007		Hansen Coupler Kit, Stainless Steel
961438		SuperCharge Fill Hose, Handwheel and Nipple, 2216 psig, 4 foot
961546		SuperCharge Fill Hose, Handwheel and Nipple, 2216 psig, 10 foot
961549		SuperCharge Fill Hose, Handwheel and Nipple, 2216 psig, 20 foot
961439		SuperCharge Fill Hose, Handwheel and Nipple, 3000 psig, 4 foot
961547		SuperCharge Fill Hose, Handwheel and Nipple, 3000 psig, 10 foot
961562		SuperCharge Fill Hose, Handwheel and Nipple, 3000 psig, 20 foot
961441		SuperCharge Fill Hose, Handwheel and Nipple, 4500 psig, 4 foot
961548		SuperCharge Fill Hose, Handwheel and Nipple, 4500 psig, 10 foot
961563		SuperCharge Fill Hose, Handwheel and Nipple, 4500 psig, 20 foot
965110		Over-the-Shoulder Buddy Breather Kit
965119		Over-the-Shoulder Buddy Breather Kit with Check Valve (for use with P/N 965122 Kit)
965122		Air Line Adapter Kit

ITEM	P/N	DESCRIPTION
	962600	COMPASS Integrated PASS Device
	963820	COMPASS Buddy Breather Kit
	963850	COMPASS SAR Attachment Kit
	963702	COMPASS and Buddy Breather Kit
	963703	COMPASS and Buddy Breather with SAR Attachment Kit
	962700	DoublePASS Remote Alarm Module
ITEM	P/N	DESCRIPTION
Fit Testing Accessories, Qualitative (Cougar and Puma)		
	193140	IAA/Banana Oil Fit Test Kit
	100100	Organic Vapor Cartridge, Box of 6 (For Use with P/N 193140 Fit Test Kit)
	193138	Replacement IAA Solution, 1 oz.
Fit Testing Accessories, Quantitative (Cougar Only)		
	962920	Fit Test Kit, SCBA/APR Adapter (Requires the P/N 962900 Kit, APR Adapter)
	962925	Fit Test Kit, Refill
	105005	P100 Filters, Box of 10
	962848	Probed Lens, TwentyTwenty Plus Facepiece

\* Shown in Figure 1

### IV. DESCRIPTION

The Panther/Cougar/Puma SCBA provides the wearer with respiratory protection in hazardous environments, and may be used for entrance into and escape from atmospheres that are immediately dangerous to life or health (IDLH). The Panther is an NFPA-compliant SCBA and may be used for fire fighting. The Cougar and Puma are industrial SCBAs and must not be used in the presence of high heat or open flames.

#### NOTE

- The Panther SCBA meets all requirements of the NFPA 1981 Standard, 2002 Edition, Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services.
- See NFPA 1500, Standard on Fire Department Occupational Safety and Health Program for proper use of SCBAs in the work environment.

### A. Backpack and Cylinder

1. The backpack consists of a lightweight contoured polymer frame with a built-in carrying handle. The cylinder is attached by a lightweight webbing-style band. The Panther harness is made of Kevlar/Nomex straps. The Cougar/Puma harness is made of nylon straps. The chest-mounted pressure gauge is mounted on the right shoulder strap, and the intermediate pressure hose is routed over the left shoulder. The gauge indicates the cylinder pressure once the cylinder valve has been opened. The chest-mounted pressure gauge is optional for the Panther SCBA. It is included with the Cougar and Puma SCBAs, but is optional for the Cougar if a Heads-Up Display is installed.
2. The air cylinder is a composite construction with an aluminum inner liner overwrapped by a non-metallic fiber, and has a maximum working pressure of 2216 or 3000 psig (low pressure) in 30-minute duration, or 4500 psig (high pressure) in 30-, 45-,

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and 60-minute durations. An all-aluminum cylinder is available with a maximum working pressure of 2216 psig only.

### **▲ WARNING**

- *The backpack must never be used as a rescue device attachment point.*
- *ONLY grasp the cylinder valve handwheel to open or close the valve; DO NOT pick up or carry a cylinder by the handwheel, drop a cylinder on the handwheel, or bump the handwheel, as this may cause the cylinder valve to inadvertently open, which may lead to the cylinder becoming airborne under the thrust of air released from the valve, causing injury or death. ALWAYS pick up and carry an air cylinder by the cylinder body.*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

### B. First Stage Regulator

The first stage regulator contains a pressure reducer, audible alarm, and intermediate pressure hose.

#### 3. Panther-style First Stage with Alarm

- a. The first stage lowers cylinder air pressure to approximately 100 psig. The relief valve activates to protect the system when the regulated pressure exceeds 200 to 225 psig.
- b. The Panther-style first stage regulator is equipped with either a whistle, warbling whistle, or bell audible alarm. The low pressure SCBA audible alarm activates at 510 to 598 psig (2216 psig system) or 690 to 810 psig (3000 psig system); the high pressure SCBA audible alarm activates at 1035 to 1215 psig (4500 psig system). The audible alarm will continue to sound until air pressure drops below 200 psig.

#### 4. MARK 2-style Bell Alarm

- a. The first stage regulator lowers cylinder air pressure to an intermediate pressure of approximately 120 psig. An automatic backup system maintains a safe flow of air in case of a malfunction.
- b. The audible alarm operates in two modes, ringing at a slow rate when the quantity of air in the cylinder has dropped to approximately 25% of capacity, and ringing rapidly when a failure occurs in the first stage system. The low pressure SCBA bell alarm rings at 510 to 598 psig (2216 psig system) or 690 to 810 psig (3000 psig system); the high pressure SCBA bell alarm rings at 1035 to 1215 psig (4500 psig system); the bell alarm will continue ringing until air pressure drops below 200 psig.

### C. Gauge/Heads-Up Display (HUD)

#### **▲ WARNING**

- *The Heads-Up Display (HUD) may only be used with the 2520XX series TwentyTwenty Plus facepiece.*
- *If the low battery alert activates (amber LED on the backpack-mounted transducer module flashes every two seconds) during storage, or if the amber LED on the backpack-mounted transducer module does not flash at all during storage, the battery must be replaced before using the SCBA.*
- *Activation of the visual alarm (flashing red LED) portion of the HUD may or may not coincide with the audible alarm (i.e., bell, whistle, etc.) on the SCBA. As soon as the first alarm activates, PROCEED IMMEDIATELY TO A SAFE AREA.*
- *You must have binocular vision (vision from both eyes) to see and interpret the display correctly. Your visual acuity while wearing the facepiece must meet the requirements set forth by the authority having jurisdiction over your operation and/or work place.*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

#### NOTE

- The Panther SCBA comes equipped with the Heads-Up Display (HUD).
- The HUD is optional on the Cougar SCBA, but may only be used with the 2520XX series TwentyTwenty Plus facepiece.
- The Puma SCBA cannot be equipped with a HUD.

The HUD is mounted on the second stage regulator. When the second stage regulator is installed in the Panther TwentyTwenty Plus facepiece, the display can be seen through openings in the facepiece nozzle cover. When the cylinder valve is opened, the HUD will activate automatically, and will indicate the air pressure remaining in the cylinder. The display consists of four green LEDs, representing Full,  $\frac{3}{4}$ ,  $\frac{1}{2}$ , and  $\frac{1}{4}$ . At full cylinder pressure, all four LEDs are lit. As the air pressure in the cylinder decreases, the LEDs turn off one at a time, thereby indicating the air pressure status. When the pressure drops below 50% of cylinder capacity, the LED representing  $\frac{1}{2}$  cylinder capacity starts to flash, and continues to flash for a short time (approximately 20 seconds) before returning to continuously lit. When the pressure drops to  $\frac{1}{4}$  (25%) of cylinder capacity, the last green LED turns red and begins to flash, thereby giving the user a visual alarm of low air pressure in ad-



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dition to the audible alarm located on the first stage regulator. On a 2216 psig SCBA, the ¼ LED will turn red and begin to flash between 510 and 598 psig; on a 3000 psig SCBA, the ¼ LED will turn red and begin to flash between 690 and 810 psig; on a 4500 psig SCBA, the ¼ LED will turn red and begin to flash between 1035 and 1215 psig. When the pressure drops to 10% of cylinder capacity, the red LED begins to flash noticeably faster and continues flashing in this manner until air pressure drops below approximately 200 psig, at which time the display will turn off. No lighted LEDs represents zero air pressure.

An external red LED, mounted on the front of the HUD module, warns others of the user's low air status by flashing at the same time the ¼ LED is flashing inside the HUD module. The external red LED flashes noticeably faster when the pressure drops to 10% of cylinder capacity.

A photodiode is mounted externally on the top of the HUD module. It senses ambient light conditions and adjusts the intensity of the green HUD LEDs to match these conditions. If the ambient light is bright, the LEDs are in bright mode. In no-light or low-light conditions, the LEDs are in dim mode so that they are not distracting to the user.

The transducer module on the backpack has a red LED that acts as a battery status indicator. When the SCBA is in storage (the cylinder valve is not opened), the amber LED will flash once every 10 seconds to indicate a usable battery condition. The amber LED flashes every two seconds to indicate a low battery condition, and it will cease flashing altogether to indicate a dead battery.

<b>▲ WARNING</b>
<ul style="list-style-type: none"><li>• <b>A Duracell Ultra 123 or Eveready Energizer EL 123A PBP must be used in the HUD transducer module in order to maintain the intrinsic safety certification of this product.</b></li><li>• <b>Failure to comply with this Warning may lead to personal injury, illness, or death.</b></li></ul>

To replace the battery, remove the slotted battery cap located on the top of the transducer module (located on the side of the cylinder band) using a coin or a large, flat-blade screwdriver. Remove the old battery, install a new battery in the orientation shown on the side of the case, and replace the battery cap.

<b>▲ WARNING</b>
<ul style="list-style-type: none"><li>• <b>If the low battery alert activates (amber LED on the backpack-mounted transducer module flashes every two seconds) during storage, or if the amber LED on the backpack-mounted transducer module does not flash at all during storage, the battery must be replaced before using the SCBA.</b></li><li>• <b>If the low battery alert in the HUD activates during actual use (amber LED at the lower right of the display flashes once every second), the SCBA may continue to be used. The battery must be replaced before the next usage.</b></li><li>• <b>Failure to comply with this Warning may lead to personal injury, illness, or death.</b></li></ul>

### D. Chest-mounted Gauge

(Optional for Panther SCBA, and Optional for Cougar SCBA if a HUD Is Installed)

The chest-mounted pressure gauge is mounted on the right shoulder strap and may be swiveled 360° for easy viewing. When the cylinder valve is opened, the gauge indicates the air pressure remaining in the cylinder.


### E. Second Stage Regulator

<b>▲ WARNING</b>
<p><b>An impact to the second stage regulator when the cylinder valve is open may inadvertently activate the First-Breath-On mechanism, causing air to flow from the regulator and diminishing the air in the cylinder. Failure to comply with this Warning may lead to personal injury, illness, or death.</b></p>

The pressure-demand second stage regulator is mounted on the facepiece by the SPERIAN AIR KLIC™ system. The mechanism automatically locks in place when the regulator is pushed into the AIR KLIC, and is detached when the release buttons are pressed. To prevent inadvertent air flow, the regulator will not operate until the First-Breath-On mechanism is activated or the manual override button on the front of the regulator is pressed. The flow of air can be stopped by pressing the shutoff button. A large red knob on the right side of the regulator controls an adjustable bypass valve. Turning this knob counterclockwise provides a constant flow of air.

