S.O.P. #:   400-27B

SUBJECT: BREATHING APPARATUS AND AIR UNITS

DIVISION: EMERGENCY OPERATIONS

Objective: To assist members in the use, routine inspection, maintenance, hydrostatic test check and refilling of Breathing Apparatus.

Section 1:   Pressure – Demand Breathing Apparatus

A.   Utilization of Breathing Apparatus in Untenable Atmospheres

    1.   All personnel shall wear breathing apparatus when there is possible exposure to chemicals and during interior fire extinguishment/overhaul operations and when otherwise directed by the Safety Officer, in conjunction with the Incident Commander.

B.   Routine In-Station Inspection

    1.   The officer-in-charge of each unit will ensure that a visual inspection and functional test are performed on all breathing apparatus is inspected at the beginning of each shift.

    2.   The visual inspection and functional test of breathing apparatus will be conducted by the member assigned to the specific riding position, in accordance with procedures in Appendix 1.

C.   Routine In-Station Maintenance

    1.   All breathing apparatus shall be cleaned in accordance with the manufacturer's instructions after each use, every Tuesday morning during routine house duties, whether they have been used or not since the last cleaning.

    2.   The following procedures are to be followed when cleaning breathing apparatus as specified in Appendix 1.

        a.   Marking of Air Cylinders.

            1)   All cylinders and harnesses will have the proper adhesive equipment sticker attached for appropriate unit identification, i.e., E-17, T-15, E-281, M-4. Markings shall be clearly legible.

                a)   Cylinder marking shall be located on the non-IDLH side of the cylinder, facing toward the carrier harness assembly.
                b)   Carrier harness assembly marking shall be located on the front of the assembly at the bottom.

            2)   No part of components of the SCBA are to be painted.

            3)   When carbon fiber cylinders become heavily soiled, they can be cleaned as outlined in Appendix 1.

SUBJECT: BREATHING APPARATUS AND AIR UNITS

Section 2:   Hydrostatic Test for Air Cylinders

Refer to Air Mask Instructions manual distributed in August 1999.

Section 3:   Refilling of Air Cylinders

A.   Air Cascade Systems are used for the refilling of breathing apparatus air cylinders.

B.   Operation of the Air Cascade System

   1.   Determine the latest hydrostatic test date on the breathing apparatus cylinder to be refilled. Do not fill any cylinder that is beyond its hydrostatic test limit.

   2.   Determine the pressure of the cylinder by checking the cylinder gauge.

   3.   Connect the charging whip to the breathing apparatus air cylinder.

   4.   Choose the lowest numbered air cascade bottle which has a pressure just above that of the breathing apparatus cylinder by opening the cascade bottle valves one at a time and reading the pressure on the manifold gauge. (If all cascade bottles are topped off at 5000 P.S.I., start with bottle #1).

   5.   Be sure all cascade bottle valves are closed. Open both the breathing apparatus cylinder and the charging whip valves slowly and fully.

   6.   Compare PSI reading of air cylinder gauge and the manifold gauge. If there is more than a 200 PSI difference (using the manifold gauge as master) have that cylinder sent to Breathing Apparatus Repair to be repaired.

   7.   Open the cascade bottle which was determined in "4" above, slowly and allow air to slowly flow into breathing apparatus cylinder.

   8.   If the cascade bottle does not have sufficient pressure to fill the apparatus cylinder, shut down that cascade bottle and open the next higher numbered cascade bottle and, again, slowly allow air to flow. If that cascade bottle does not have sufficient pressure to fill the breathing apparatus cylinder, repeat the operation until approximately 4500 PSI is reached using the manifold gauge as the master gauge, then shut all valves and disconnect air cylinder from the charging whip.

Appendix #1, MSA G1 SCBA Visual Inspection and Function Test

A. Visual Inspection
1. Inspect all components for deterioration, dirt, cracks, debris, tears, holes, stickiness, signs of heat or chemical related damage or other visible signs of damage.
2. Inspect all straps (shoulder pads, pull straps, lumbar pad, waist straps, facepiece head harness) for tears, cuts, wear, abrasions, missing buckles or straps.
3. Perform all component specific inspections listed below.

Facepiece
1. Inspect lens for cracks, scratches, deformation, and color change.
2. Check facepiece rubber for a tight seal and secure fit to the lens ring.
3. Ensure exhalation valve is clean and operates easily.
   - The valve must move off the seat and return when released (from inside the facepiece).
4. Inspect facepiece inlet for damage.
   - Ensure the inhalation valve is in place.
5. Inspect nosecup to ensure the check valve is in place and the nosecup is secure to the component housing.

Regulator
1. Ensure that moisture or debris is not present, especially inside the regulator and in the microphone ports.
2. Ensure the O-ring and seal ring are free of debris and not damaged or missing.

Pressure Reducer
1. Threaded Connect: Unthread the handwheel coupling nut from the cylinder valve (if present).
   - Inspect the coupling nut for thread damage.
   - Before installing the threaded handwheel, check that the O-ring inside the handwheel coupling nut is present and free of damage.
   - If the O-ring is damaged, it must be replaced before the SCBA is used.
2. Quick Connect: Turn the quick connect counterclockwise a quarter of a turn and pull away from cylinder valve to release (if present).
   - Before installing ensure there is no dirt or debris on either the male or female end of the coupling.
   - Ensure the adapter on the cylinder valve is tight.
3. Inspect the high pressure relief valve for damage.
   - Ensure the relief valve label is not damaged and that the relief valve ports are not showing.
   - If damaged, remove the SCBA from service and replace the relief valve.
4. Reattach **quick connect coupler to** the cylinder valve.
   - Quick connect: Push quick connect coupling onto the cylinder valve adapter until an audible snap is heard.
5. The handgrip will rapidly rotate approx. 45° counter clockwise indicating that the valve is connected to the pressure regulator. Ensure the bell is properly aligned and the screws are tight. The bell should not be able to be rotated or loose.
   - If the bell is loose or can rotate, remove the SCBA from service.

Visual Inspection

Cylinder and Valve Assembly
1. Check the hydrostatic test date on the cylinder approval sticker located on the cylinder neck. Carbon-wrapped cylinders must be tested every five years.
2. Ensure the needle and gauge face on the cylinder valve gauge are clearly visible and that the gauge stem is not bent.

3. Ensure the rubber boot is present on the cylinder valve. If the boot is missing, remove from service and until a new one is installed.
4. For a remote connect cylinder, ensure the dove tail feature is not damaged or cracked. If damaged, remove from service.

Carrier Assembly
1. Operate the latch on the cylinder band to ensure that it opens and closes properly and that it holds the cylinder securely.
2. Ensure that the lumbar pad is attached securely.
3. Ensure the power module and pressure reducer are secured to the backplate by the lower cover.
4. For remote connect cylinders, ensure the dove tail feature on the lower cover is not damaged or broken.

Control Module
1. Check the displays for cracks and other visible damage.
2. Ensure the buttons are not damaged or missing.
3. Ensure the hose assembly is securely attached to the control module.
4. Ensure the needle and gauge face on the gauge are clearly visible and that the gauge stem is not bent.

Power Module
1. Ensure that the power module and battery module are securely attached to the backplate.
2. Inspect the piezo emitters on both sides of the power module.
    - The emitter covers should not obstructed by dirt or debris.

Battery Module

1. Unlock the battery module with the battery removal tool.
    - Push the removal tool into the slot in the battery module and click into place.
    - Pull the removal tool and the battery module out of the power module.

2. Remove the battery module from the power module.
    - Check the battery module for visible damage, ensure that the connection seal is in place and undamaged.
    - Reinsert the battery module and turn off the PASS device.

B. Functional Tests

Check that the Regulator and Facepiece Can Hold a Negative Pressure
1. Close cylinder valve and purge any air from the system using bypass knob or the purge cover on the regulator
2. Hold the facepiece against the face to create an effective seal.

3. Attach regulator to the facepiece and inhale until the facepiece begins to collapse against the face.
4. Hold breath for approximately 10 seconds, negative pressure should be maintained and the facepiece should remain collapsed against the face for the entire 10 seconds.
5. Do not use the SCBA if negative pressure cannot be maintained in the facepiece.

Check Function of Regulator
1. Push the release buttons on the side of the regulator to ensure the regulator is shut off.
2. If the regulator is equipped with a bypass valve, ensure that the bypass knob is fully closed (clockwise).
3. Open the cylinder valve and ensure the valve is completely open.
4. Observe the LED display.
    - The LEDs must illuminate in a sequenced pattern.
    - After the sequence is completed, the corresponding system pressure will be displayed.
5. Open the bypass knob (counterclockwise).
    - Ensure that air flows from the regulator.
6. Close the bypass knob (clockwise).
7. Attach the regulator to the facepiece.
8. Ensure proper attachment by pulling on the regulator.
9. Don the facepiece or hold the facepiece against the face to create an effective seal.
10. Inhale sharply to start air flow.
11. Breathe normally.
    - Ensure proper regulator response.
    - The regulator should NOT make any unusual sounds including whistling, chattering, or popping
12. Remove the facepiece from the face.
13. Ensure that air flows freely.
14. Push the regulator release buttons.
    - Ensure that air flow stops.

Check Function of Control Module, Power Module, HUD and Primary Low Pressure Warning Device
When testing the control module, lay the control module down flat to check the white light illuminating the pressure gauge and to check if the graphical display and the analog gauge are consistent within a 5% range (~~110/2216 psi~~, 225/4500 psi) with the cylinder pressure.
Both reset buttons on the control module have the same function. Use one when resetting the motion alarm and the other when testing the manual alarm. Verify proper function of the HUD, control module, power module, and low pressure warning device by observing the control module gauge and display when the alarms sound. Perform this test with a full cylinder.

1. Pressurize the system by opening the cylinder valve.
    - Observe the starting sequence of the LEDs on the regulator.
    - Listen for the power module to sound and for the primary low pressure warning alarm to sound briefly.
    - Ensure that the buddy lights are flashing green.
    - Ensure the pressure gauge and LCD display (if configured) show the correct pressure.
2. Allow the control module to remain motionless for approximately 20 seconds.
    - Listen for the power module to sound repeated tones of the PASS pre-alarm.
    - Verify that the buddy lights are flashing red.
    - Verify that the red LED is flashing in the HUD.
3. Shake the control module to reset the alarm before the unit goes into full alarm.