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### F. Facepiece

 <b>WARNING</b>
<ul style="list-style-type: none"><li>• <i>The SPERIAN Puma hood-style facepiece :</i></li><li>• <i>Must be worn in conjunction with an SCBA and used as specified in SPERIAN's instructions.</i></li><li>• <i>When donned and used with its SCBA, will reduce, but not eliminate, the inhalation of contaminants.</i></li><li>• <i>Does not protect against falling objects or projectiles.</i></li><li>• <i>Does not protect exposed areas of the body.</i></li><li>• <i>Must not be worn around open flames. It must not be used for structural fire fighting, underwater activities, or abrasive blasting.</i></li><li>• <i>Must not be used unless a satisfactory fit is obtained.</i></li><li>• <i>Must not be reused if contaminated.</i></li><li>• <i>Must not be altered or modified in any manner.</i></li><li>• <i>Requires that the wearer must assure that the neck seal is not compromised by hair or clothing when in use.</i></li><li>• <i>Requires that after each use and/or cleaning and disinfecting, anti-fog solution (SPERIAN P/N 951015, 951016, or 981805) must be applied to the inside of the lens. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></li></ul>

The Panther/Cougar SCBA will include a "hard" TwentyTwenty® Plus facepiece. The Puma SCBA will include a "soft" hood-style facepiece. The silicone TwentyTwenty Plus facepiece has a special wide lip sealing surface and five point silicone headstrap harness or optional Headnet™ harness. The lens is treated with an abrasion-resistant coating on the inside and outside surfaces of the lens. The nozzle houses a removable nose cup, speaking diaphragm, and exhalation valve. The AIR KLIC is threaded into the nozzle by a ratchet mechanism to prevent leakage and provide a secure mount for the second stage regulator.

The Puma hood-style facepiece is constructed of several different components. The hood material is a multi-layered specialty material specifically designed for its resistance to a wide range of chemicals. The hood contains a flexible lens made of clear, non-porous vinyl. The primary neck seal of the hood-style facepiece is constructed of neoprene rubber, a material used for many conventional type facepieces. A secondary seal is made inside the hood-style facepiece with a silicone nose cup. The nose cup is available in small, medium, or large size. The suspension system secures the hood-style facepiece in place on the user. Anti-fog solution (SPERIAN P/N 951015, 951016, or 981805) may be

applied to the inside of the lens. An AIR KLIC provides a secure mount for the SCBA second stage regulator.

 <b>WARNING</b>
<p><i>The hood material, vinyl lens, neoprene neck seal, and adhesive all may react in a different manner when exposed to chemicals or chemical mixtures. You must verify that none of the components of the hood will degrade against the chemicals or mixtures to which it may be exposed. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></p>

The hood-style facepiece is made of several components, each having different reactions to chemical environments. It is vital to ensure that you have objective evidence that the hood will be able to maintain its integrity against the expected chemical exposure during operations. This can be accomplished by tests you conduct or by contacting SPERIAN for further information.

### G. Universal Air Connection (UAC)


#### NOTE

- The Panther SCBA comes equipped with the Universal Air Connection (UAC).
- The UAC is optional on the Cougar and Puma SCBAs.

The Universal Air Connection (UAC) and fill hose (purchased separately in the P/N 968950 Rapid Intervention Kit) or SuperCharge fill hose (See Parts List, General Accessories, on page 5.) provide a means for filling SCBA cylinders during a rescue. An attendant/rescue crew member must assist with the cylinder filling.

The Universal Air Connection (UAC) is located on the first stage regulator body. The UAC is accompanied by a relief valve located on the back of the first stage regulator, designed to vent air to atmosphere when the fill pressure exceeds the cylinder service pressure in order to prevent cylinder overpressurization. The UAC has a dust plug which must be installed over the coupling at all times before and after filling operations. The UAC fill hose has the mating fill coupling. A directional flow control piston is located in the quick disconnect coupling to prevent air loss and hose whipping if the hose is installed incorrectly. The quick disconnect coupling is supplied with dust plugs which must be installed when the fill hose is not in use.

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 <b>WARNING</b>
<ul style="list-style-type: none"><li>• <b>The UAC has a dust plug which must be installed over the coupling at all times before and after filling operations.</b></li><li>• <b>DO NOT allow oil, grease, or other contaminants to come in contact with the quick disconnect couplings.</b></li><li>• <b>DO NOT use air other than breathing air, Grade D or better, conforming to CGA G-7.1 Commodity Specification for Air. The moisture content, expressed as dewpoint, shall be maintained at -65°F (-53.9°C) or lower, or less than 24.0 ppm by volume moisture content.</b></li><li>• <b>The SPERIAN UAC or UAC fill hose must ONLY be used to fill compressed air cylinders. The SPERIAN UAC or UAC fill hose must NEVER be used:</b><ol style="list-style-type: none"><li>1. <b>As a buddy breathing device.</b></li><li>2. <b>For SCBA-to-SCBA filling.</b></li><li>3. <b>To provide a continuous air supply.</b></li></ol></li><li>• <b>Failure to comply with this Warning may lead to personal injury, illness, or death.</b></li></ul>

## V. UNPACKAGING

### IMPORTANT—READ CAREFULLY

#### A. Warranty Card

##### NOTE

The warranty is void unless the warranty card is returned to the factory within 30 days of purchase.

1. Fill in the form with the required information.
2. Mail back the completed warranty registration card immediately.
3. To comply with NIOSH, SPERIAN is required to retain the completed warranty registration card.
4. Always refer to the equipment serial number if a claim is made.


#### B. Remove the SCBA from the Packaging

1. Carrying case
  - a. Remove the carrying case from the box.
  - b. Lift both locking tabs on the case and open it.
  - c. Remove the facepiece from the case.
  - d. Unfasten the Velcro transportation fasteners.
  - e. Lift the SCBA from the case.
2. Carton packaging
  - a. Remove the facepiece from the box.
  - b. Remove the plastic transportation cradle from the box with the SCBA connected to it.

- c. Cut both of the locking straps that secure the SCBA to the transportation cradle.
- d. Lift the SCBA from the cradle.

<b>CAUTION</b>
<b>Exercise extreme care when identifying SCBA components. Engraving may induce stresses in materials that, over time, could propagate cracks. Plastic labels, dyno-labels, and stickers may burn.</b>

## VI. OPERATION


 <b>WARNING</b>
<b>Wear gloves when handling SCBAs that have been stored in extreme temperatures. Failure to comply with this Warning may lead to personal injury, illness, or death.</b>

##### NOTE

See NFPA 1500, Standard on Fire Department Occupational Safety and Health Program for proper use of SCBAs in the work environment.

#### A. Donning

1. Remove the SCBA from its carrying case or stored location.
2. Hand tighten the first stage handwheel to the cylinder valve outlet.
3. Ensure that the cylinder valve gauge reads in the green (FULL) zone.

 <b>WARNING</b>
<b>Check the cylinder band latch each time; set the cylinder band or strap to match the cylinder. Failure to comply with this Warning may lead to personal injury, illness, or death.</b>

4. Check the latch on the cylinder band and ensure that the cylinder is secure in the backpack.
5. Lay the harness out and straighten each strap. All adjustable straps should be extended to maximum length.
6. There are two methods of donning the SCBA: coat-style, one arm at a time; and over the head. Choice of the method of donning is a matter of individual choice or organizational policy. Both methods are described below.

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### a. Over the Head

- i. Lean the SCBA cylinder against your legs, cylinder valve resting on the floor and the harness spread to each side.
- ii. Grasp the cylinder and backpack near the center as shown in Figure 2.
- iii. Lift the SCBA over your head as shown in Figure 3, and allow it to slide onto your back.



Figure 2. Grasp Cylinder



Figure 3. Over Head

### b. Coat Style

- i. Insert your arm through one of the shoulder straps and swing the SCBA onto your back. See Figure 4.
- ii. Insert your other arm through the other shoulder strap.



Figure 4. Coat Style

### Both Methods

7. Lean forward and pull the harness adjustment straps until the back support rests in the small of your back. See Figure 5.

#### NOTE

If the harness adjustment straps are properly tightened, the weight of the SCBA will be carried on the hips instead of the shoulders. If the harness adjustment straps restrict movement, readjust.

8. Take up the slack with the harness adjustment straps. See Figure 5.
9. Fasten the waist belt buckle. Pull forward on the waist straps as shown in Figure 6, and tighten until very snug.




Figure 5. Lean Forward

10. Readjust the harness adjustment straps so that the weight of the SCBA is distributed properly on the hips. Do not overtighten.



Figure 6. Tighten Waist Strap

11. Tighten the AIR KLIC (the adapter into which the second stage regulator is inserted) in the facepiece by turning it clockwise.
12. Verify that the AIR KLIC is secured by trying to turn it counterclockwise.

 <b>WARNING</b>
<b><i>The AIR KLIC must be held securely in the nozzle by the ratchet mechanism. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></b>

13. Don the facepiece as follows:

#### TwentyTwenty Plus Facepiece:

There are two methods, depending upon which head harness is used, to secure the TwentyTwenty® Plus facepiece to the user. Both methods are described below.

- a. Standard silicone headstrap:
  - i. Fully loosen the headstraps.
  - ii. If your SCBA is equipped with a neck strap, place the neck strap over your head.

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- iii. Grasp the lower headstraps as shown in Figure 7.



**Figure 7. Grasp Lower Headstraps**

- iv. Place your chin in the chin cup and pull the straps over your head.
- v. Center the facepiece and flatten the headstrap hub on the back of your head.
- vi. Tighten the two lower straps. Do not overtighten.
- vii. Tighten the temple straps (Figure 8), then the top strap, until all the headstraps lay flat on your head.



**Figure 8. Tighten Upper Headstraps**

- viii. Perform a leak check as described below.

### NOTE

When properly adjusted, the headstrap hub should be centered on the back of your head, and the lower straps should be below your ears. Make sure that your chin is properly recessed in the chin cup.

#### b. Optional Headnet™

- i. Inspection

Ensure that the three locking fabric straps located across the forehead are fully inserted into their slots in the rims and that the locking flaps prevent the straps from pulling out of the slots.

- ii. Place your chin in the chin cup, pull the Headnet over your head, and tighten by pulling evenly on the upper and lower straps. See Figure 9.



**Figure 9. Adjust Headnet**

- iii. Center the facepiece and flatten the Headnet with a wiping motion toward the back of your head.
- iv. Retighten the elastic adjustment straps. Do not overtighten.
- v. Perform a leak check as described below.

### NOTE

When properly adjusted, the Headnet should be centered on the back of your head, and the lower straps should be below your ears.

#### Puma Hood-style Facepiece:

### **⚠ WARNING**

***The wearer must assure that the neck seal is not compromised by hair or clothing when in use. Failure to comply with this Warning may lead to personal injury, illness, or death.***

- a. Fully loosen the suspension straps.
- b. Grasp the hood by the neck seal and pull the neck seal over your head.
- c. Position the nose cup on your face, then simultaneously tighten the two suspension straps.