Functional Test

4. Allow the control module to remain motionless until the full alarm sounds (30 seconds).
    - Listen for the power module to sound the tones of the PASS full alarm.
    - Verify that the buddy lights are flashing red.
    - Verify that the red LED is displayed in the HUD.
    - Verify that shaking the control module does not reset the full alarm.

5. Reset the PASS alarm by pressing the left reset button (green) on the side of the control module twice within approximately one second.
6. To check the manual activation of the PASS alarm, press and hold the alarm button on the front of the control module until the alarm activates.
    - Listen for the power module to sound the tones of the PASS full alarm.
    - Verify that the buddy lights are flashing red.
    - Verify that the red LED is displayed in the HUD.
7. Reset the PASS alarm by pressing the right reset button (green) on the side of the control module two times within approximately one second.
8. Close the cylinder valve fully.
9. Slowly open the bypass valve on the regulator to vent the pressure until the control module pressure reading drops below the following values:
    - 1575 psi - approximately (4500 psi system)
10. A flashing red LED must display in HUD at the appropriate pressure. The primary low pressure warning device should be alarming, all of the buddy lights should be flashing red, and the pneumatic light should illuminate. The alarms should continue until the air pressure is 200 psi or less.
11. When the system pressure falls below 200 psi, turn the control module off (sleep mode) by pressing the reset button (green) two times within approximately one second.
12. Open the bypass valve slowly to release any remaining pressure in the system.
13. Close the bypass valve.
    - If the primary low pressure warning device, control module, power module, or HUD does not function properly, the SCBA must be removed from service.

Speaker Module Function
1. Pressurize the system and ensure the PASS device and HUD are turned ON.
2. Attach the regulator to a facepiece and begin breathing air. This will activate the regulator and start the voice amplification.
3. Talk into the facepiece to ensure the speaker module is operating properly.
4. Press and hold the ON/OFF button on the speaker module until the audible tone sounds and the unit turns OFF.
    - The LED on the speaker module should be OFF.
5. Press and hold the on/off button on the speaker module until the audible tone sounds and the unit turns ON.

If the SCBA DOES NOT function properly in any of the above sections, the SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repair person before using. Failure to follow this warning can result in serious personal injury or death.

Appendix #2, MSA G1 SCBA Operating Manual

MSA
The Safety Company

Operating Manual
G1
SCBA
NIOSH CBRN and NFPA 1981/1982

US

Order No.: 10158406/01

MSAsafety.com

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Safety Regulations G1

1. Safety Regulations
This SCBA complies with the National Institute for Occupational Safety and Healthy (NIOSH) regulation under 42 CFR Part 84 for open circuit self-contained breathing apparatus, the National Fire Protection Association (NFPA) Standard 1981 on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services and the NFPA Standard 1982 on Personal Alert Safety Systems (PASS).

> ⚠️ **Caution Hazard**   ***Read and follow all NIOSH approval limitations. Misuse can result in serious injury or death.***

1.1 NIOSH Approval Information
This pressure-demand, self-contained breathing apparatus (SCBA) is certified by the National Institute for Occupational Safety and Health (NIOSH) for use in atmospheres immediately dangerous to life or health (IDLH): "Immediately dangerous to life or health" means conditions that pose an immediate threat to life or health or conditions that pose immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse cumulative or delayed effects on health [Title 42 CFR, Part 84.2, (Q)].

Certifying Agency Contact Information
National Institute for Occupational Safety and Health (NIOSH)
Phone: 800-CDC-4636

NIOSH Cautions and Limitations
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 as specified by the manufacturer.
O- Refer to Users 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 instructions before donning.

NIOSH S - Special or Critical User's Instructions
- Approved for use at temperatures above -25°F (- 32°C).
- Approved only when the compressed-air cylinder is fully charged with air meeting the requirements of the Compressed Gas Association Specification G-7 for quality verification level (grade) D air or equivalent specifications.
- In fire service applications, MSA recommends breathing air quality in accordance with NFPA 1989.
The cylinder shall meet applicable DOT specifications.
- Do not alter this SCBA. Altering will void the Intrinsic Safety rating and may affect the Intrinsic Safety of the device. Misuse or abuse of the heads-up display (HUD), control module, power module or speaker module or using this equipment in a manner or situation not intended by the manufacturer, may result in damage to the HUD, control, power, or speaker module, may result in personal injury or death to user or persons dependent on the user. Always inspect the HUD, control, power, and speaker module for damage before use. If damage is found, immediately remove the device from service. The HUD, control, power, and speaker module are approved intrinsically-safe and conform to UL 913 6th edition, Class I, Division 1, Groups C and D, Temperature Rating T1

Safety Regulations G1

- Use the SCBA with adequate skin protection when worn in gases and vapors that poison by skin absorption (for example: hydrocyanic-acid gas).
- Approval for use against CBRN chemical warfare agents is maintained only when using approved components and following instructions listed on the NIOSH approval matrix (P/N 10158405).
- For non-CBRN applications see Approval Insert (P/N 10154623).
- Do not mark the SCBA, i.e., with stamps, labels, paint, or other method. Use of such markings may interfere with apparatus use or may constitute a flammability hazard.

Cautions And Limitations Of Emergency Breathing Support Systems (EBSS)

- Activation or engagement of EBSS in either the donor or receiver mode changes the SCBA use to Escape-Only, approved service time for either the donor, or the receiver is no longer applicable.
- EBSS may not be engaged or activated in donor mode after the donor End-of-Service-Time-Indicator (EOSTI) has activated.
- Users must be fully trained in the operation of EBSS in accordance with a training program conforming to the requirements of NFPA Standards 1404, Fire Service Respiratory Protection Training and 1500, Fire Department Occupational Safety and Health Program.
- Simultaneous connection of more than two users, one donor and one receiver, is not permitted. SCBAs operated in EBSS mode are approved for escape only.
- Entry approval only restored after re-charge, either host or donor.
- Connection not to be established after donor/host EOSTI activation.
- Limited to one donor/receiver (host/parasite) pair. Not suitable for connection in CBRN environment.

1.2 NIOSH CBRN Approval Information
Use in conjunction with personal protective ensembles that provide appropriate levels of protection against dermal hazards. Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death. Direct contact with CBRN agents requires proper handling of the SCBA after each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the SCBA after decontamination. The respirator should not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.

⚠ **Caution Hazard**	*FAILURE TO FOLLOW THE ABOVE ITEMS IN ADDITION TO ALL ESTABLISHED CBRN PROTECTIVE MEASURES CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.*

This SCBA has been designated by NIOSH as being CBRN (chemical, biological, radiological, and nuclear) Agent Approved. It complies with the special tests under NIOSH 42 CFR 84.63(c); Chemical Agent Permeation and Penetration Resistance Against Distilled Sulfur Mustard (HD) and Sarin (GB) and the Laboratory Respirator Protection Level (LRPL) tests.

Safety Regulations G1

**NIOSH Cautions and Limitations of Use for CBRN
(Chemical, Biological, Radiological, and Nuclear) SCBA**

Q- Use in conjunction with personal protective ensembles that provide levels of protection against dermal hazards.
R- Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.
T-Direct contact with CBRN agents requires proper handling of the SCBA after each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the SCBA after decontamination.
U- The respirator should not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.

1.3 NFPA Approval Information
The MSA G1 SCBA meets the requirements of the National Fire Protection Association (NFPA) 1981
(2013 edition) Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency
Services when configured in accordance with the NFPA approval. When the SCBA is equipped with a power and control module, the SCBA meets the requirements of the NFPA 1982 (2013 edition)
Standard on Personal Alert Safety Systems (PASS) when configured in accordance with the NFPA approval. The MSA G1 SCBA must be used in accordance with NFPA 1500 Standard on Fire Department
Occupational Safety and Health Program to maintain NFPA 1981.
The certification agency for NFPA compliant SCBA used by MSA is Safety Equipment Institute (SEI).
SEI can be contacted for clarification on your NFPA compliant version of this SCBA or to report any operational malfunction.

Safety Equipment Institute (SEI)
Certifying Agency Contact Information
1307 Dolley Madison Blvd.
Suite 3A
McLean, VA 22101
Phone (703) 442-5732
Fax (703) 442-5756

1.4 FCC Approval
This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

(1) This device may not cause harmful interference and
(2) This device must accept any interference that may cause undesired operation.

NOTE: The G1 HUD, control, power, or speaker module have been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency and, if not installed in accordance with instructions, may cause harmful interference to radio communications.

Changes or modifications not expressly approved by MSA could void the user's authority to operate the equipment.

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1.5 Intrinsic Safety Approval Information
The MSA G1 SCBA equipped with a mask mounted G1 Regulator with HUD, battery, power, speaker and control module are intrinsically-safe and conform to UL 913 6th edition, Class I, Division 1, Groups C and D, Temperature Rating T1.

Do not alter this SCBA. Altering will void the Intrinsic Safety rating and may affect the Intrinsic Safety of the device. Misuse or abuse of the heads-up display (HUD), control module, power module or speaker module or using this equipment in a manner or situation not intended by the manufacturer, may result in damage to the HUD, control, power, or speaker module, may result in personal injury or death to user or persons dependent on the user. Always inspect the HUD, control, power, or speaker module for damage before use. If damage is found, immediately remove the device from service. Use only batteries specified within this manual to stay compliant with the instrinsic safety approval.

1.6 Industry Canada statement
This device complies with RSS-210 of the Industry Canada Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Ce dispositif est conforme à la norme CNR-210 d'Industrie Canada applicable aux appareils radio exempts de licence. Son fonctionnement est sujet aux deux conditions suivantes: (1) le dispositif ne doit pas produire de brouillage préjudiciable, et (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

1.7 Important Notice for Respirator Users and Respiratory Protection Program Administrators

(1) An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and training in the use of equipment, inspection and maintenance of equipment, and medical surveillance.
[See OSHA regulations, Title 29 CFR, Part 1910.134 (c).]

(2) This SCBA may be used only after proper instruction and training in its use as specified in NFPA-1500 and OSHA regulations Title 29 CFR, Part 1910.134.

1.8 Reference
For more information on the SCBA use and performance standards, consult the following publications:
- NFPA Standard 1500, Fire Department Occupational Safety and Health Programs (Chapter 5) and NFPA 1981 Standard, on Open-Circuit SCBA's for Fire Service. Above publications are available from the following: National Fire Protection Association, Batterymarch Park, Quincy, MA 22269.
- ANSI Standard Z88.5, Practices for Respiratory Protection for the Fire Service; and, ANSI Standard Z88.2, Practices for Respiratory Protection. American National Standards Institute, 1430 Broadway, New York, NY 10018.
- OSHA Safety and Health Standards (29 CFR 1910) (see specifically Part 1910. 134), available from the Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.
Compressed Gas Association, Inc., 1725 Jefferson Davis Hwy., Suite 1004, Arlington, VA 22202.

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1.9 Contact Information

In the event of a product concern, contact your local MSA authorized repair center or distributor, who will provide the necessary information to MSA for issue resolution. To report any serious concerns or to inquire about the products use the following contact information:

MSA North America
Corporate Center
1000 Cranberry Woods Drive
Cranberry Township, PA 16066
Phone 1-800-MSA-2222
Fax 1-800-967-0398

MSA Canada
16435 118th Avenue
Edmonton AB T5V 1H2
Phone 1-800-MSA-2222
Fax 1-800-967-0398

MSA de Mexico, S A De C V
Fraccionamiento Industrial Avenida
Del Conde #6
76240 El Marques, Queretaro
Phone 01 800 672 7222
Fax +52-44 2227 3943

2. Description

The MSA G1 - referred to hereafter as SCBA - is a pressure-demand self-contained breathing apparatus (SCBA) operating independent of the ambient air for use in atmospheres immediately dangerous to life or health.

Breathable air is supplied to the user from a compressed air cylinder via a pressure reducer, a regulator and a facepiece. The exhalation air is released directly into the ambient atmosphere.

The integrated personal alert safety system (PASS) provides the user with the ability to monitor movement through a motion sensor. When a user remains motionless for 30 seconds, the PASS device goes into full alarm to alert those around the user. The PASS device also monitors cylinder pressure and battery status.

The G1 SCBA consists of the following components:
- G1 Facepiece
- G1 Regulator (also referred to as Demand Valve)
- G1 Heads-Up Display (HUD) (part of both facepiece and regulator)
- G1 Pressure Reducer with low pressure warning device
- G1 Control Module
- G1 Power Module
- Cylinder and Valve Assembly
- G1 Carrier and Harness Assembly

Optional components:
- G1 Speaker Module
- ExtendAire II
- Quick-Fill Pouch
- Telemetry Module

Description G1

2.1 G1 Facepiece
The facepiece provides breathable air from the regulator past an inhalation valve to the inside of the lens (to minimize lens fogging) and then through the check valves into the nosecup. Exhaled air is directed out of the exhalation valve by the nosecup directly to ambient air. The face seal provides a snug, comfortable fit, and tight seal. The facepiece is available in 3 sizes (small, medium, large) and the nosecup is available in 3 sizes (small, medium, large).

The facepiece is equipped with a mechanical speech diaphragm that enhances speech communication. The HUD is provided inside the facepiece through light pipes from the regulator.

When in safe atmospheres with no regulator attached, ambient air can be inhaled directly through an opening to facilitate breathing and speaking with minimal resistance.

SUBJECT: BREATHING APPARATUS AND AIR UNITS

Description G1

2.2 G1 Regulator (also known as Demand Valve)

The mask mounted G1 Regulator is a pressure-demand regulator, which maintains a positive pressure in the facepiece while the SCBA is in use. The positive pressure regulator reduces the pressure coming from the pressure reducer further to provide breathable air to the user.
The regulator is connected to the facepiece with a fixed position Push-To-Connect (PTC) connection.
The regulator has two cover options available, purge and solid cover. The purge cover allows users to activate the regulator manually or provide a quick burst of air during use without using the bypass knob.

The regulator houses an electronic module which provides HUD functionality and microphone placement.
The microphones are activated when the regulator is connected to the facepiece and the user begins breathing. Inhalation noise is not amplified by the system.
The hose for the regulator is available in two options, continuous or quick connect. The continuous hose provides an uninterrupted connection from the pressure reducer to the regulator. A quick connect coupling is positioned on the chest between the pressure reducer and regulator to enable regulator removal from the SCBA for testing or repair. Both types of hoses for electronic versions have integrated wiring and hoses.

2.3 G1 Heads-Up Display (HUD)

The HUD is integrated into the regulator and projects light into the facepiece. The HUD allows users to see the cylinder pressure and alarm status while wearing the SCBA. The HUD receives the information on the SCBA and power from the power module. The HUD consists of 7 LEDs which are separated on the left and right sides to improve visibility and clarity. A light sensor in the regulator varies the LED intensity depending on the ambient light condition (optional setting).

Description G1

2.4 Cylinder and Valve Assembly

The cylinder and valve assembly store high pressure air which will be reduced to provide the user breathable air. Cylinders are available in multiple pressures and rated service times. The valve assembly provides the user the ability to open the pressure to the rest of the system. The valve assembly consist of a handwheel for opening and closing the valve, pressure gauge that always provides the pressure in the cylinder, threaded CGA connection for filling and attachment, and burst disc for over pressurization.

The SCBA can be attached to the cylinder in multiple configurations. A threaded or quick connection is available and a threaded cylinder can easily be upgraded to a quick connect attachment. The cylinder can be connected to the SCBA by a side connection off the cylinder valve (remote connect). When using a remote connect cylinder, a dove tail interlocking feature is used to secure the cylinder to the backplate of the SCBA.

Connection Type	Connection Location
Threaded	Remote (side)
Quick Connect	Remote (side)

Cylinder Capacity

Capacity (Cubic Ft.)	Pressure (psig)	Rated Svc* Life (Min.)
45	2216	30
45	4500	30
66	4500	45
88	4500	60

* As approved by NIOSH

2.5 G1 Pressure Reducer with Primary Low Pressure Warning Device

The pressure reducer reduces the cylinder pressure to an intermediate pressure, which is in turn further reduced by the regulator to a pressure that is respirable by the user. The pressure reducer incorporates a fail-safe design which ensures air flow to the user in the event of a malfunction within the pressure reducer.
The pressure reducer incorporates an intermediate pressure relief valve, and a cylinder connector with a sintered filter to capture particulates that may be in the air stream.

Universal Air Connection (UAC)

All NFPA approved SCBA are equipped with a UAC fitting (Universal Rescue Connection). The UAC fitting is a male fitting inlet for use by Rapid Intervention Teams for emergency filling of the SCBA or during transfill operations.

Description G1

Primary Low Pressure Warning Device (Bell)
The primary low pressure warning device alarms when there is approximately 35 % of the SCBA's rated service time remaining and when the cylinder valve is first opened, providing an audible indication that the alarm is working properly. NIOSH regulation states that the primary low pressure warning device must alert the user at 35%± 2%. MSA sets all low pressure warning signals to the mean of the requirement, hence 35 %.

Cylinder	Remaining Service Time (Approx.)	End of Service Time Indicator Pressure(Approx.)
30 min. 2216 psi	10 minutes	775 psi
30 min. 4500 psi	10 minutes	1575 psi
45 min. 4500 psi	16 minutes	1575 psi
60 min. 4500 psi	21 minutes	1575 psi

NOTE: The remaining service time calculations are based on a 40 LPM (liters per minute) NIOSH breathing rate.

2.6 G1 PASS Device
The PASS device on the G1 SCBA is made up of three components: battery module, power module, and control module. The PASS device provides the user the ability to monitor movement through a motion sensor. When a user remains motionless for 30 seconds, the PASS device goes into full alarm to alert those around the user. The PASS device also monitors cylinder pressure and battery status.
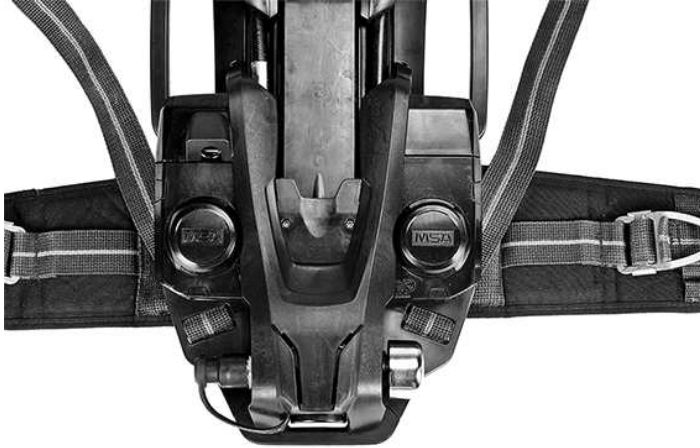

G1 Control Module

The G1 control module is the user's interface with the SCBA and PASS device.
The control module is assembled to the high pressure air source and to the power module by a pneumatics and electronic hose assembly. It is equipped with an analog gauge as well as a graphical display to provide vital information: numeric cylinder pressure, battery status, alarms and time remaining (optional).

SUBJECT: BREATHING APPARATUS AND AIR UNITS

Description G1

When the control module is being read by the user, no buddy lights on the control module will flash and a white gauge light will illuminate, to enable the user to read the gauge and display. If the SCBA is equipped with the optional telemetry module, the radio link status and evacuation alarms are displayed. The integrated PASS motion sensor is housed within the control module. The ALARM button of the control module activates the full PASS alarm with or without air pressure.

G1 Power Module

The power module serves as the power supply and provides all of the information for the control module, regulator and speaker module.

The power module is connected to the backplate. It connects to the battery module, emits audible PASS alarms and pre-alarms and has 4 buddy lights.

The battery module is equipped with six C-cell batteries. The system notifies the user when the batteries need to be replaced by emitting an audible tone from the power module, displaying an empty battery icon on the display of the control module, and by a flashing yellow LED on the HUD.

The power module is also equipped with a RIT light, which activates when low pressure alarm (configurable to medium pressure alarm) occurs, to make it easier to see the UAC in the dark.

The power module has a data logging feature that records information about the SCBA while the control module is turned on. This data log memory can be accessed using the MSA A2 Software.

The power module contains an internal real time clock. This clock can be reset using the MSA A2 Software. By default, the internal clock is set to Eastern Standard Time.