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### B. Leak Check—TwentyTwenty Plus Facepiece

<b>⚠ WARNING</b>
<b><i>Do not use this SCBA in a contaminated atmosphere if you do not obtain a satisfactory seal during the leak check. If a seal was not obtained, reposition the facepiece, check the straps, and perform the leak check again. Failure to obtain a satisfactory seal could allow contaminants to leak into the facepiece, causing illness or death.</i></b>

1. Place the palm of your hand over the AIR KLIC as shown in Figure 10.



Figure 10. Leak Check

2. Inhale and hold your breath for a few seconds. The facepiece should collapse on your face without leaking.
3. If the facepiece leaks, reposition, check the straps, and repeat the leak check.

### C. Leak Check—Puma Hood

1. Don and pressurize the Puma SCBA.
2. Hold your breath for several seconds and listen for audible leaks.

### D. Exhalation Valve Test—TwentyTwenty Plus Facepiece and Hood

<b>CAUTION</b>
<b><i>Do not use this SCBA in a contaminated atmosphere if the exhalation valve is not working properly. Failure to verify that the exhalation valve is functioning properly could result in difficulty in exhaling from the facepiece or hood.</i></b>

1. To test the exhalation valve, take a deep breath and hold it. Cover the AIR KLIC again as shown in Figure 10 and exhale.
2. If the exhalation valve is stuck, it will be difficult to exhale. If the exhalation valve is stuck, exhale sharply to open the valve. If the valve still doesn't open, clean the valve per the instructions in the repair table on page 29 of this manual.

### E. Pressurization

1. Fully depress the shutoff button on the second stage regulator.
2. Verify that the red bypass knob is in the closed position.
3. Fully open the cylinder valve (Figure 11). In order to fully open the cylinder valve, the handle must be rotated at least one complete revolution (360° minimum).



Figure 11. Open Cylinder Valve

<b>⚠ WARNING</b>
<b><i>An impact to the second stage regulator when the cylinder valve is open may inadvertently activate the First-Breath-On mechanism, causing air to flow from the regulator and diminishing the air in the cylinder. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></b>

- a. If equipped with a chest-mounted pressure gauge, ensure the needle reads in the green (FULL) zone.
- b. If equipped with a Heads-Up Display (HUD), check the HUD to ensure that the display reads full cylinder pressure (all four green LEDs lighted).

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**⚠ WARNING**

***The audible alarm must sound and the HUD LEDs must flash in sequence as the system is pressurized. If either alarm fails to activate (sound and flash) as you pressurize your SCBA, DO NOT USE the SCBA. Failure of either alarm could result in a failure to realize that the SCBA is near the end of its service life, resulting in death or injury.***

4. Engage the cylinder valve handle locking sleeve (if so equipped) by turning it clockwise to prevent accidental valve closure.
5. Remove the second stage regulator from the waist strap regulator holder by pressing the two release buttons.

### NOTE

The second stage regulator release buttons must be pressed simultaneously to remove the regulator from the holder.

6. Insert the regulator into the AIR KLIC as follows:
  - a. If the SCBA is equipped with a Heads-up Display (HUD), insert the regulator into the AIR KLIC on the facepiece (Figure 12) such that the HUD display is positioned on top, and press firmly until you hear both release buttons snap into place. If the regulator does not snap into place, rotate the regulator while pressing firmly until the HUD guides itself into the proper position and the regulator snaps into place.
  - b. If the SCBA is not equipped with a HUD, insert the regulator into the AIR KLIC on the facepiece/hood (Figure 12) and press firmly until you hear both release buttons snap into place.



Figure 12. Insert Regulator

### NOTE

- A CLICK will be heard when each AIR KLIC button is properly engaged.
- Do not press the release buttons when installing the regulator.

**⚠ WARNING**

***Both release buttons must be properly engaged. Rotate and tug the regulator to ensure that both release buttons are properly engaged in the AIR KLIC. Do not push the release buttons while verifying the engagement of the regulator. Do not press the release buttons unless you intend to remove the regulator from the facepiece. Pressing either release button during or after installation onto the facepiece could result in inadvertent regulator disengagement, causing death or injury.***

7. Take a sharp, deep breath to activate the regulator.
8. Take several breaths to check the flow of air.
9. Quickly open and close the bypass valve to ensure that it is operating properly.

**⚠ WARNING**

***The SCBA has a rated service duration of 30, 45, or 60 minutes based on the requirements of the Code of Federal Regulations, Title 42, Part 84, Subpart H. Actual service duration will frequently be less than the rated time, depending on the physical condition and exertion level of the user, initial cylinder pressure, and ambient temperature. When either low air alarm begins sounding, PROCEED IMMEDIATELY TO A SAFE AREA. Failure to comply with this Warning may lead to personal injury, illness, or death.***


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### F. Universal Air Connection (UAC) Operation

The SPERIAN UAC is intended to be used with the P/N 968950 UAC Rapid Intervention Kit, purchased separately. The P/N 968950 UAC Rapid Intervention Kit is equipped with a high pressure fill whip that is compatible with the UAC coupling on the first stage regulator. The P/N 968950 UAC Rapid Intervention Kit is capable of accommodating a 60-minute high pressure cylinder.

Although it is possible to add air to a SPERIAN SCBA via the UAC system while the SCBA is being worn, SPERIAN recommends that the cylinder be placed in a container or in a location which is designed to restrain fragments in the event of a component failure during filling. Filling an SCBA cylinder while the SCBA is being worn should only be done when the circumstances justify exposing the SCBA user to the added risk associated with the fill procedure.

First stage regulators equipped with the UAC have a pressure relief valve (PRV) incorporated into the first stage regulator housing. The PRV is designed to vent air to atmosphere when the fill pressure exceeds the service pressure of the cylinder. If a high pressure (4500 psig) fill (supply) cylinder is used on a 2216 psig or 3000 psig SCBA, the PRV may open and vent air to atmosphere. The PRV will reset (close) at a pressure below the service pressure of the SCBA.

 <b>WARNING</b>
<ul style="list-style-type: none"><li>• <b>NEVER use the Universal Air Connection (UAC) for routine filling of SCBA cylinders. The UAC is intended to be used for cylinder filling during rescue operations only.</b></li><li>• <b>Never use the SPERIAN UAC to fill an SCBA cylinder while the SCBA is being worn unless there is a compelling reason to assume the risk of injury if there is a component failure during the fill process.</b></li><li>• <b>Never use the SPERIAN UAC to fill an SCBA air cylinder while the SCBA is being worn if the SCBA or the cylinder is suspected of having been dropped, exposed to direct flame impingement, or damaged in any way.</b></li><li>• <b>The purity of the UAC air source must meet the requirements set forth in the Compressed Gas Association Commodity Specification for Air, G-7.1, Type 1, Grade D, with a dewpoint not greater than -65°F (-53.9°C), or less than 24 ppm by volume.</b></li></ul>

### **WARNING—Continued**

- **The relief valve on the first stage regulator is factory set. Tampering with the relief valve may cause the SCBA to malfunction or may result in a decrease in service life.**
- **If at any time during filling an air leak is detected or suspected in the SCBA or the fill system, disconnect the fill whip from the SCBA. Close the cylinder valve on the fill cylinder and vent the air from the fill whip. Remove the SCBA from service for inspection and repair by a SPERIAN-certified technician before use.**
- **The dust covers on the UAC coupling and the UAC fill whip must be installed at all times unless the SCBA cylinder is being filled via the UAC.**
- **Failure to comply with this Warning may lead to personal injury, illness, or death.**

### NOTE

Air venting from the PRV is extremely loud.

1. Open the cylinder valve on the UAC fill system (supply cylinder). The fill whip is now pressurized.
2. Remove the dust cover from the UAC Rapid Intervention Kit fill whip.
3. Remove the dust cover from the UAC coupling on the SCBA.
4. Connect the fill whip to the UAC coupling on the SCBA. Push the female coupling on the fill whip until a click is heard. The cylinder will start filling as soon as the fill whip coupling engages into the UAC coupling on the SCBA.
5. Filling is complete when the pressure in the SCBA cylinder and in the fill cylinder are equalized. This will take place in approximately one minute.

### NOTE

In most cases, the cylinder will not be filled to full service pressure. The resulting service life of the SCBA will be reduced.

6. Disconnect the fill whip coupling by pulling back on the outer locking sleeve. An audible hissing or popping will be heard when the fill whip is disconnected. When this occurs, coupling separation has been achieved.
7. Replace the dust cover on the SCBA UAC coupling.




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8. Close the cylinder valve on the fill system and vent the air from the fill whip. Replace the dust cover on the fill whip.

### G. Emergency Operation


1. PROBLEM: Restricted or interrupted air flow
  - a. Open the bypass valve by turning the red knob on the second stage counterclockwise until the desired constant air flow is achieved.

 <b>WARNING</b>
<b><i>Activating the bypass valve rapidly depletes your air supply. Immediately exit to a safe area. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></b>


- b. IMMEDIATELY exit to a safe area.
  - c. Have the SCBA inspected and/or repaired by a certified repair technician before reuse.
2. PROBLEM: First-Breath-On failure
    - a. Press the manual override button on the front of the regulator to start air flow.
    - b. IMMEDIATELY exit to a safe area.
    - c. Have the SCBA inspected and/or repaired by a certified repair technician before reuse.
  3. PROBLEM: Free flow
    - a. If the regulator will not shut off (free flow) during extremely heavy breathing, exhale forcefully. The regulator should return to normal flow.
    - b. If the free flow continues, open and close the bypass once.
    - c. If the problem persists, IMMEDIATELY exit to a safe area.
    - d. Have the SCBA inspected and/or repaired by a certified repair technician before reuse.
  4. PROBLEM: First stage overpressurization relief valve operates
    - a. If the cylinder valve incorporates a locking sleeve, disengage it by pushing in and turning it counterclockwise as far as it will go.
    - b. Regulate the amount of air flow by manually throttling the cylinder valve.
    - c. Immediately exit to a safe area.
    - d. Have the SCBA inspected and/or repaired by a certified repair technician before reuse.
  5. PROBLEM: Second stage regulator accidentally disengages from facepiece
    - a. Hold your breath. Locate the regulator using the regulator supply hose (the regulator will be free-flowing), and immediately insert the regulator into the facepiece. Resume breathing.

- b. Push the regulator firmly into the facepiece. Ensure that both AIR KLIC buttons are engaged.
- c. Immediately exit to a safe area.
- d. Have the SCBA inspected and/or repaired by a certified repair technician before reuse.

### H. Doffing

 <b>WARNING</b>
<b><i>Doff the SCBA only in a safe area. Failure to comply with this Warning may lead to personal injury, illness, or death.</i></b>

1. Press the second stage regulator shutoff button.
2. Press the two release buttons and remove the regulator from the facepiece.
3. Disengage the cylinder valve locking sleeve (if so equipped) by pushing in and turning it counterclockwise.
4. Close the cylinder valve.
5. Press the override button or open the bypass valve on the second stage regulator to vent air from the SCBA.
6. Close the bypass valve.

 <b>WARNING</b>
<b><i>The SCBA must be stored in a cool, dry location with the cylinder valve closed and the air pressure vented from the system. Storing an SCBA with the cylinder valve open and the system under pressure can result in damage to elastomeric materials in the regulator, particularly if the SCBA is stored at temperatures above 160°F (71°C). Damage resulting from improper storage could result in reduced flow or even stop flow conditions, resulting in injury, illness, or death.</i></b>

7. Push the second stage regulator into the waist-strap-mounted regulator holder until it clicks.
8. Place your thumbs under the headstrap buckles, loosen the straps, and remove the facepiece.
9. Clip the D-ring from the top facepiece buckle onto the snap hook on the shoulder strap.
10. Unsnap the waist strap and optional chest strap, loosen the shoulder straps, and remove the SCBA.