⚠️ **Caution Hazard**	*Before placing the SCBA in service, verify that the internal clock is set to the appropriate time as per the user's geographic location. Failure to do so can result in inaccurate data logging.*

Description G1

2.7 G1 Harness and Carrier Assembly

The harness and carrier assembly consists of:
- Backplate (houses the power module, battery module, and pressure reducer)
- Cylinder band with latch to hold the cylinder
- Shoulder pads
- Adjustable pull straps
- Lumbar pad
- Waist belt
- Regulator Keeper
- Chest strap (optional)

Shoulder Straps
The shoulder pads are available in two options; standard and serviceable. The standard shoulder pads provide weight distribution across the shoulder, friction pad to prevent slippage of the straps, increased visibility with retroreflection material, and steel buckles for a secure fit. The serviceable shoulder pads provide the same features as the standard shoulder pad but allow the user to easily access the hoses without having to disconnect them from the SCBA. The tunnels on these pads are released using snap buttons to ease in swapping or repair of components. The inside and outside of the shoulder straps are identifiable by print/stitching. A facepiece clip can also be attached to either shoulder strap.

The control module, regulator, and speaker module can be positioned either on the left or right shoulder pad. Typically the regulator and speaker module are placed on the left shoulder and the control module is placed on the right shoulder. The regulator keeper can be positioned in multiple locations including the waist belt and chest strap. The regulator and the regulator keeper must be on the same side of the user.

Lumbar Pad

The lumbar pad is available in three versions:
- Adjustable Lumbar Pad - The adjustable lumbar pad provides the user three positions for ideal comfort. The lumbar pad can be adjusted by one-hand and can be adjusted while worn. The lumbar pad also has a swivel feature to allow it to move with the user.
- Fixed Position Lumbar Pad - The fixed position lumbar pad provides the user with the middle position of the adjustable lumbar pad position and is not adjustable. The lumbar pad also has a swivel feature to allow it to move with the user.
- Basic Lumbar Pad - The basic lumbar pad is a fixed position, non-swivel unit that provides a low profile, light weight lumbar option for the user.

Description G1

2.8 G1 Speaker Module (Optional)

The speaker module amplifies and clarifies the speech from the facepiece during use. When inhaling, the breathing sound will not be amplified (optional). The speaker module is turned OFF when the complete SCBA is turned OFF and can also be activated/deactivated with its button. Pressing of the button is acknowledged by a beep.

2.9 Optional Components

ExtendAire II
The ExtendAire II is a pneumatic manifold that allows two users to connect and share intermediate pressure air. Each manifold contains both a male and female Quick Connect for ease of connection. The manifold is attached to three feet of usable hose. A pouch is attached to the user's left side to store and protect the manifold and hose assembly.

Quick-Fill Pouch
The Quick-Fill Pouch is a storage pouch attached to the user's right side. It is similar to the ExtendAire II pouch, but is used to hold a Quick-Fill line. The pouch is held securely closed by a combination of hook and loop fasteners and snaps, but can be opened using one hand.

Telemetry Module
The telemetry module provides the firefighter with two-way communication with Incident Command. The firefighter's vital statistics such as cylinder pressure, approximate service time remaining, PASS alarm, low battery alarm, and thermal alarm are transmitted back to Incident Command. Also, the firefighter has the ability to be evacuated remotely by Incident Command. The radio transmitter is located inside of the power module. The telemetry module is only available for SCBAs with integrated PASS devices. For details see Chapter 18.

Size Selection G1

3. Size Selection

Regardless of facial dimensions and respirator sizing charts, an actual respirator fit test, either qualitative or quantitative must be performed to ensure the correct respirator size selection.

(1) Fit test the respirator size relative to your facial features and dimensions. The safety administrator or program manager might assist in selecting the initial size to try.
(2) Carefully don the mask and conduct a negative pressure seal test. See donning instructions for procedure.
(3) If the facepiece does not pass the negative pressure seal test or feels uncomfortable, try the next nearest size relative to your face.

Passing the negative pressure seal test does not verify the size is correct. The size selected must be verified by successfully passing a Respirator Fit Test, either qualitative or quantitative. If the respirator passes a negative pressure seal test but DOES NOT pass a Respirator Fit Test, try the next nearest size.

Once the proper size is selected, the respirator must pass a negative pressure seal test every time the facepiece is donned to ensure proper fit before using the respirator. If other than facial seal leakage is detected, the condition must be investigated and corrected before another test is made.

The facepiece must also pass the negative pressure seal test before the user attempts to enter a toxic atmosphere. The facepiece will not furnish protection unless all inhaled air is drawn through the SCBA.

3.1 Respirator Fit Test

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Caution Hazard
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The user must perform a respirator fit test (Quantitative Test or Qualitative Test) and follow all warnings and limitations specified. Failure to do so can result in serious personal injury or death.
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A qualitative or quantitative respirator fit test must be carried out routinely for each wearer of this respirator to determine or confirm the amount of protection that the respirator provides.

Quantitative Test
If a quantitative fit test is used, a fit factor of at least 500, based on ambient aerosol fit test methods or equivalent, is required before any type of respirator is assigned to an individual.

Qualitative Test
If a qualitative fit test is used, only validated protocols are acceptable. The individual must pass a test designed to assess a fit factor of at least 500.

NOTE: When this facepiece is used for CBRN APR, a fit factor of at least 2000 is required for quantitative or qualitative test. Refer to User Instructions (P/N 10158743) for more information regarding CBRN APR use.

Use Quik Chek Kit (P/N 805078) to perform fit testing and following instructions provided with the kit. The fit test kit includes an adapter and instructions. Canister sold separately. Be sure the probe does not contact the face during fit testing. Failure to do so can result in false protection factor readings.

4. Visual Inspections

Conduct the visual inspections: Upon receipt, daily, and after use.
Inspect the entire SCBA after it is cleaned and disinfected.

Caution Hazard	***DO NOT inspect the SCBA before cleaning if there is danger of contacting hazardous contaminants. Clean and disinfect first, then inspect. Failure to follow this warning can cause inhalation or skin absorption of the contaminant and result in serious personal injury or death.***

NFPA-1500, as well as ANSI standards Z88.2 and Z88.5, describe three levels of inspection procedures which are to be performed. Refer to these documents, or to an inspection program prepared by a health professional in establishing an inspection program.

Caution Hazard	***If the SCBA exhibits any of the conditions listed in the Component Inspection section or if the SCBA does not function properly as described in the Functional Tests section, the SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repairperson before using. Failure to follow this warning can result in serious personal injury or death.***
	Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer. Failure to follow this warning can result in serious personal injury or death.

All Components

(1) Inspect all components for deterioration, dirt, cracks, debris, tears, holes, stickiness, signs of heat or chemical related damage or other visible signs of damage.
(2) Inspect all straps (shoulder pads, pull straps, lumbar pad, waist straps, facepiece head harness) for tears, cuts, wear, abrasions, missing buckles or straps.
(3) Perform all component specific inspections listed below.

SUBJECT: BREATHING APPARATUS AND AIR UNITS

Visual Inspections G1

4.1 Facepiece
(1) Inspect the lens for cracks, scratches, deformation, and color change.
(2) Check the facepiece rubber for a tight seal and secure fit to the lens ring.
(3) Ensure the exhalation valve is clean and operates easily. The valve must move off the seat and return when released (from inside the facepiece).
(4) Inspect the facepiece inlet for damage. Ensure the inhalation valve is in place.
(5) Inspect the nosecup to ensure the check valve are in place and the nosecup is secure to the component housing.

4.2 Regulator
(1) Ensure that moisture or debris is not present, especially inside the regulator and in the microphone ports.

⚠️ Caution Hazard	*DO NOT use any sharp objects to remove dirt or debris from the microphone ports. Rinse with water to flush ports out. Allow ports to dry fully before placing back into service. Failure to follow this warning could result in serious personal injury or death.*

(2) Ensure the o-ring and seal ring are free of debris and not damaged or missing.
(3) If the SCBA is equipped with a quick connect hose, inspect the rubber seal for deterioration, dirt, cracks, tears, or tackiness.
- Inspect the quick connect fittings.
- Ensure that the openings are clear and free of debris and other contaminants.
- Ensure that the quick connect fittings operate properly and are secured.

4.3 Pressure Reducer
(1) Threaded Connect: Unthread the handwheel coupling nut from the cylinder valve (if present).
- Inspect the coupling nut for thread damage.
- Before installing the threaded handwheel, check that the o-ring inside the handwheel coupling nut is present and free of damage. If the o-ring is damaged, it must be replaced before the SCBA is used.
(2) Quick Connect: Turn the quick connect counterclockwise a quarter of a turn and pull away from cylinder valve to release (if present).
- Before installing ensure there is no dirt or debris on either the male or female end of the coupling.
- Ensure the adapter on the cylinder valve is tight.
(3) Inspect the high pressure relief valve for damage.
- Ensure the relief valve label is not damaged and that the relief valve ports are not showing.
- If damaged, remove the SCBA from service and replace the relief valve.
(4) Reattach handwheel to the cylinder valve.
  Threaded connect:
- Thread the handwheel coupling nut onto the cylinder threads. The handwheel should be hand-tight (no tools).
  Quick connect:
- Push the quick connect coupling onto the cylinder valve adapter until an audible snap is heard. The handgrip will rapidly rotate approx. 45° counter clockwise indicating that the valve is connected to the pressure regulator.
- Grasp the handwheel firmly and pull on it to ensure the handwheel is fully attached.

(5) Ensure that the bell is properly aligned and that the screws are tight. The bell should not be able to be rotated or loose.
- If the bell is loose or can rotate, remove the SCBA from service.

Visual Inspections G1

4.4 Cylinder and Valve Assembly
(1) Check the hydrostatic test date on the cylinder approval sticker located on the cylinder neck. Carbon-wrapped cylinders must be tested every five years.
(2) Ensure the needle and gauge face on the cylinder valve gauge are clearly visible and that the gauge stem is not bent.
(3) Ensure the rubber boot is present on the cylinder valve. If the boot is missing, remove from service and until a new one is installed.
(4) For a remote connect cylinder, ensure the dove tail feature is not damaged or cracked. If damaged, remove from service. It is also essential that the required inspections and tests be performed on all SCBA cylinders in accordance with Department of Transportation (DOT) regulations. DOT regulations require that composite cylinders be retired from service after the fifteenth year. This does not include cylinder valve assemblies that may be reused. Contact an MSA distributor or sales associate for more information regarding this policy.

4.5 Carrier Assembly
(1) Operate the latch on the cylinder band to ensure that it opens and closes properly and that it holds the cylinder securely.
(2) Ensure that the lumbar pad is attached securely.
(3) Ensure the power module and pressure reducer are secured to the backplate by the lower cover.
4) For remote connect cylinders, ensure the dove tail feature on the lower cover is not damaged or broken.