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11. Prepare the SCBA for storage.

### I. Cylinder Removal and Reinstallation

#### 1. Removal

- Close the cylinder valve by rotating the shutoff handwheel clockwise.
- Relieve the hose pressure by opening the second stage regulator bypass valve (red knob) and listening for system depressurization.
- Remove the first stage regulator from the cylinder valve by rotating the red or green first stage handwheel counterclockwise.

#### **⚠ WARNING**

*Use extreme care when changing cylinders. DO NOT allow moisture or ice to enter the regulator system. Moisture or ice entering the regulator system may cause the SCBA to freeze up, restricting or stopping air flow to the user, resulting in death or injury.*

- *ONLY grasp the cylinder valve handwheel to open or close the valve; DO NOT pick up or carry a cylinder by the handwheel, drop a cylinder on the handwheel, or bump the handwheel, as this may cause the cylinder valve to inadvertently open, which may lead to the cylinder becoming airborne under the thrust of air released from the valve, causing injury or death. ALWAYS pick up and carry an air cylinder by the cylinder body.*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

d. Prevent the cylinder from accidentally falling by placing a free hand on the top of the cylinder.

e. Remove the tank band as follows:

- Loosen the tank band latch by flipping the cam-over buckle toward the user.
- Remove the tank band buckle from the spring-catch mechanism by grasping and rotating the tank band buckle as shown in Figures 13 and 14.

f. Rotate the cylinder 90° so that the cylinder valve handwheel faces away from the user.

g. Remove the cylinder by allowing it to rotate around the tank bracket to a horizontal orientation. Lift the cylinder valve free.

h. Place the cylinder in a safe location and prevent it from accidentally rolling into hazards that may damage the exterior of the cylinder.

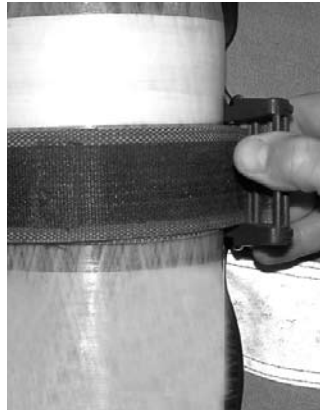


Figure 13. Flip the Buckle Latch



Figure 14. Rotate the Buckle Upward

#### 2. Installation

#### **⚠ WARNING**

- *Use proper lifting techniques to lift the fully charged cylinder to prevent back injury.*
- *ONLY grasp the cylinder valve handwheel to open or close the valve; DO NOT pick up or carry a cylinder by the handwheel, drop a cylinder on the handwheel, or bump the handwheel, as this may cause the cylinder valve to inadvertently open, which may lead to the cylinder becoming airborne under the thrust of air released from the valve, causing injury or death. ALWAYS pick up and carry an air cylinder by the cylinder body.*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

a. Place cylinder valve handwheel into the tank bracket.

#### **CAUTION**

*Avoid valve damage by preventing the cylinder valve threads from becoming damaged.*

b. Lift up until the cylinder rests against the backpack frame.

c. Rotate the cylinder until the cylinder valve threads face to the user's left side.

d. Adjust the cylinder band to prevent the cylinder from falling off the backpack as follows:

i. Changing to the same diameter cylinder:

- Place the metal bail of the tank band buckle into the spring-catch mechanism by pushing down on the spring. The bail should slide on the spring until it is centered underneath the catch.

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- b. Tighten the tank band by flipping the cam-over buckle away from the user.
- ii. Changing to a **different** diameter cylinder:
  - a. Adjusting the tank band for a smaller diameter cylinder:
    1. Place the metal bail of the tank band buckle into the spring-catch mechanism by pushing down on the spring. The bail should slide on the spring until it is centered underneath the catch.
    2. Adjust the slack in the tank band by pulling the outermost tank band strap through the buckle until the inner strap is almost snug. Readjust as necessary.
    3. Adjust the slack in the outer strap by sliding the double bar D-ring away from the tank band buckle. The outer strap should lay flat on the inner strap.

### CAUTION

***Avoid excessive cylinder rattle or the potential for the cylinder to fall out from adjusting the tank strap too loose.***

4. Tighten the tank band by flipping the cam-over buckle away from the user.
- b. Adjusting the tank band strap for a larger diameter cylinder:
  1. Slide the double bar D-ring toward the tank band buckle.
  2. Pull the excess strap through the buckle so that the inner and outer straps are the same length.
  3. Place the metal bail of the tank band buckle into the spring-catch mechanism by pushing down on the spring. The bail should slide on the spring until it is centered underneath the catch.

### CAUTION

***Avoid excessive cylinder rattle or the potential for the cylinder to fall out from adjusting the tank strap too loose.***

4. Tighten the tank band by flipping the cam-over buckle away from the user.

### WARNING

***Check the cylinder latch each time the cylinder is installed. Set the cylinder band or strap to match the cylinder. Failure to comply with this Warning may lead to personal injury, illness, or death.***

## J. Transportation

Recommended methods of transportation include the following:

1. Mounting bracket
  - a. Brackets inside a fire apparatus storage compartment or integrated into a seat should attach to the cylinder only. Securely mount the SCBA and verify that the bracket does not straddle or interfere with the tank band, tank band latch, cylinder valve, backpack, or first stage regulator.
  - b. The SCBA mounting position should prevent any part of the SCBA from being slammed in a door or door hinge.
2. SCBA hard case or soft bag for transportation in a car trunk or truck bed.
3. If the above methods are not achievable, secure the SCBA to prevent rolling, sliding, or bouncing, which could cause damage.

## K. Interface Considerations

1. Protective hoods, if used, must be donned after a satisfactory facepiece fit check has been achieved.
2. Ensure that the audible and visual low air alarms and PASS alarm (if used) remain functional by not allowing turnout gear, ice, fire fighting equipment, or tools to cover these devices.
3. Do not mount other fire fighting tools such that they interfere with the function of the SCBA.

## VII. CYLINDER FILLING AND SAFETY

### WARNING

- ***You must read and understand all warnings and instructions provided on the cylinder DOT warning label and in instruction manuals before using the cylinder/valve assembly.***
- ***Only trained personnel may store, fill, service, maintain, handle, use, or dispose of cylinders used with this SCBA. Follow the guidelines of the Compressed Gas Association (CGA) pamphlets P-1, C-1, C-2, C-6, C-6.1, C-6.2, G-7, and G-7.1, as appropriate. Always follow established safety precautions when recharging cylinders.***
- ***Do not alter cylinders used with this SCBA.***
- ***Fill only to the specified service pressure. Do not overfill.***
- ***Do not fill a leaking cylinder. Depressurize immediately.***
- ***Do not tamper with the safety pressure relief device. Rapid depressurization***

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### **▲ WARNING—Continued**

*when the safety pressure relief device activates will cause excessive noise. During rapid depressurization, cylinders may become ballistic and cause injury. Stay clear of cylinders when the safety relief valve is activated.*

- *Do not fill the cylinder if unraveling or charring of composite fibers occurs.*
- *Do not fill or use the cylinder if you have any doubt about its suitability for recharge. Return it to a certified hydrostatic test facility.*
- *Do not expose cylinders used with this SCBA to open flame or heat sources which may heat the cylinder to 350°F. Cylinders damaged by fire or heated to 350°F must be destroyed.*
- *Repainted or refinished cylinders must be hydrostatically tested before reuse.*
- *DO NOT over-torque the air cylinder valves. ALWAYS verify that the hydrostatic test facility performing your cylinder testing DOES NOT over-torque the cylinder valves when they reinstall them. SPERIAN SCBA air cylinder valves must be tightened with a torque wrench to a torque value of 70 ft-lb. The torque wrench must have a range of no more than 0 to 175 ft-lb and an accuracy of at least  $\pm 4$  ft-lb (a variation of no more than 6%).*
- *Do not fill a fiberglass or Kevlar composite cylinder if it is not marked as being hydrostatically tested within three (3) years. Do not fill a carbon composite cylinder or an aluminum cylinder if it is not marked as being hydrostatically tested within five (5) years.*
- *Do not fill or use composite cylinders older than 15 years. Depressurize and destroy these cylinders. Call SPERIAN before condemning 15 year old carbon fiber cylinders. An extension of service life beyond 15 years may have been approved since the cylinder was manufactured.*
- *Inspect cylinders before each filling. Remove cylinders from service which have cuts, gouges, dings, bulges, corrosion, etc. A special internal and external visual inspection of cylinders must be completed at least every hydrostatic test. Follow the guidelines of CGA 6.2.*
- *Do not fill with oxygen.*
- *Do not use caustic paint strippers or corrosive cleaners.*
- *Do not remove, obscure, or alter any labels on SCBA cylinders.*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

### A. Inspection

After each use and prior to recharging, each air cylinder shall be subjected to a thorough visual inspection:

### **▲ WARNING**

- *Do not fill any cylinders that are damaged, you suspect may be damaged or unsafe, or are out of conformance with applicable hydrostatic test dates. Damaged cylinders must be inspected by an approved hydrostatic test facility and repaired as required before being filled.*
- *DO NOT over-torque the air cylinder valves. ALWAYS verify that the hydrostatic test facility performing your cylinder testing DOES NOT over-torque the cylinder valves when they reinstall them. SPERIAN SCBA air cylinder valves must be tightened with a torque wrench to a torque value of 70 ft-lb. The torque wrench must have a range of no more than 0 to 175 ft-lb and an accuracy of at least  $\pm 4$  ft-lb (a variation of no more than 6%).*
- *Failure to comply with this Warning may lead to personal injury, illness, or death.*

#### 1. Steel and Aluminum Cylinders

Ensure that no more than five years have elapsed since the last hydrostatic test has been performed, as indicated by the most recent date stamped into the cylinder shoulder. Inspect the exterior of the cylinder for dents, gouges, or rusted areas, and evidence of exposure to high temperature such as darkened or blistered paint, charred decals, melted or distorted gauge lens, etc.

#### 2. Composite Cylinders

Ensure that no more than three years have elapsed since the last hydrostatic test has been performed on fiberglass or Kevlar cylinders, and no more than five years have elapsed since the last hydrostatic test has been performed on carbon cylinders; and that the cylinder is less than 15 years old. Inspect the exterior of the cylinder for dents, gouges, or cuts which have penetrated and caused separation or unraveling of the composite overwrap. Watch for evidence of exposure to high temperature, such as darkened or blistered paint, charred overwrap or decals, melted or distorted gauge lens, etc.

#### 3. Cylinder Valve

The cylinder valve should also be examined for obvious external damage such as a deformed handwheel, inaccurate or inoperative pressure indicator, damaged threads on the outlet connection, or other evidence of impact or exposure to extreme heat. If internal contamination is sus-

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pected, remove the cylinder valve and inspect the interior of the cylinder. The cylinder valve overhaul cycle should be as follows. For steel, all aluminum, or carbon composite cylinders, overhaul the valve at every hydrostatic retest (5 year cycle). For fiberglass or Kevlar composite cylinders, overhaul the valve at every other hydrostatic retest (6 year cycle).