4.6 Control Module
(1) Check the displays for cracks and other visible damage.
(2) Ensure the buttons are not damaged or missing.
(3) Ensure the hose assembly is securely attached to the control module.
(4) Ensure the needle and gauge face on the gauge are clearly visible and that the gauge stem is not bent.

4.7 Power Module
(1) Ensure that the power module and battery module are securely attached to the backplate.
(2) Inspect the piezo emitters on both sides of the power module.
   • The emitter covers should not obstructed by dirt or debris.

4.8 Battery Module

(1) Unlock the battery module with the battery removal tool.
   • Push the removal tool into the slot in the battery module and click into place.
   • Pull the removal tool and the battery module out of the power module.

(2) Remove the battery module from the power module.
(3) Check the battery module for visible damage, ensure that the connection seal is in place and undamaged.
(4) Reinsert the battery module and turn off the PASS device.

Visual Inspections G1

4.9 ExtendAire II

(1) Inspect the ExtendAire II Manifold. Ensure that all roll pins are present.

(2) Inspect Quick-Connect fittings.

(3) Ensure that the openings are clear and free of debris and other contaminants.

(4) Ensure that the Quick-Connect fittings operate properly and are secured.

4.10 Record Keeping
Following inspection, the date and initials of the designated inspector should be recorded. A more detailed record of the operations performed can be noted on an inspection and maintenance log, available from MSA. When the inspection data has been recorded, the SCBA is ready for functional tests.

5 Functional Tests

If the SCBA does not function properly as described in the Functional Tests section, the SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repairperson before using. Failure to follow this warning can result in serious personal injury or death.

If the SCBA has passed the visual inspection successfully, conduct the functional tests daily and after each use. If any part of the SCBA fails the functional test, do not use the SCBA and return the device to a certified repair technician.

NOTE: The functional checks must be conducted with a full cylinder. Before starting the tests, check the pressure gauge on the cylinder valve to verify that the cylinder is full.

5.1 Check that the Regulator and Facepiece Can Hold a Negative Pressure
1. Close the cylinder valve and purge any air from the system using the bypass knob or the purge cover on the regulator
2. Hold the facepiece against the face to create an effective seal.
3. Attach regulator to the facepiece and inhale until the facepiece begins to collapse against the face.
4. Hold breath for approximately 10 seconds.
    * Negative pressure should be maintained and the facepiece should remain collapsed against the face for the entire 10 seconds. Do not use the SCBA if negative pressure cannot be maintained in the facepiece.

5.2 Check Function of Regulator
1. Push the release buttons on the side of the regulator to ensure the regulator is shut off.
2. If the regulator is equipped with a bypass valve, ensure that the bypass knob is fully closed (clockwise).
3. Open the cylinder valve and ensure the valve is completely open.
4. Observe the LED display.
    * The LEDs must illuminate in a sequenced pattern.
    * After the sequence is completed, the corresponding system pressure will be displayed.
5. Open the bypass knob (counterclockwise).
    * Ensure that air flows from the regulator.
6. Close the bypass knob (clockwise).
7. Attach the regulator to the facepiece.
8. Ensure proper attachment by pulling on the regulator.
9. Don the facepiece or hold the facepiece against the face to create an effective seal.
10. Inhale sharply to start air flow.

Functional Tests G1

11. Breathe normally.
     - Ensure proper regulator response.
     - The regulator should NOT make any unusual sounds including whistling, chattering, or popping
12. Remove the facepiece from the face.
13. Ensure that air flows freely.
14. Push the regulator release buttons.
     - Ensure that air flow stops.

5.3 Check Function of the Control Module, Power Module, HUD and Primary Low Pressure Warning Device

DO NOT disconnect the coupling nut when pressure is shown on analog pressure gauge. Release all pressure from the SCBA by opening the regulator bypass valve or pressing the purge button. Removing the coupling nut while the SCBA is pressurized can result in serious personal injury, death, or

SCBAs with integrated PASS:
To make sure that all lights are visible for these checks, align the control module, regulator and SCBA as shown below.

When testing the control module, lay the control module down flat to check the white light illuminating the pressure gauge and to check if the graphical display and the analog gauge are consistent within a 5% range (110/2216 psi, 225/4500 psi) with the cylinder pressure.
Both reset buttons on the control module have the same function. Use one when resetting the motion alarm and the other when testing the manual alarm.
Verify proper function of the HUD, control module, power module, and low pressure warning device by observing the control module gauge and display when the alarms sound. Perform this test with a full cylinder.

DO NOT disconnect the coupling nut when pressure is shown on analog pressure gauge. Release all pressure from the SCBA by opening the regulator bypass valve or pressing the purge button.
Removing the coupling nut while the SCBA is pressurized can result in serious personal injury, death, or damage to equipment.

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Functional Tests G1

1. Pressurize the system by opening the cylinder valve.
   - Observe the starting sequence of the LEDs on the regulator.
   - Listen for the power module to sound and for the primary low pressure warning alarm to sound briefly.
   - Ensure that the buddy lights are flashing green.
   - Ensure the pressure gauge and LCD display (if configured) show the correct pressure.
2. Allow the control module to remain motionless for approximately 20 seconds.
   - Listen for the power module to sound repeated tones of the PASS pre-alarm.
   - Verify that the buddy lights are flashing red.
   - Verify that the red LED is flashing in the HUD.
3. Shake the control module to reset the alarm before the unit goes into full alarm.
4. Allow the control module to remain motionless until the full alarm sounds (30 seconds).
   - Listen for the power module to sound the tones of the PASS full alarm.
   - Verify that the buddy lights are flashing red.
   - Verify that the red LED is displayed in the HUD.
   - Verify that shaking the control module does not reset the full alarm.
5. Reset the PASS alarm by pressing the left reset button (green) on the side of the control module twice within approximately one second.
6. To check the manual activation of the PASS alarm, press and hold the alarm button on the front of the control module until the alarm activates.
   - Listen for the power module to sound the tones of the PASS full alarm.
   - Verify that the buddy lights are flashing red.
   - Verify that the red LED is displayed in the HUD.
7. Reset the PASS alarm by pressing the right reset button (green) on the side of the control module two times within approximately one second.
8. Close the cylinder valve fully.
9. Slowly open the bypass valve/keep purge pressed on the regulator to vent the pressure until the control module pressure reading drops below the following values:
   - 775 psi - approximately (2216 psi system)
   - 1575 psi - approximately (4500 psi system)

A flashing red LED must display in HUD at the appropriate pressure. The primary low pressure warning device should be alarming, all of the buddy lights should be flashing red, and the pneumatic light should illuminate. The alarms should continue until the air pressure is 200 psi or less.

10. When the system pressure falls below 200 psi, turn the control module off (sleep mode) by pressing the reset button (green) two times within approximately one second.
11. Open the bypass valve slowly/keep purge pressed to release any remaining pressure in the system.
12. Close the bypass valve/release purge. If the primary low pressure warning device, control module, power module, or HUD does not function properly, the SCBA must be removed from service.

Functional Tests G1

5.4 Speaker Module Function
1. Pressurize the system and ensure the PASS device and HUD are turned ON.
2. Attach the regulator to a facepiece and begin breathing air. This will activate the regulator and start the voice amplification.
3. Talk into the facepiece to ensure the speaker module is operating properly.
4. Press and hold the ON/OFF button on the speaker module until the audible tone sounds and the unit turns OFF.
   - The LED on the speaker module should be OFF.
5. Press and hold the on/off button on the speaker module until the audible tone sounds and the unit turns ON.

6 Donning

> *- If the SCBA does not function properly as described in this section, the SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repairperson before using.*
> *- This device may not seal properly with your face if you have a beard, gross sideburns or similar physical characteristics (see NFPA-1500 and ANSI Z88.2). An improper facial seal may allow contaminants to leak into the facepiece, reducing or eliminating respiratory protection. Do not use this device if such conditions exist.*
> *- The face-to-facepiece seal must be tested before each use.*
> *- A nosecup must be installed in the facepiece.*
> *- In order to guarantee a proper fit for those wearing glasses, the G1 spectacle kit must be worn since ordinary glasses cannot be worn under the facepiece.*
> *- Never remove the facepiece except in a safe, non-hazardous, non-toxic atmosphere.*
> *- Users must wear suitable protective clothing and precautions must be taken so that the device is not exposed to atmospheres that may be harmful to it. Failure to follow these warnings can result in serious personal injury or death.*

6.1 Approval Verification
Before using the SCBA, ensure all NIOSH Approval Labels and Approval Inserts have been reviewed to ensure the configuration of the SCBA is an approved configuration. Refer to the Safety Regulation for more details and a complete list of CAUTIONS and LIMIATIONS for the SCBA. For NIOSH 42 CFR
Part 84 approval configurations, see Approval Insert (P/N 10154623). For NIOSH CBRN configurations, see Approval Insert (P/N 10158405).

Donning G1

6.2 Preparation
The device must have passed all visual inspections and functional tests (see previous chapters) before use.
1. Ensure that the cylinder is fully pressurized.
2. Check cylinder connection:
    Remote Connection:
    - Threaded connect:
        Check that the coupling nut is hand-tight (no tools).
        Ensure the cylinder valve is correctly seated in the dove tail.
    - Quick connect:
        Ensure secure connection by pull on quick connect coupling.
        Ensure the cylinder valve is correctly seated in the dove tail.
3. Pull on the cylinder latch assembly to ensure the cylinder latch is attached securely.
4. Check battery status by pressing and holding both reset buttons until the battery icon appears.
    - The battery icon will shut off after approximately 10 seconds.
5. Loosen the shoulder straps as far as possible.
6. Loosen the waist belt straps as far as possible.
7. Tag in the user's information with ID Tag. See "Personnel ID Tag" section for more information.

6.3 SCBA Donning Procedure

1. Slide the right arm through the right shoulder strap

.

2. Slide the left arm through the left shoulder strap.
- Check correct orientation of shoulder straps.
- If chest strap is present, ensure the regulator hose is on top.

3. Bend forward slightly; resting the carrier on the back.

Donning G1

4. Fasten the waist belt and pull forward on the waist strap pull tabs to tighten for a snug fit.
   - Most of the SCBA weight should be carried on the hips.
5. Attach the chest strap buckle (optional). Tighten if necessary.