## 4. Additional Information

- a. Additional information on cylinder inspection and maintenance can be found in CGA pamphlet C-6, "Standards for Visual Inspection of Compressed Gas Cylinders," CGA pamphlet C-6.1, "Visual Inspection of High Pressure Aluminum Cylinders," or CGA pamphlet C-6.2, "Guidelines for Visual Inspection and Requalification of Fiber Reinforced High Pressure Cylinders," available from the Compressed Gas Association, Inc. If there is any doubt about the suitability of a cylinder to recharge, it should be returned to a certified hydrostatic retest facility for expert examination and retesting.
- b. A comprehensive listing of all licensed hydrostatic test stations is available from the Department of Transportation.

## B. Filling Procedure

### 1. Air Purity

Unless safety and health codes in your area specify otherwise, air cylinders should be refilled with compressed air meeting the purity requirements for Type 1, Grade D Gaseous Air as specified by the Compressed Gas Association Commodity Specification for Air, publication G-7.1. The moisture content, expressed as dewpoint, shall be maintained at -65°F (-53.9°C) or lower, or less than 24.0 ppm by volume moisture content. **UNDER NO CIRCUMSTANCES SHALL AN AIR CYLINDER BE FILLED OR PARTIALLY FILLED WITH OXYGEN.**

### 2. Maximum Fill Pressure

Determine the service pressure of the cylinder prior to filling. Type 3AA steel cylinders that bear a plus symbol (+) after the latest retest date may be recharged to a pressure 10% greater than the marked service pressure. For example, a cylinder marked 3AA 2015 with a plus symbol after the latest test date may be filled to a pressure of 2216 psig.

Marked Service Pressure	2015 psig
10% of 2015	<u>+201 psig</u>
Maximum Fill Pressure	2216 psig

Composite and aluminum cylinders may be filled only to the service pressure indicated on the cylinder label. Composite and aluminum cylinders must never be filled to a pressure greater than the marked service pressure.

### 3. Filling Procedure

- a. The fill station must be constructed and equipped in accordance with applicable state industrial safety codes.
- b. The cylinder may be partially immersed (**DO NOT** submerge the cylinder valve) in a water bath to minimize the temperature rise that occurs as the cylinder is filled. The fill hose should be equipped with a restraining cable to prevent uncontrolled "whipping" in case of hose failure.
- c. After connecting the fill hose, open the cylinder valve fully. A separate metering valve must be used to control the fill rate. Fill the cylinder slowly, at a rate not exceeding 500 psig per minute. (Use caution if faster recharging rates are used.) After the initial filling, allow the cylinder to cool to room temperature, then "top off" the cylinder to achieve full service pressure.
- d. Use particular care to ensure that an air cylinder is never connected to a source capable of supplying air at a pressure greater than the maximum service pressure of that cylinder.
- e. Close the cylinder valve when the cylinder is full.
- f. Slowly bleed pressure from the filling lines.
- g. Disconnect the filling line.

### 4. Storage

Air cylinders should be recharged as soon as is practical after use. Cylinders should not be stored partially charged, for two reasons:

- a. If used without recharge, the service duration of the apparatus is reduced.
- b. The safety relief device is designed specifically to protect a fully charged cylinder from the effects of a fire.

For maximum safety, the cylinders should be stored fully charged.

If the cylinder is stored empty and the valve is inadvertently left open, humid atmospheric air may enter the cylinder and result in interior corrosion.

If a self-contained breathing apparatus is to be maintained in "standby" mode, i.e., available for immediate emergency usage, the cylinder pressure gauge should be checked at least once a month to assure that the cylinder is charged to full service pressure. Place the cylinder in a suitable safety sleeve or filling area.

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## VIII. MAINTENANCE

### NOTE

Inspect the SCBA for defects before and after each use, and at least once monthly if not used. Repair as necessary, clean and disinfect after each use, and store properly to assure that the SCBA is maintained in satisfactory working condition. Keep a record of inspection and repair dates and results. Refer to the inspection table in the back of this manual.

### A. Facepiece Cleaning

TwentyTwenty Plus Facepiece:

 <b>WARNING</b>
<ul style="list-style-type: none"><li>• <i>It is the user's responsibility to ensure that the cleaning process chosen provides adequate disinfection or decontamination.</i></li><li>• <i>Specialized processes are required to disinfect and decontaminate a respirator. You MUST follow the instructions of the manufacturer who supplies the disinfecting or decontamination equipment or chemicals.</i></li><li>• <i>In the absence of a commercial sanitizing product, the hypochlorite solution described in the steps below will eliminate many, but not all biohazards.</i></li><li>• <i>Failure to comply with this Warning may lead to personal injury, illness, or death.</i></li></ul>

<b>CAUTION</b>
<ul style="list-style-type: none"><li>• <i>DO NOT clean the facepiece with the regulator attached.</i></li><li>• <i>You must ensure that this respirator is not damaged by disinfecting or decontamination equipment or chemicals.</i></li><li>• <i>The facepiece lens can be scratched through careless or abusive handling. DO NOT use abrasive cleaners or pads. DO NOT towel dry.</i></li><li>• <i>Cleaning or bleaching solutions containing chlorine will damage the Headnet.</i></li></ul>

### NOTE

- Silicone and rubber parts of the facepiece may be cleaned between washings with SPERIAN Mask Wipes, P/N 140096.
- ANSI Z88.2 1992 also provides information and guidelines on the cleaning and sanitizing of respirators.


1. Make a cleaning solution of warm (48°C or 120°F maximum) water and a mild detergent.
2. Immerse the facepiece top first in the solution until the exhalation valve is covered.
3. Agitate the facepiece and gently clean with a soft brush.
4. Thoroughly rinse the facepiece in fresh water, paying particular attention to removal of all soap residue from the exhalation valve. If possible, direct running water onto the exhalation valve.
5. Disinfect the facepiece in a warm (48°C or 120°F maximum) suitable sanitizing solution, such as a "hypochlorite solution" (two [2] tablespoons of chlorine bleach per gallon of water), for 2 to 3 minutes. Rinse thoroughly with fresh warm (48°C or 120°F maximum) water. If other sanitizing solutions are used (such as quaternary ammonium or glutaraldehyde), follow the manufacturer's instructions supplied with the sanitizing compound.
6. Allow the facepiece to drip dry. Warm air may be used to speed up drying.

### NOTE

Cleaning solutions containing ammonia or repeated washing will remove the lens anti-fog coating. Recoat with SPERIAN Anti-Fog Solution, P/N 951015 (1 oz.), or P/N 951016 (16 oz.), or Anfi-fog Wipe, P/N 981806.

7. Hold the facepiece firmly against your face and exhale several times to ensure that the exhalation valve functions smoothly.
8. After cleaning, apply three drops of anti-fog solution to the inner surface of the lens and spread with a lint-free cloth. Allow the coating to dry for 15 minutes before using the facepiece.

Puma Hood:

 <b>WARNING</b>
<ul style="list-style-type: none"><li>• <i>It is the user's responsibility to ensure that the cleaning process chosen provides adequate disinfection or decontamination.</i></li><li>• <i>Specialized processes are required to disinfect and decontaminate a respirator. You MUST follow the instructions of the manufacturer who supplies the disinfecting or decontamination equipment or chemicals.</i></li><li>• <i>Use ONLY the sanitizing products listed in this manual to disinfect and decontaminate the full facepiece hood.</i></li></ul>

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### **▲ WARNING—Continued**

- **After each use and/or after cleaning and disinfecting, anti-fog solution (SPERIAN P/N 951015, 951016, or 981806) must be applied to the inside of the lens.**
- **Failure to comply with this Warning may lead to personal injury, illness, or death.**

### **CAUTION**

- **DO NOT clean the full facepiece hood with the regulator attached.**
- **You must ensure that this respirator is not damaged by disinfecting or decontamination equipment or chemicals.**
- **The full facepiece hood lens can be scratched through careless or abusive handling. DO NOT use abrasive cleaners or pads. DO NOT towel dry.**

#### NOTE

ANSI Z88.2 1992 also provides information and guidelines on the cleaning of respirators.

9. After each use, prior to cleaning and disinfecting, inspect the inside of the lens for an anti-fog appliqué. If an appliqué is present, inspect the appliqué to verify that it is still adhering to the lens properly. If the anti-fog appliqué is delaminating from the lens, then remove it from the inside of the lens by lifting up one edge of the appliqué and gently peeling the appliqué away from the lens, being careful not to damage the lens.

#### NOTE

Once the appliqué has been removed, it is not necessary to replace it with another appliqué. Application of SPERIAN anti-fog solution, P/N 951015, 951016, or 981806, to the inside of the lens is adequate.

10. Make a cleaning solution of warm (48°C or 120°F maximum) water and a mild detergent.
11. Immerse the hood in the solution until the exhalation valve is covered.
12. Agitate the hood and gently clean with a soft brush.
13. Thoroughly rinse the hood in fresh water, paying particular attention to removal of all soap residue from the exhalation valve. If possible, direct running water onto the exhalation valve.

14. Disinfect the full facepiece hood using one of the following sanitizing products: ARI Sanitizer Deodorizer—ARI, Orchard Hill, GA; Lysol Disinfectant; or Simple Green All Purpose Cleaner.
15. Allow the hood to drip dry. Warm air may be used to speed up drying.
16. Hold the hood inner mask firmly against your face and exhale several times to ensure that the exhalation valve functions smoothly.
17. After cleaning and disinfecting the hood, liberally apply SPERIAN anti-fog solution, P/N 951015, 951016, or 981805, to the inside of the urethane lens, and allow it to dry thoroughly.

### **B. Second Stage Regulator Cleaning**

### **▲ WARNING**

**Do not allow water or cleaning solutions to enter the breathing system or the regulator. Dirt, dust, or soap residue could degrade regulator performance, causing it to fail, possibly resulting in injury or death. Do not submerge the regulator in water or cleaning solutions. It may be partially submerged only as instructed in step 8 below. Failure to comply with this Warning may lead to personal injury, illness, or death.**

#### NOTE

- Always hold the regulator with the outlet facing downward during washing and rinsing.
  - The Protective Cleaning Cap, P/N 961170, may be used to seal the Cougar/Puma second stage regulator to prevent water or contaminants from entering the regulator outlet. See Figure 15.
1. Make a cleaning solution of warm water and a mild detergent.
  2. Have a bucket of fresh water available for rinsing.
  3. Install the second stage cleaning cap, P/N 961170.
  4. With the regulator facing downward, clean the exterior surfaces with a soft brush.
  5. With the regulator facing downward, immediately rinse the exterior surfaces with fresh water. Scrub excess soap away with the brush. Remove the second stage cleaning cap. If water enters the second stage regulator while cleaning, flow the regulator and bypass to expel all moisture.

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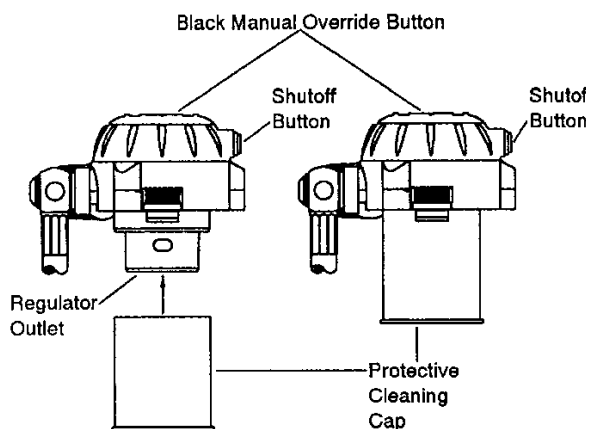


Figure 15. Protective Cleaning Cap

6. Using a damp, lint-free cloth, clean the interior of the outlet tube.
7. Dry with a clean cloth or with low pressure breathing grade (15 psig maximum) clean air.
8. If dirt or debris interferes with the First-Breath-On mechanism, clean it as follows:
  - a. Lift the edge of the rubber manual override button cover with a small flat-blade screwdriver and peel it off.
  - b. Place the protective cleaning cap over the outlet tube.
  - c. Hold the regulator with the cover facing downward and rinse in a shallow bucket of fresh water.
  - d. Allow the water to drain, and dry with low pressure Grade D air (15 psig maximum) directed into the venting groove under the shut-off button.
  - e. Reinstall the manual override button cover.

### C. Exterior Surfaces Cleaning

#### CAUTION

**Do not allow cleaning solutions to enter the breathing system.**

The hoses, backpack harness, frame, and cylinder/valve assembly may be cleaned with a damp cloth or a mild soap and warm water solution. Rinse thoroughly and air dry or wipe with a clean cloth.

### D. Inspection (see page 28)

### E. Repair (see page 29)

#### WARNING

**Before disassembly, make sure that all air is bled from the lines. Shut off or deplete the air supply to prevent equipment damage or personal injury.**

#### CAUTION

**User repair of the SPERIAN SCBA is limited to replacement of components listed on the NIOSH approval label and repairs described in the table on page 29. Disassembly should be performed only to the extent necessary to replace the components. To protect your warranty and the NIOSH certification on the equipment, all other repairs must be done only by SPERIAN-certified technicians. If there are none at your facility, consult your SPERIAN distributor for the repair facility nearest you.**

#### NOTE

All SPERIAN-certified Technicians are required to remain current on new procedures and parts through SPERIAN's published Technical Bulletins, technical manual revisions, and certification seminars.

### F. Functional Testing (see page 31)

Perform functional tests after cleaning or repair.

### G. Cylinder Maintenance and Recharging

Refer to section VII, Cylinder Filling and Safety, for details on the maintenance and recharging procedures for cylinders approved for use with SPERIAN SCBAs.

### H. Cold Weather Operation and Maintenance

Operation of the SPERIAN SCBA in cold weather, 32°F (0°C) or colder, requires the user to be aware of the potential problems caused by the combination of moisture and low temperatures.

#### WARNING

- **Moisture entering the regulator system, either from moisture in the cylinder air or by external means, e.g., inclement weather conditions, may cause regulator system freezeup, restricting or stopping air flow to the user. This could result in injury or death to the user.**
- **Recharge the cylinders with Grade D or better air conforming to Compressed**



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### **▲ WARNING—Continued**

**Gas Association Specification G-7.1. Moisture content, expressed as dewpoint, shall be maintained at -65°F (-53.9°C) or lower, or less than 24.0 ppm by volume. Air exceeding this moisture content may cause regulator system freezeup, restricting or stopping air flow to the user. This could result in injury or death to the user.**

#### NOTE

- Moisture can cause regulator system freezing problems even if the ambient air temperature is above freezing. The air flowing from the SCBA cylinder through the regulator system decreases from cylinder pressure to near atmospheric pressure very rapidly. As this pressure decreases, the air rapidly expands, causing the air and therefore the regulator to cool.
- Although the ambient temperature may be above 32°F (0°C), the temperature inside the regulator system may be considerably lower (below freezing).
- SPERIAN recommends that SCBAs used on a routine basis or SCBAs kept for emergency use be stored at temperatures above 32°F (0°C). SCBAs stored at temperatures below 32°F (0°C) may need to be warmed to at least 32°F (0°C) prior to use if ice has formed on the low pressure alarm, facepiece exhalation valve, AIR KLIC, and/or quick-disconnects.

SPERIAN recommends a “change of season” inspection and increased attention to your preventive maintenance during cold weather conditions. The following recommended inspections and procedures will help prevent cold weather problems; however, cold weather conditions may also cause other problems not listed below.

#### 1. Air Supply

#### NOTE

Cold weather conditions require very dry air. Moisture entering the SCBA may cause icing and equipment malfunction.

- a. Test compressor(s) for air quality and dewpoint prior to the cold season.
- b. Recharge the cylinders with Grade D or better air conforming to Compressed Gas Association Specification G-7.1. Moisture content, expressed as dewpoint, shall be maintained at -65°F (-53.9°C) or lower, or less than 24.0 ppm by volume.
- c. Prevent any moisture from entering the SCBA.

- d. Remove ice and water from cylinder valve threads prior to filling in cold weather conditions.
2. Facepiece and Exhalation Valve (TwentyTwenty Plus Facepiece)
    - a. The facepiece must be protected from moisture during cold weather conditions to reduce ice formation on the facepiece lens, in the AIR KLIC, and in the exhalation valve.
    - b. Prior to donning the facepiece in cold weather, visually inspect the lens, AIR KLIC, and exhalation valve for ice.
    - c. If ice is present, warm the facepiece to melt the ice. Ice may be melted by placing the facepiece inside outerwear near the body to warm.
    - d. Ice in the exhalation valve may be melted by at least six to eight exhalations onto the exhalation valve.
    - e. Verify the proper function of the exhalation valve by performing a positive pressure exhalation test (hard facepiece and hood) and negative pressure leak check (hard facepiece only) as follows.
      - f. Don the facepiece as specified in the Donning section of this manual.
      - g. Perform a positive pressure exhalation test:
        - i. Take a deep breath, and place your hand over the AIR KLIC.
        - ii. Exhale normally. The exhalation valve must function normally.
        - iii. If the exhalation valve does not function or it is difficult to exhale, remove the facepiece.
        - iv. Exhale on the exhalation valve at least six to eight more times to melt the ice.
        - v. Reposition the facepiece, check the straps, and repeat the test.
        - vi. If the exhalation valve continues to malfunction, remove the facepiece from service.
        - vii. Have the facepiece inspected and/or repaired by a SPERIAN-certified repair technician before reuse.
      - h. Perform a negative pressure leak check:
        - i. Place your hand over the AIR KLIC.
        - ii. Inhale and hold your breath for a few seconds. The facepiece should collapse on your face and remain collapsed for several seconds without leaking.
        - iii. If the facepiece leaks, exhale onto the exhalation valve at least six to eight more times. Reposition the facepiece, check the straps, and repeat the leak check.

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- iv. If the facepiece continues to leak, remove it from service.
  - v. Have the facepiece inspected and/or repaired by a SPERIAN-certified repair technician before reuse.
- i. Again, visually check to verify that the facepiece, lens, AIR KLIC, and exhalation valve are ice-free.



### WARNING

***If it becomes necessary to remove the facepiece when using the SCBA, move to a non-hazardous area first. Failure to comply with this Warning may lead to personal injury, illness, or death.***

- j. If the ambient temperature is near or below freezing, place the facepiece and regulator under outerwear to keep it warm in case reuse is necessary.

### 3. Second Stage Regulator



### WARNING

- ***Ice on the second stage regulator AIR KLIC buttons or the facepiece AIR KLIC adapter may prevent proper engagement of the regulator.***
- ***The user must ensure that the regulator is properly engaged by rotating and tugging the regulator to verify that both release buttons are properly engaged in the AIR KLIC.***
- ***Failure to comply with this Warning may lead to personal injury, illness, or death.***

- a. The second stage regulator must be protected from moisture during cold weather conditions to avoid ice buildup on its exterior surfaces. Ice can interfere with emergency bypass operation or AIR KLIC button function, which can hinder regulator removal from the facepiece or from the regulator receiver.
- b. Visually inspect the external surfaces of the regulator for ice prior to use.
- c. If ice is present, it may be melted by placing the regulator inside outerwear near the body to warm.
- d. Again, visually inspect the regulator for ice, then check the red bypass knob and the AIR KLIC buttons for proper function.
- e. Should ice form on the regulator while the regulator is in the facepiece, it will continue to function properly. When it becomes necessary to remove the regulator, rotate the regulator to break off the ice, then remove the regulator from the facepiece.

- f. If the AIR KLIC buttons are frozen and the regulator cannot be removed, do not force the buttons. Move to a non-hazardous area, depress the regulator shutoff button, and remove the facepiece and regulator as a unit.
- g. If the shutoff button is nonfunctional, turn off the air supply at the cylinder valve.
- h. Remove the facepiece and regulator as a unit.
- i. Warm the facepiece and regulator until the normal function of the AIR KLIC button and/or the shutoff button returns.
- j. Should ice form on the regulator while the regulator is in the regulator receiver, rotate the regulator to break off the ice, then remove the regulator from the regulator receiver.
- k. If the AIR KLIC buttons are frozen and the regulator cannot be removed from the receiver, do not force the buttons. Unbuckle the waist belt, and place the belt, regulator receiver, and regulator under outerwear next to your body to warm it until the AIR KLIC button functions properly.

### 4. Backpack

- a. Visually inspect the tank band catch, shoulder pad adjustment buckles, and hip wing adjustment points for ice.
- b. Remove ice by flexing and moving the straps through the adjustment mechanisms.

### 5. Regulator Receiver

- a. During cold weather operation, keep the regulator receiver cover in place on the regulator receiver to keep out moisture and debris.
- b. Visually inspect the regulator receiver for ice prior to use.
- c. Remove ice by warming the regulator receiver, placing it under outerwear near the body to warm.

### 6. Cylinder Valve

- a. During cold weather conditions, ice can form on the cylinder valve. Ice may interfere with the cylinder ratchet lock mechanism.
- b. Warm the cylinder valve to melt the ice and return the ratchet lock mechanism to proper working order.



### WARNING


***Do not use heat above 160°F (71°C) or direct flame to melt ice. Failure to comply with this Warning may lead to personal injury, illness, or death.***

### NOTE

Remove ice and water from cylinder valve threads prior to filling in cold conditions.

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## 7. Gauge and Alarms

 <b>WARNING</b>
<b><i>DO not use the SCBA if there is ice on the gauge face or alarm. Gauge or alarm freezeup could result in a failure to realize that the SCBA is near the end of its service life, causing personal injury or death.</i></b>


### a. Gauge

- i. Verify that the gauge face is free from ice.
- ii. If there is any ice on the gauge, remove the ice prior to returning the SCBA to service.
- iii. During use, turn the gauge to face the body. Check the gauge frequently for ice buildup.

### b. Audible Alarm

- i. Verify that the audible alarm is vertical above the first stage regulator body.
- ii. During cold weather conditions, ice can form on the audible alarm, rendering the alarm inaudible. Break the ice or melt it with a gloved hand.
- iii. Ice may obstruct the alarm vent holes and the end of the bell piston (if used), interfering with the operation of the SCBA. Melt the ice with a gloved hand.


### c. Heads-Up Display

 <b>WARNING</b>
<b><i>DO NOT use the SCBA if there is ice on the HUD or audible alarm. Malfunction of either alarm could result in a failure to recognize that the SCBA is near the end of its service life, causing personal injury or death.</i></b>

- i. During cold weather conditions, ice can form on the HUD display.
- ii. Verify that the HUD display is free from ice.
- iii. If there is any ice on the HUD display, remove the ice prior to returning the SCBA to service.

## 8. First Stage Regulator

During cold weather conditions, ice may form on the exterior surfaces of the first stage regulator.