6. Stand up straight. Pull down on the shoulder strap pull tabs to tighten straps. Adjust the waist belt if necessary.

7. The adjustable lumbar pad can be adjusted while wearing the SCBA.
   - Loosen or release the waist buckle.
   - Reach behind to find the lumbar pad.
   - Pull the level towards the user and push up or down depending on the adjustment needed.
   - Release the tab and pull up or down to ensure the lumbar pad is locked in.

8. Tuck in the shoulder straps and waist strap ends. They must be tucked in and lay flat across the body.

Donning G1

9. Grasp the regulator and push the side buttons to release the regulator from the regulator keeper.
    *   Ensure that the red bypass knob is fully closed (clockwise).

10. Reach behind and fully open the cylinder valve.

When pressurizing the system, listen for any hiss or pop sounds from the system. If heard, remove the SCBA from service. Return it to a MSA trained or certified repair technician. Failure to follow these warnings can result in serious personal injury or death.

11. As the system pressure rises from 0 to 200 psi, both visible and audible alerts activate automatically, indicating that the SCBA is functioning properly. The following indications must occur:
    *   Brief sound from the pressure reducer primary low pressure warning device
    *   Chirp from the power module and speaker module (if available)
        *   Pressure display on the HUD Buddy light flashing

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Donning G1

 DO NOT use the SCBA if the primary low pressure warning device fails to alarm, the power module fails to sounds, or the buddy lights or HUD lights fail to illuminate. The SCBA must be checked and corrected for proper operation by an MSA trained or certified technician before using. Failure to follow these warnings can result in serious personal injury or death.

No air should flow from the regulator. If it does, repeat previous steps 9, 10 and 11.

12. Ensure the control module and the HUD pressure indicators show a full cylinder.

 DO NOT use the SCBA if the cylinder gauge and control module readings are not within 5% (110/2216 psi, 225/4500 psi) of full cylinder pressure. Failure to follow these warnings can result in serious personal injury or death.

Check the regulator's bypass operation.
13. Grasp the red knob and turn it counter-clockwise.
    - Listen for airflow and then turn it to the off position.
14. Listen for air leaks and watch the pressure indicators (pressure gauge, control module, HUD) for 10 seconds.
15. The product is now ready to use.

 DO NOT use the SCBA if the pressure drops more than 100 psi in ten seconds. The SCBA must be repaired; otherwise, reduced service life may result. Failure to follow these warnings can result in serious personal injury or death.

 DO NOT use the SCBA if the pressure reducer warning signal fails to sound or fails to continuously sound down to pressures of 200 psi, or if the control module or HUD fails to light properly. Failure to follow these warnings can result in serious personal injury or death.

Donning G1

6.4 Facepiece Donning Procedure
The facepiece is either carried using the neck strap in front of the chest or using the clip on the shoulder strap. To ensure protection from dirt and debris, ensure the facepiece opening is towards the user's body.

1.   Spread the harness with both hands.

2.   Position the chin into the chin cup.

3.   Pull the head straps over your head.
   - Ensure that the harness is sitting correctly and is not twisted.

4.   Adjust facepiece and tighten the straps firmly and evenly.

Caution Hazard

Ensure that the top of the facepiece seal __directly__ contacts the user's forehead. Ensure that there is no hair between the facepiece's seal and the user's skin. Failure to follow these warnings can result in serious personal injury or death.

Leak Check

In order to check the facepiece-to-face tightness a leak test must be performed before each use.

1. Seal the inlet connector with the palm of your hand or by attaching the regulator.
    - If properly aligned the bypass knob will show on the right side of the user's facepiece.

2. Test   tightness.

    - The
        - Inhale and hold breath for 10 seconds. facepiece must stay collapsed on face.
        and
    - Exhale. The exhalation valve should open release the pressure inside the facepiece.
3. If necessary   retighten the straps.
    - If the
        leak test fails the facepiece must not be
        used.

Installing the Push-to-Connect Regulator

1. Grasp the regulator and insert it into the facepiece by pushing inward.
    - If properly aligned the bypass knob will show on the right side of the user's facepiece.

2. Check proper engagement by pulling on the regulator to ensure that the regulator is securely attached to facepiece.

⚠ **Caution Hazard**   *DO NOT use the SCBA unless the regulator is connected properly. A regulator that is not installed correctly can separate from the facepiece unexpectedly. Failure to follow these warnings can result in serious personal injury or death.*

3. Inhale sharply to start the air flow.
4. Check the bypass again by turning the red knob counter-clockwise until increased air flow is felt. Close the bypass.

⚠ **Caution Hazard**   *There must be a continuous flow of air when the bypass knob is opened. If not, do not use the SCBA. Failure to follow these warnings can result in serious personal injury or death.*

NOTE: If the SCBA passes all tests, it is ready for use. These tests must be performed every time before entering a hazardous atmosphere. If the SCBA fails to meet any of the tests, the condition(s) must be corrected before using the SCBA.

7. During Use

⚠️ **Caution Hazard**	**Before use, the product operability must be verified. The product must not be used if:** • The function test is unsuccessful, • The product is damaged, • Proper servicing/maintenance has not been made or • Genuine MSA spare parts have not been used. **Take into account the following factors which may affect the duration or the service life:** • The degree of physical activity of the user; • The physical condition of the user; • The degree that the user's breathing rate is increased by excitement, fear, or other emotional factors; • The degree of training or experience which the user has had with this or similar equipment; • Whether or not the cylinder is fully charged; • The presence in the compressed air of carbon dioxide concentrations greater than the .04% level normally found in atmospheric air; • The atmospheric pressure; if used in a pressurized tunnel or caisson at 2 atmospheres (15 psi gauge) the duration will be one-half as long as when used at 1 atmosphere; at 3 atmospheres the duration will be one-third as long; the service life of the SCBA is based on 1 atmosphere of pressure. • The condition of the SCBA. **Leave a contaminated area immediately if:** • Breathing becomes difficult • Dizziness or other distress occurs • You taste or smell the contaminant • You experience nose or throat irritation • SCBA not functioning according to the instructions or training **DO NOT use the carrier and harness assembly** as a vertical raising or lowering device. **Do NOT use this product** as a self-contained underwater breathing apparatus. This will result in a rapid loss of air which could result in serious injury or loss of life. **Return to a safe atmosphere** immediately if discoloration, crazing, blistering, cracking, or other deterioration of the facepiece lens material is observed. **Misuse or abuse** of the HUD, the control module, power module, speaker module or the equipment to which they are attached, or using this equipment in a manner or situation not intended by the manufacturer, or may result in personal injury or death to user or persons dependent on the user or damage to the equipment. **Misuse and/or failure to follow this warning can result in serious injury or death.**

Before using the SCBA, ensure all NIOSH Approval Labels and Approval Inserts have been reviewed to ensure the configuration of the SCBA is an approved configuration. Refer to the Safety Regulation for more details and a complete list of CAUTIONS and LIMIATIONS for the SCBA. For NIOSH 42 CFR Part 84 approval configurations, see Approval Insert (P/N 10154623). For NIOSH CBRN configurations, see Approval Insert (P/N 10158405).

Periodically check the pressure indicated on HUD and chest mounted pressure indicator during use.
The control module continually displays the cylinder pressure while the HUD indicates when each segment of the total cylinder pressure has been reached. When the needle on pressure indicator reaches the red zone on the gauge face, the primary low pressure warning device alarms, the HUD will display a flashing red pressure LED, and the alarm button on the control module and buddy lights on the power module will flash red.

The HUD, control module, and primary low pressure warning device indicate when cylinder pressure drops below these approximate values:
* 775 psi-approximately (2216 psi system)

- 1575 psi-approximately (4500 psi system)

During Use G1

Immediately return to fresh air if:
- SCBA free-flows (provides air when not inhaling).
- Low pressure warning device sounds.
- HUD low pressure indicator lights and flashes red.
- Control module alarm button flashes red.
- When the HUD, control module, or low pressure warning device indicates 35% cylinder pressure, immediately return to fresh air.
- If the air flow in the SCBA is reduced: Immediately open the regulator bypass/keep purge pressed. Immediately return to fresh air.

⚠ Caution Hazard	***SCBA service life is greatly reduced when the regulator bypass is used.***

7.1 Cold Weather Operation

Moisture can cause problems in the SCBA if it freezes. However, moisture can cause freezing problems even if the surrounding air is above freezing. Air flowing from the cylinder through the pressure reducer and regulator drops from cylinder pressure to close to atmospheric pressure very quickly. This causes the air to expand and creates a cooling effect. Although the surrounding temperature may be warmer than 32°F (0°C), the temperature inside the regulator may be lower. Prior to storage of the SCBA at temperatures below 0°F (-18°C), verify that the battery module is equipped with fully charged batteries.

1. Any water inside could turn to ice and restrict airflow. To keep moisture from entering the facepiece mounted regulator, keep the regulator in the regulator keeper when not in use.
2. When the SCBA is away from heat, water spray can freeze on the regulator surface. Ice can build up and bind the side buttons or the bypass valve. Before entering or re-entering a hazardous atmosphere, ensure the side buttons and bypass valve are ice-free and operating properly.
3. Periodically check the bypass to be sure it is ice-free.
4. Moisture can enter through the cylinder valve or coupling nut when cylinders are replaced on the SCBA. When replacing cylinders, ensure moisture or contamination does not enter the system. Remove any ice from these fittings.
5. Wipe the coupling nut threads and cylinder valve threads before installing a new cylinder. Water can contaminate the system and freeze.
6. When cleaning the SCBA, ensure water does not enter the facepiece or regulator.
7. Thoroughly dry the facepiece and facepiece mounted regulator after cleaning and disinfecting. Follow Confidence Plus® Cleaning Solution instructions.
8. The latch can freeze when moist. Clean and dry the latch before storing the SCBA at low temperatures.
9. If moisture gets on the dove tail, the cylinder could get stuck in the dove tail if it freezes. Clean and dry the dove tail before storing the SCBA at low temperatures.
10. Ensure that the UAC dust cap is in place before storing the SCBA.

⚠ Caution Hazard	***Fresh batteries must be installed in the battery module prior to storage of the SCBA at cold temperature for an extended period of time.***

Telemetry Equipped SCBA

Telemetry equipped SCBA in cold temperatures may lose and gain connection during use. Even if the telemetry module connection is lost, the device will continue to try and reconnect. The breathing performance of the SCBA is unaffected by the telemetry device.