 <b>WARNING</b>
<b><i>Use extreme care when changing cylinders. DO NOT allow moisture or ice to enter the regulator system. Moisture or ice entering the regulator system may cause the SCBA to freeze up, restricting or stopping air flow to the user, resulting in death or injury.</i></b>

## 9. Buddy Breather Assembly

- a. During cold weather conditions, ice may form on the buddy breather assembly.
- b. Prior to use, visually inspect the buddy breather components for ice.
- c. Remove or melt the ice, then dry the buddy breather components to avoid water entering the regulator.
- d. Always keep the rubber cap installed during cold weather conditions when the buddy breather is not in use.

## 10. Training and Use

- a. Conduct training sessions for cold weather operations using all equipment and accessories which may be used during actual operations.
- b. During cold weather operations, do not place cylinders or SCBAs into wet or snowy areas.
- c. Visually inspect the cylinder to remove ice; clean the threads; and take care to prevent water from entering the cylinder or accumulating on connecting surfaces.
- d. Icing will be accelerated by high air flow conditions. Examples may include, but are not limited to:
  - Bypass usage
  - Facepiece or hood leakage due to improper sealing
  - Allowing the regulator to free-flow when the facepiece is off
  - Improperly maintained equipment
- e. After cleaning, allow the SCBA to dry completely before returning it to storage. Be sure the facepiece/hood exhalation valve is dry before placing the facepiece/hood into storage. Coat the interior surface of the facepiece lens with SPERIAN Anti-fog Solution, P/N 951015 or 951016, or Anti-fog Wipe, P/N 981806.


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## 11. Accessories

Cold weather conditions may have adverse effects on the performance of the SCBA accessories.

- a. Air line hoses can become stiff.
- b. Ice on quick-disconnect couplers can make them difficult or impossible to connect.
- c. Plastic components can become brittle.
- d. Electrical equipment (e.g., radios, PASS devices, and lights) tends to become more difficult to use in cold temperatures, especially if there is ice.
- e. Use SCBA accessories with extreme care in cold weather conditions. Visually inspect them periodically for ice.

## I. Storage

 <b>WARNING</b>
<p><b><i>The SCBA must be stored in a cool, dry location with the cylinder valve closed and the air pressure vented from the system. Storing an SCBA with the cylinder valve open and the system under pressure can result in damage to elastomeric materials in the regulator, particularly if the SCBA is stored at temperatures above 160°F (71°C). Damage resulting from improper storage could result in reduced flow or even stop flow conditions, resulting in injury, illness, or death.</i></b></p>

1. Inspect, clean, and repair as required before storing.
  - a. Connect a fully charged air cylinder to the first stage regulator and secure it in the backpack.
  - b. Check that the cylinder valve locking sleeve (if so equipped) is in the LOCKED position.
  - c. Check that the bypass is closed.
  - d. Fully loosen the harness adjustment straps and waist strap.
  - e. Fully loosen the facepiece/hood headstraps.
  - f. Place the facepiece/hood in a mask bag.
2. After inspection, cleaning, and necessary repair, the SCBA should be stored away from dust, sunlight, heat, extreme cold, excessive moisture, or damaging chemicals.

## J. Overhaul Frequency

The SCBA must be cleaned, tested, and pass an annual performance flow test, utilizing a properly calibrated Biosystems Posi-Chek with SPERIAN-specific software. Maintenance must be performed by a SPERIAN-certified technician. SCBAs subjected to daily or severe service, such as heavy use, extreme temperatures, flame, or exposure to chemicals require more frequent servicing.

1. Cylinder Valve Overhaul Schedule  
Cylinder valves must be overhauled according to the following schedule:

- a. Cylinder valves on steel, aluminum, or fully wrapped carbon fiber cylinders must be overhauled every 5 years or at each hydrostatic test.
- b. Cylinder valves on composite cylinders: hoop-wrapped, fully wrapped, fiberglass, or Kevlar must be overhauled every 6 years or at every other hydrostatic test.

2. Cylinder Valve Hydrostatic Test Schedule  
Cylinders require hydrostatic testing to verify that the cylinder can hold its rated pressure. Hydrostatic testing is required by the Department of Transportation (DOT) at the following intervals:

- a. Steel cylinders—every 5 years (indefinite life until it fails a hydro test)
- b. All-aluminum (not including hoop-wrapped)—every 5 years (indefinite life until it fails a hydro test)
- c. Hoop-wrapped—every 3 years (15 year life)
- d. Fully wrapped fiberglass—every 3 years (15 year life)
- e. Fully wrapped Kevlar—every 3 years (15 year life)
- f. Fully wrapped carbon fiber—every 5 years (15 year life)

### 3. Maintenance Record

A maintenance record must be kept for each SCBA, noting at least:

- a. Date of repair
- b. Name of repair technician
- c. Description of malfunction
- d. Course of action taken to correct malfunction
- e. Any other data which may be pertinent

All records and test results must be permanently filed for future reference.

Refer to the SCBA service manual for instructions for troubleshooting, repair, and overhaul. The

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overhaul process involves replacement of certain o-rings, lubricants, or other components.

### **K. Additional Information**

If you need assistance or additional information on any SPERIAN product, consult your local distributor or contact:

#### **SPERIAN**

**3001 South Susan Street**

**Santa Ana, CA 92704**

**(714) 545-0410 or (888) APR-SCBA**

**FAX (714) 850-0299**

**ALL RETURNED PRODUCTS MUST BE  
DECONTAMINATED PRIOR TO SHIP-  
MENT. PRODUCTS CONTAMINATED  
WITH DANGEROUS SUBSTANCES  
WILL BE REFUSED AND RETURNED  
FREIGHT COLLECT.**

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### IX. INSPECTION TABLE

**IF ANY OF THE DEFECTS LISTED BELOW ARE FOUND, HAVE THE SCBA REPAIRED BEFORE USE.**

COMPONENT	LOOK FOR
HARD FACEPIECE LENS	<ol style="list-style-type: none"> <li>1. Nicks, scratches, or abrasions which could impair visibility.</li> <li>2. Deep gouges or cracks which could reduce impact resistance.</li> <li>3. Anti-fog coating in need of replacement.</li> </ol>
HARD FACEPIECE RIMS	<ol style="list-style-type: none"> <li>1. Deformed, cracked, or broken rims.</li> <li>2. Loose rim screws. (Do not overtighten.)</li> </ol>
HARD FACEPIECE SKIRT	<ol style="list-style-type: none"> <li>1. Cuts, gouges, or punctures.</li> <li>2. Tears or nicks in the sealing area.</li> <li>3. Deterioration from age, heat, or contamination.</li> </ol>
HARD FACEPIECE HEADSTRAP, BUCKLE STRAPS	<ol style="list-style-type: none"> <li>1. Abrasions or nicks.</li> <li>2. Deterioration from age, heat, or contamination.</li> </ol>
HARD FACEPIECE INLET NOZZLE	<ol style="list-style-type: none"> <li>1. Heat damage to the nozzle body and cover.</li> <li>2. AIR KLIC not seated and ratchet ring not engaged.</li> <li>3. Dirt and debris in the exhalation module.</li> <li>4. Exhalation valve sticking closed. (Exhale a few times to test.)</li> <li>5. Exhalation valve sticking open under positive pressure. (Test with regulator.)</li> <li>6. Damaged exhalation valve or valve seat.</li> </ol>
HOOD LENS	Scratches, cuts, or abrasions that could impair visibility or cause the hood to leak.
HOOD SUSPENSION	<ol style="list-style-type: none"> <li>1. Webbing color change, excessive wear, or fraying.</li> <li>2. Inspect stitching for thread unraveling, abrasion, cuts, tears, and chemical attack.</li> </ol>
HOOD FABRIC & NECK SEAL	<ol style="list-style-type: none"> <li>1. Integrity of seams.</li> <li>2. Cuts or abrasions in fabric or neck seal that could cause the hood to leak or the neck seal to tear.</li> </ol>
SECOND STAGE REGULATOR & HOSE	<ol style="list-style-type: none"> <li>1. Cracks or heat damage to housing or cover.</li> <li>2. Faulty operation of bypass valve, First-Breath-On, AIR KLIC, or override buttons.</li> <li>3. Dirt and debris in the outlet port; screen and grill cracked.</li> <li>4. Hose or fittings corroded, cracked, or leaking.</li> <li>5. Sticking release and shutoff buttons.</li> <li>6. Loose regulator outlet.</li> </ol>
GAUGE	<ol style="list-style-type: none"> <li>1. Gauge lens scratched; pointer deformed or stuck.</li> <li>2. Hose or fittings corroded, cracked, or leaking.</li> <li>3. Torn rubber boot.</li> </ol>
HEADS-UP DISPLAY (HUD)	<ol style="list-style-type: none"> <li>1. Display cover scratched or damaged.</li> <li>2. Cable cracked or split.</li> <li>3. Dirty or damaged display, including LEDs and photodiode.</li> <li>4. Display housing cracked or damaged.</li> </ol>
FIRST STAGE REGULATOR & AUDIBLE ALARM	<ol style="list-style-type: none"> <li>1. Hose and fittings corroded, cracked, or leaking.</li> <li>2. Loose retaining rings on hose connectors. Loose inlet nipple.</li> <li>3. Abrasion of hose.</li> <li>4. Damaged female threads on CGA handwheel.</li> <li>5. Damaged o-ring or groove on CGA nipple.</li> <li>6. Loose inlet nipple.</li> <li>7. Missing o-ring.</li> <li>8. Dents or heat damage to housing.</li> <li>9. Dented or deformed bell (bell alarm only).</li> <li>10. Loose screws securing bell to regulator body (bell alarm only).</li> <li>11. Debris or water under bell (bell alarm only).</li> </ol>
HARNESS FRAME	<ol style="list-style-type: none"> <li>1. Cylinder band and latch not working properly.</li> <li>2. Cylinder not secured in frame and band.</li> <li>3. Bent, broken, or cracked frame.</li> <li>4. Webbing color change; excessive wear or fraying; cuts, nicks, or broken stitching.</li> <li>5. Inspect stitching for thread unraveling, abrasion, cuts, tears, and chemical or corrosion attack at the top of the shoulder strap, shoulder strap adjustment buckle, and tank band strap. Failure of these connections allows the backpack to fall off.</li> <li>6. Buckles damaged or corroded.</li> <li>7. Loose hardware.</li> <li>8. Plastic crazing, charring, cracking, pitting, blistering, and significant color changes.</li> <li>9. Bent or broken spring.</li> </ol>

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AIR CYLINDER & VALVE	<ol style="list-style-type: none"> <li>1. Dents, gouges, blisters, or cuts.</li> <li>2. External damage to cylinder valve.</li> <li>3. Smooth operation of valve handwheel and ratchet collar (if so equipped).</li> <li>4. Loose screws securing rubber guard on cylinder valve.</li> <li>5. Condition of threads on valve outlet.</li> <li>6. Cylinder pressure gauge lens scratched; pointer deformed or stuck.</li> <li>7. Gauge reading correctly.</li> <li>8. Hydrostatic test date within three years (Fiberglass and Kevlar cylinders) or five years (carbon, aluminum or steel cylinders).</li> </ol>
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### NOTE

- Inspection guidelines for cylinders are prescribed in pamphlets C-6, C-6.1, and C-6.2 of the Compressed Gas Association. These pamphlets may be obtained from the Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, VA 22202.
- If there are any items not listed above that appear to be defective, have the SCBA repaired before use.