8. G1 Heads-Up Display (HUD)

8.1 G1 HUD Pressure Status

The G1 HUD provides the pressure and alarm status to the user through light pipes into the facepiece.
The pressure status is on the right side of the user, while the alarm status is on the left side of the user. The pressure status indicators are divided into four segments. These four segments are based on percentage of the maximum pressure of the cylinder. Each segment has a corresponding quantity and color of LEDs associated with them. Below are the segments the G1 HUD:

Segment	Pressure range	Illuminated LEDs
Segment 1	75 to 100 %	Four (4) green LEDs
Segment 2	50 to 74 %	Three (3) green LEDs
Segment 3	36 to 49 %	Two (2) yellow LEDs
Segment 4	0 to 35 %	One (1) red LED

The G1 settings can be configured to when and how the segments get displayed. There are four (4) options the user can select from prior to using the product.

Option 1: Intermittent Mode (Default Mode)

Intermittent mode shows the pressure status when there is a change from one segment to another.
- Segment 1 is displayed at start-up with a full cylinder and displayed for 20 seconds before going out.
- Segment 2 displays once the pressure reached its range and is displayed for 20 seconds before going out.
- Segment 3 will flash when the pressure reached its range and displays for 30 seconds before going out.
- Once Segment 4 is reached the LEDs activate and stay flashing until the unit is shutdown.

The HUD can be refreshed during a segment by pressing the reset button to display the pressure.
This mode uses the least amount of power providing the best battery life.

🟢🟢🟢🟢	Segment 1: 75 to 100% On for 20 sec, Steady on
⚪🟢🟢🟢	Segment 2: 50 to 74% On for 20 sec, Steady on
⚪🟡🟡⚪	Segment 3: 36 to 49% On for 30 sec, Flashing
🔴⚪⚪⚪	Segment 4: 0 to 35% Flashing continuously

G1 Heads-Up Display (HUD)

Option 2: Intermittent Mode with Continuous at Segment 3
Intermittent mode with Continuous at Segment 3 is similar to Intermittent Mode except that when Segment 3 is reached, the LEDs remain on and flashing until Segment 4 is reached. The HUD can be refreshed during a segment by pressing the reset button to display the pressure.

🟢🟢🟢🟢	Segment 1: 75 to 100% On for 20 sec, Steady on
⚪🟢🟢🟢	Segment 2: 50 to 74% On for 20 sec, Steady on
⚪🟡🟡⚪	Segment 3: 36 to 49% Flashing continuously
🔴⚪⚪⚪	Segment 4: 0 to 35% Flashing continuously

Option 3: Continuous Mode
Continuous mode shows the pressure status at all times. The LEDs will remain on at all times so the user can always look down to know the pressure. This mode uses the most amount of power providing the shortest battery life of the four options.

🟢🟢🟢🟢	Segment 1: 75 to 100% Steady on continuously
⚪🟢🟢🟢	Segment 2: 50 to 74% Steady on continuously
⚪🟡🟡⚪	Segment 3: 36 to 49% Flashing continuously
🔴⚪⚪⚪	Segment 4: 0 to 35% Flashing continuously

Option 4: Oscillating Mode Oscillating mode shows the pressure status on an interval basis. The LEDs cycle from a low light level to a high light level periodically. The LEDs are always on and the brightness changes over time during the pressure ranges of Segment 1 and Segment 2. Once Segment 3 is reached, the LEDs flash for 30 seconds before going back to oscillating until Segment 4 is reached. Once Segment 4 is reached the LEDs activate and stay flashing until the unit is shutdown.

🟢🟢🟢🟢	Segment 1: 75 to 100% Oscillating
⚪🟢🟢🟢	Segment 2: 50 to 74% Oscillating
⚪🟡🟡⚪	Segment 3: 36 to 49% Flashing 30 sec, Oscillating
🔴⚪⚪⚪	Segment 4: 0 to 35% Flashing continuously

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8.2   G1 HUD Alarm Status

The status LEDs alert the user to primary and second alarms on the SCBA. These status LEDs use three icons:

- Battery icon
- Running man icon
- Caution triangle.

Alarm	Illuminated Icon	Icon shown
PASS Pre-Alarm	🔋 🏃 🔺	Red Flashing*
PASS Full Alarm	🔋 🏃 🔺	Red Solid
PASS Manual Alarm	🔋 🏃 🔺	Red Solid
Electronics Failure	🔋 🏃 🔺	Red Flashing*
Primary Thermal Alarm (Optional)	🔋 🏃 🔺	Red Flashing*
Alarm	**Illuminated Icon**	**Icon shown**
Secondary Thermal Alarm (Optional)	🔋 🏃 🔷	Blue Flashing*
LCD Thermal Alarm	🔋 🏃 🔷	Blue Flashing*
Pressure Drop Alarm (Optional)	🔋 🏃 🔷	Blue Flashing*
Evacuate (if equipped)	🔋 🏃 🔺	Red Flashing*

G1 HUD Alarm Status

Evacuate Confirmed (if equipped)	🔋 🏃 ⚠️	Red Solid*
Low Battery Alarm	🔋 🏃 ⚠️	Yellow Flashing*

* Check control module for more information

NOTE: For optional alarms, refer to the MSA A2 Software to configure these alarms.

G1 HUD Buddy Light

The G1 HUD is equipped with a buddy light that utilizes the top button on the regulator. The buddy light on the regulator is the only buddy that does not light green. The buddy light will illuminate yellow at Segment 3 of the pressure range. It will illuminate red when the pressure reaches Segment 4 or a primary alarm goes off. Primary alarms are considered PASS alarms and primary thermal alarm. All other alarms are considered secondary alarms and only alert the user.

G1 HUD Light Sensor

The G1 HUD is also equipped with an ambient light sensor that analyzes the surround light and changes the intensity of the LEDs to ensure they are easy to see. The ambient light sensor is located in the regulator. Light is captured by the regulator button and travels inside the regulator to the sensor. There are multiple settings to the light sensor. Under bright light conditions, the LEDs are brightened to their maximum intensity. When in very dark surroundings, the LEDs are dimmed to their lowest intensity to ensure they do not blind the user.

9. Control Module

> ⚠️ **Caution Hazard**
>
> *The control module has the ability to display calculated remaining service time counting down to 0 psi (default) or 35% of the rated service pressure or to medium pressure alarm. The user must determine which option has been selected for the control module in service.*
> *Actual time remaining may be less than the calculated time displayed.*
> *Increases in breathing rate may reduce remaining time more than expected.*
> *Use time indicator as general guide only. The time displayed is based on the continuation of the average breathing rate over the last three minutes.*
> *Increases in the breathing rate after checking the displayed time may result in less remaining time than anticipated.*
> *Failure to follow this warning can result in serious personal injury or death.*

US

9.1 PASS Device Functionality

The G1 Control Module provides the primary user interface for the SCBA electronics. For the PASS device, the control module displays the SCBA pressure (configurable), estimated time remaining (configurable), the status of the thermal sensor, battery level, and radio communication status, if equipped. The control module will also display all alarm conditions for easy interpretation. The G1 Power Module provides the power and data to the control module to display the information. The power module also provides the alarms and sounds for the system as well as providing four buddy lights to make others aware of the system status.

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Control Module G1

Sleep Mode
When the unit is not being used, it is in sleep mode. Sleep mode is a condition in which the unit periodically checks for changes in the system and will wake as needed. The conditions that will wake up the system from sleep mode include battery installation, system pressurization or pressing the ALARM button on the control module.

The control module will also wake from sleep mode when the RESET button is pressed and held to check the battery status without pressurizing the system. If the button is continued to be held after the battery symbol appears, the control module will go into service mode which provides additional detail on the products usage. Service mode should only be used by trained personnel.

Start-up Sequence

<table>
<tr>
<td>⚠️
 Caution
 Hazard</td>
<td>*If the control module displays a "Do Not Use" icon during start-up, the SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repair technician. Failure to follow this warning can result in serious personal injury or death.*</td>
</tr>
</table>

Once the PASS device leave sleep mode, it will enter a start-up sequence that will provide the user information on the state of the unit for operation.

Step 1 *MSA The Safety Company / Jack Davidson / Ladder*	- The logo screen displays on the control module showing the MSA logo and a user and/or team name if assigned to the device. - The buddy lights on the power and control module cycle through red, yellow, and green. - The power module plays the start-up tone. During this process, the PASS device is performing a selftest to ensure the device is operating correctly.
Step 2 ✅	The self-test screen displays the results of the self-test to the user. - A successful self-test will display a "Go" icon to indicate the unit can be put into service. - If maintenance is required, a "maintenance" icon will appear indicating the unit should be removed from service after use. - If the device should not be used, a "Do Not Use" icon will display on the control module and the full alarm from the power module will be alarmed. At this point, the PASS device will not continue to operate. The SCBA must be removed from service and must be checked and corrected for proper operation by an MSA trained or certified repair technician before using.
Step 3	The primary screen displays and the product can be used.

Primary Screen

The primary screen provides all critical information to the user. To illuminate the primary either pick up the control module or press the RESET button. Three options of information can displayed on the primary screen: pressure status, time remaining calculation, or time on air.

Fig. 1Primary Screen

The pressure status is a configurable option in the PASS device and is set as the default. The settings can be changed by using the MSA A2 Software (P/N 10162374). The two other options for the primary screen are time remaining calculation or time on air.