### X. REPAIR TABLE

COMPONENT	INSTRUCTIONS
HEADSTRAP, BUCKLE STRAP REPLACEMENT	<ol style="list-style-type: none"> <li>1. Remove the old straps.</li> <li>2. Install new straps.</li> </ol>
EXHALATION MODULE	<ol style="list-style-type: none"> <li>1. Remove the nozzle cover by pressing the ratchet ring with a finger and unscrewing the AIR KLIC counterclockwise.</li> <li>2. Remove the valve assembly by squeezing the legs of the spring retainer.</li> <li>3. Clean or replace the valve assembly.</li> <li>4. Replace the valve assembly by guiding the valve stem into the opening in the nozzle, ensuring that the spring is rotated only 45° clockwise.</li> <li>5. Insert the spring retainer legs into the openings on the nozzle.</li> <li>6. Reassemble the nozzle cover and AIR KLIC.</li> <li>7. Fit the facepiece over your face and cycle the exhalation valve by blocking the AIR KLIC opening with your palm and exhaling several times.</li> <li>8. Perform a leak check as described in OPERATION INSTRUCTIONS, or conduct a facepiece leak test on the Biosystems Posi-Chek with SPERIAN-specific software installed.</li> </ol>
NOSE CUP	Replace the nose cup on the nozzle, aligning the slot on the nose cup with the tab on top of the nozzle.
FACEPIECE LENS REPLACEMENT	<ol style="list-style-type: none"> <li>1. Use a 5/32 inch Allen wrench to remove the rim nuts and screws.</li> <li>2. Gently separate the rims from the facepiece.</li> <li>3. Pull the silicone skirt away from the lens.</li> <li>4. Remove the nozzle cover by pressing the ratchet ring with a finger and unscrewing the AIR KLIC counterclockwise.</li> <li>5. Remove the nozzle by pushing it from the front of the facepiece. Use thumbs to press the locking tabs at the sides of the nozzle. (DO NOT push on the spring retainer.)</li> <li>6. Place the nozzle into the new lens.</li> <li>7. Reassemble the nozzle cover and AIR KLIC.</li> <li>8. Install the nose cup.</li> <li>9. Place the lens edge inside the lens channel of the skirt, centering the lens so that the facepiece-to-face seal is not distorted.</li> <li>10. Install the skirt rims; start the screw on one side; then start the screw on the other side. <b>CAUTION—Do not pinch the silicone between the rims.</b></li> <li>11. Alternate tightening each screw until firmly tightened. <b>NOTE—The corners of the skirt should be centered between each rim when installation is complete.</b></li> <li>12. Perform a leak check as described in OPERATION INSTRUCTIONS.</li> </ol>
HOOD REPLACEMENT—DISASSEMBLY	<ol style="list-style-type: none"> <li>1. Unsnap the cradle strap and remove.</li> <li>2. Unscrew the AIR KLIC and remove the yoke/adjusting straps.</li> <li>3. Remove the exhalation valve cover, spring, and spring pad.</li> <li>4. From inside the hood, separate the half-mask from the exhalation valve seat and remove the half-mask.</li> <li>5. Remove the exhalation valve seat from the hood.</li> </ol>

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HOOD REPLACEMENT— ASSEMBLY	<ol style="list-style-type: none"> <li>1. From the outside of the hood, insert the exhalation valve seat into the appropriate opening. Work it through carefully so as not to tear the hood.</li> <li>2. From the inside of the hood, insert the exhalation valve seat flange into the half-mask. Orient it correctly if necessary.</li> <li>3. Replace the yoke/adjusting strap, and secure it with the AIR KLIC. Hand tighten the yoke/adjusting strap.</li> <li>4. Weave the cradle strap through the slots in the rear of the hood and snap the strap together.</li> <li>5. Inspect and/or replace the exhalation valve.</li> <li>6. Replace the spring pad, spring, and exhalation valve cover.</li> <li>7. Inspect and/or replace the o-ring in the AIR KLIC.</li> </ol>
HARNESS	<ol style="list-style-type: none"> <li>1. Remove all pneumatic hoses and regulators by unsnapping the fasteners.</li> <li>2. Remove the straps by unweaving them from the frame and hip wing. NOTE—Unweaving one side at a time leaves the other side as a reference.</li> <li>3. Remove the tank band spring with needle-nose pliers.</li> <li>4. Remove the hip wing pin with an arbor press or a punch and hammer.</li> <li>5. Mount appropriate new hardware.</li> <li>6. Reattach the hose, hardware, and accessories.</li> </ol>
FIRST STAGE CGA O-RING	<ol style="list-style-type: none"> <li>1. Remove the old o-ring.</li> <li>2. Ensure that the o-ring seat is undamaged and free of debris.</li> <li>3. Lightly lubricate a new o-ring with Christolube and install on the o-ring seat.</li> </ol>
ACCESSORIES	Each modification kit and accessory purchased from SPERIAN has installation instructions. Use these instructions for removing and replacing any accessory.

### NOTE

Make appropriate entries on equipment record cards.



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### XI. FUNCTIONAL TESTING TABLE

COMPONENT	INSTRUCTIONS
HARD FACEPIECE	<ol style="list-style-type: none"> <li>1. Don and adjust the facepiece.</li> <li>2. Block the AIR KLIC opening with the palm of your hand.</li> <li>3. Inhale gently. The facepiece should collapse slightly and hold for a few seconds without leaking.</li> <li>4. Exhale with the AIR KLIC opening covered. The exhalation valve must not stick.</li> </ol>
LEAK TEST	<ol style="list-style-type: none"> <li>1. Push the shutoff button on the second stage regulator to stop the flow of air.</li> <li>2. Open the cylinder valve to fully pressurize the regulators.</li> <li>3. Close the cylinder valve.</li> <li>4. Observe the gauge/alarm for 15 seconds. Significant needle movement indicates a leak, and the SCBA should not be used.</li> </ol>
AUDIBLE ALARM TEST	<ol style="list-style-type: none"> <li>1. Open the cylinder valve to fully pressurize the SCBA.</li> <li>2. Close the cylinder valve.</li> <li>3. Press the shutoff button on the second stage regulator to stop the flow.</li> <li>4. Slightly open and close the bypass valve to stop the gauge pointer at each mark for 2 seconds.</li> <li>5. Continue to open and close until the pointer moves slowly to the FULL mark.</li> <li>6. The audible alarm should begin when the gauge reaches approximately FULL.</li> <li>7. When the audible alarm begins, close the bypass valve.</li> <li>8. The alarm should continue until the air is almost depleted.</li> <li>9. Bleed all residual air.</li> <li>10. Close the bypass valve.</li> </ol>
HEADS-UP DISPLAY	<ol style="list-style-type: none"> <li>1. Open the cylinder valve to fully pressurize the SCBA.</li> <li>2. Close the cylinder valve.</li> <li>3. Press the shutoff button on the second stage regulator to stop the flow.</li> <li>4. Slightly open and close the bypass valve to stop the LED display at each 1/4 mark for 5 seconds.</li> <li>5. Continue to open and close the bypass valve slowly until the HUD display reads 1/2 full.</li> <li>6. Verify that the 50% warning is working correctly (the green LED representing 1/2 cylinder pressure should blink on and off for approximately 10 seconds, then stay lighted continuously).</li> <li>7. Continue to open and close the bypass valve slowly until the HUD display reads 1/4 full.</li> <li>8. The audible and visual alarm should begin when the display reaches approximately 1/4 full. Activation of the visual alarm (flashing red LED) portion of the display may or may not coincide perfectly with the audible alarm (i.e., bell, whistle, etc.) on the SCBA.</li> <li>9. When the audible alarm begins, close the bypass valve.</li> <li>10. Both alarms should continue until the air is almost depleted.</li> <li>11. Bleed all residual air.</li> <li>12. Close the bypass valve.</li> </ol>
SCBA FUNCTION TEST	<ol style="list-style-type: none"> <li>1. Attach the first stage regulator to a fully charged cylinder.</li> <li>2. Close the second stage regulator bypass valve and depress the shutoff button.</li> <li>3. Slowly open the cylinder valve.</li> <li>4. Check that the cylinder valve gauge and gauge/alarm both read in the green zone.</li> <li>5. Attach the second stage regulator to the facepiece and inhale. The regulator should deliver an acceptable flow of air without excessive effort, free flow, or fluttering.</li> <li>6. Slowly open the bypass valve. A steady flow of air should enter the facepiece.</li> <li>7. Depress the shutoff button. Air flow should stop.</li> <li>8. Push the override button. A small burst of air should enter the facepiece and the regulator should activate.</li> <li>9. Close the cylinder valve and bleed all residual air.</li> </ol>

#### NOTE

A program for use, training, inspection, record keeping, and maintenance is given in the United States National Fire Protection Association Standard 1404, Fire Department Self-Contained Breathing Apparatus Program.

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### NOTE

This section must be read in conjunction with the NIOSH approval label in this user's manual. Failure to observe these cautions and limitations voids NIOSH approval.

### XII. CAUTIONS AND LIMITATIONS

D—Air line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA-7.1, Grade D or higher quality.

E—Use only the pressure ranges and hose lengths specified in the user's instructions.

I—Contains electrical parts which have not been evaluated as an ignition source in flammable or explosive atmospheres by MSHA/NIOSH.

J—Failure to properly use and maintain this product could result in injury or death.

M—All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.

N—Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration specified by the manufacturer.

O—Refer to user's instructions, and/or maintenance manuals for information on use and maintenance of these respirators.

S—Special or critical user's instructions and/or specific use limitations apply. Refer to user's instructions before donning.

### S—SPECIAL OR CRITICAL USER'S INSTRUCTIONS

1. This respirator is approved for use above -30°F, except when used with 945007 quick couplers, and/or when used with the hood-style facepiece (P/Ns 968005, 968006, and 968007). When used with 945007 quick couplers, this respirator is approved for use above 0°F. When used with the hood-style facepiece, this respirator is approved for use above 10°F. When used with a hard facepiece in temperatures of 0° and lower, use anti-fog solution P/N 951015, 951016, or 981806.

2. When the Air Line Adapter Kit is used, the following requirements apply:

- a. The device must be supplied with respirable breathing air.
- b. No more than three (3) lengths of air supply hose shall be used.
- c. The air supply hose inlet must be supplied with 80 to 125 psig air pressure.
- d. The length of the air supply hose must be 25 to 300 feet for the 9304 Series hose and 10 to 300 feet for the 9308 Series hose. Do not use the 9304 Series hose with the 9308 Series hose.
- e. If the air line fails, the SCBA must be activated and the air line disconnected.
- f. Not more than 20% of rated capacity shall be used during entry.

3. Use with adequate skin protection when worn in gases or vapors that poison by skin absorption (for example, hydrocyanic acid gas).

4. Approved only when compressed air container is fully charged with air meeting the requirements of the Compressed Gas Association, G-7.1 for Type 1, Grade D air or equivalent specifications, and having a moisture content, expressed as dewpoint, of -65° or lower. The container shall be marked "Fill With Compressed Air Only" and shall meet applicable DOT specifications.

5. Never substitute, modify, add, or omit parts. Use only exact replacement parts on the configuration specified by SPERIAN.

6. DEATH OR SERIOUS INJURY may result if instructions are not carefully followed.

7. READ AND UNDERSTAND all instructions, limitations, and other warnings found on the apparatus and in the operation manual.

8. After each use and/or cleaning and disinfecting of the hood-style facepiece, anti-fog solution (SPERIAN P/N 951015, 951016, or 981806) must be applied to the inside of the lens.

9. The Universal Air Connection (UAC) and Heads-Up Display (HUD) are approved for use at temperatures above -25°F (-31.7°C).

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