Options and Screens
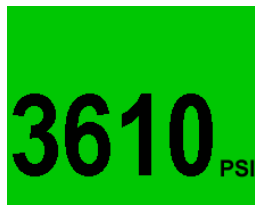
Option 1 Pressure status provides the user the pressure of the system

Option 2 Time remaining feature calculates the amount of air used and estimates how long it will take to use the remaining air in the cylinder

The Background color of the screen corresponds with the system pressure.
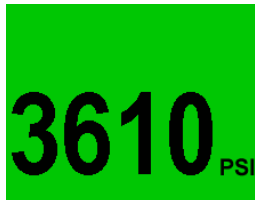
Green indicates pressure 50% or higher
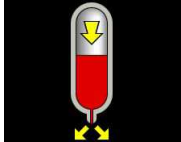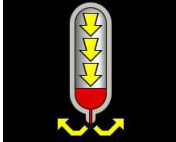
Yellow indicates pressure between 36 and 49%

Red indicates a pressure lower then 35%

US

Control Module G1

Alarm Type	HUD	Control Module		Buddy Lights	Sound
Motion/manual full alarm	Red Attention Solid			Red	NFPA Full Alarm
Low pressure alarm (EOSTI)	Red Pressure Flashing			Red	Optional sound (See A2 Software)
Pressure drop alarm (optional)	Blue Attention Flashing			Red	Optional sound (See A2 Software)
Evacuate (if equipped)	Red Evacuation Flashing			Red	Sweep
Evacuation confirmed(if equipped)	Red Evacua-tion Solid			Red	None
Overhaul reminder (optional)	Based on Pressure and Alarms			Based on Pressure and Alarms	None
Hardware failure	Red Attention Flashing			Red	NFPA Full Alarm

Alarm Type	HUD	Control Module	Buddy Lights	Sound
Thermal Alarm **Primary**	Red Attention Flashing **(optional)**		Red	Optional sound (See A2 Software)

Control Module G1

Thermal Alarm **Secondary (optional)**	Blue Flashing	⚠ **3610**PSI	🌡️ 🔵 📶 🔋 🕐 **45**min	Based on pressure	Optional sound (See A2 Software)
Thermal Alarm Confirm (Primary)	Red Attention Solid	⚠ **3610**PSI	🌡️ 🔵 📶 🔋 🕐 **45**min	Red	None
LCD Temp Alarm	Blue Attention Flashing			Based on Pressure	None
Low Battery	Yellow Battery Flashing	⚠ **3610**PSI	🌡️ 🔵 📶 🔋 🕐 **45**min	Based on Pressure	Beep every 10 seconds
Medium Pressure Alarm	None	**2130**PSI	🌡️ 🔵 📶 🔋 🕐 **45**min	Yellow	Optional sound (See A2 Software)

Secondary Alarms

Icon

The attention icon flashes for an active and new warning or is steady for an old/ seen warnings that have been viewed.

Evacuation alarm, the running man icon is visible on the primary screen if the evacuation has been confirmed.

The buddy light status remains based on pressure status for secondary alarms. **NOTE:** For optional alarms configuration, refer to **A2 Accountability Control Software Operating Manual, 10162374**

US

Thermal Alarm

> ## ⚠ WARNING
>
> Although this thermal alarm provides an indication that the temperature/time curve is exceeded, the curve may not represent the threshold to injury due to variations in individuals and the protective clothing worn. Use this alarm as a reference only to increasing temperature/time. Do not use as a substitute for standard operating procedures regarding escape from temperature/time extremes. Misuse can result in serious personal injury or death.

The control module can monitor thermal conditions if the thermal alarm option is activated. The thermal alarm can be set to either a primary alarm or secondary alarm. Secondary alarm is the default condition. If the user is exposed to more than the pre-set limit of thermal load (temperature/time), the secondary alarm on the control module will display and the power module will sound a tone every 5 seconds.

The figure below shows the control module thermal alarm activation curve. The temperature/time limits correspond to this graph. The thermal alarm sounds if the preset limit exceeds the curve displayed on the graph. The alarm will self-cancel depending on the severity of conditions. This may occur even though the temperature is above the thermal curve.
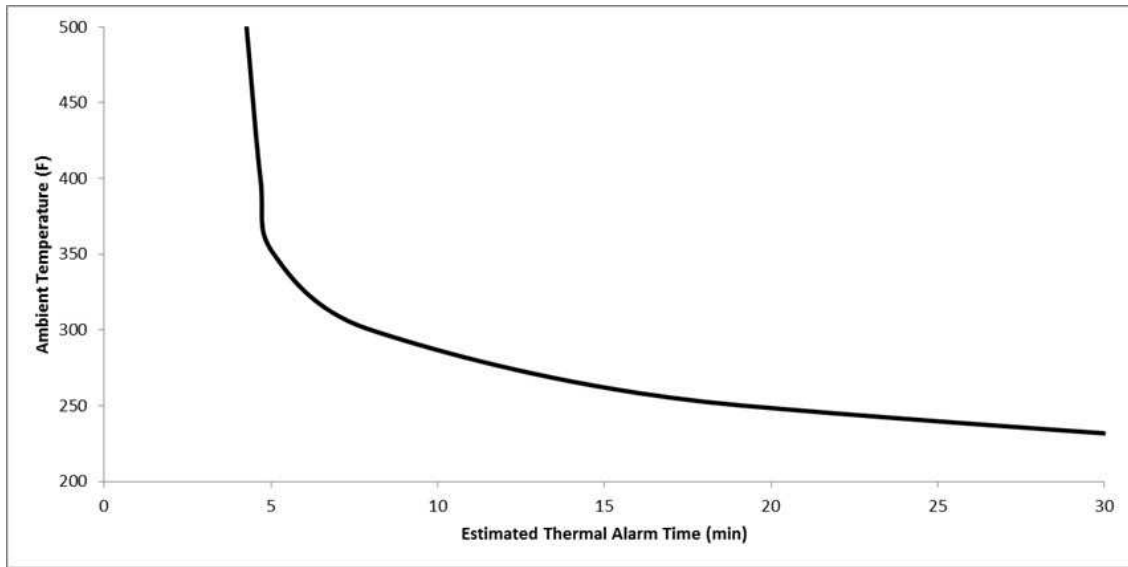
NOTE: This chart was generated from data obtained in a laboratory setting and is for reference only. Conditions are highly variable in an actual use scenario. Users of the control module with the thermal alarm option should develop procedures for the use of this feature.

9.3   Secondary Alarm Icons

The secondary alarm icon indicates either the thermal alarm, battery alarm, or radio connection loss occurred. These icons will remain on the main screen until the condition is corrected by the system (example: radio connection is re-established).

The evacuate alarm can only be cleared by restarting the SCBA.

Secondary Screen

The secondary screen provides the user information if needed by the user. To switch to the secondary screen, press the RESET button once.

The secondary screen displays

- temperature icon
- short range radio icon
- long range radio icon
- battery icon
- time remaining calculation

Similar to the primary screen, the time remaining calculation is configurable to pressure status, time remaining or time on air. The icons on the screen indicate different states of the device. The chart below explains the different states of the device.

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.**Icons**

Thermal	Bluetooth	Long Distance Radio	Battery
Low Heat Load	Connection established	Good connection	5 green segments: 80-100% battery charge
High Heat Load	Connection lost	Warning Loss of link	4 green segments: 60-79% battery charge
	No Connection	Hardware failure	3 green segments: 40-59% battery charge
		Capable No Connection	2 yellow segments: 20-39% battery charge
			1 red segment: 0-19% battery charge Change/ recharge battery, do not use device

9.4   ID Tagging

The G1 Control Module was designed to allow the user to tag the SCBA during the use of the product.

1. Press and hold the RESET button until the RFID symbol appears

2. Place the ID Tag on the user side of the backplate, on the left side of the power module.
   - The control module will display the ID tag information and beep once complete.

3. If the control module does not display ID tag information, repeat steps 1 and 2.

The G1 Control Module also allows the user to tag the SCBA while the unit is turned off.

1. Press and hold the green RESET buttons until the battery icon displays.

2. When the battery icon is displayed on the screen, press the ALARM button and RFID symbol will appear.

3. Place the ID Tag on the user side of the backplate, on the right side of the power module.
   - The control module will display the ID tag information and beep once complete

4. If the control module does not display ID tag information, repeat steps 1 and 2.

US

9.5 Screen Displays During Tagging

To start the tagging procedure, press the RESET button until the RFID screen appears

RFID screen

Personal ID TAG read

When the device has read the tag, it confirms with a beep.

9.6 Button Functions

RESET Buttons (green)

> ℹ Both reset buttons have the same function, instead of pressing one button twice when advised.

Pressing either button performs the following, depending on context:

Single press to:

- Activate the backlight and refresh the HUD (when in intermittent mode)
- Toggle between primary and second screen Double press to:
- Reset PASS pre-alarm (or shake control module to reset)
- Reset PASS full alarm
- Confirm evacuation
- Turn off device (when below 200 psig)
- Clear primary alarms

ALARM Button

Activates PASS full alarm by pressing and holding the ALARM button. This will occur when either the unit is OFF or ON.

9.7 Turning OFF the Control Module

(1) Upon returning to fresh air, close the cylinder valve completely and release all pressure from the SCBA.

(2) When the pressure falls below 200 psi, turn the control module off by double pressing the reset button (green).

▷ The shutdown sequence will display on the screen and the lights on the control module and the power module will stop flashing.

US

10. After Use

10.1 Removing the SCBA

(1) Grasp the regulator buttons.

(2) Push the release   buttons and pull the regulator out of
    facepiece.

(3) Close the cylinder valve fully

(4) Open the regulator bypass or press the purge button (if equipped) to
    release system pressure. Close the bypass.

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After Use G1

(5) When the pressure falls below 200 psi, turn the control module off by depressing the reset button (green) two times within approximately one second.

NOTE: The HUD and speaker module (if equipped) will automatically turn itself OFF, within 60 seconds after the SCBA has been depressurized. A red LED will flash until the HUD turns off.

(6) Stow the regulator in the regulator keeper when it is not in use.

(7) To remove the carrier and harness, press in on the waist belt buckle release button.
(8) Disconnect the chest strap buckle (if used).

(9) To loosen the shoulder straps, grasp the pull tabs and push them out and away from the body.

(10) Slip the left arm out of the shoulder strap first, then remove the harness.

After Use G1

NOTE: Be sure to replace the cylinder with a fully charged one. Complete Inspection, Cleaning and Disinfecting Procedures outlined in this manual. Ensure that the complete SCBA is clean and dry.
Ensure that facepiece head harness straps and harness adjustment straps are fully extended. Place the complete SCBA in the storage case or suitable storage location so that it can be easily reached for emergency use. (See storage instructions.) In situations where users share the SCBA, the regulator must be cleaned and disinfected using a Confidence Plus cleaning and disinfecting wipe to prevent cross contamination between users.

10.2 Removing the Facepiece

(1) Loosen the head harness by pulling the buckles forward using your fingers.

(2) Grip the chin straps and pull the head harness forward over the head.

(3) Grip the front of facepiece away the facepiece (as shown) and pull the and down from the user.

11 Cleaning and Disinfection

> ⚠ **Caution Hazard**
> *- DO NOT use any cleaning substances that can or might attack any part of the SCBA.*
> *- DO NOT use alcohol because it may deteriorate rubber parts.*
> *- If not rinsed thoroughly, cleaning agent residue may irritate the wearer's skin.*
> *Failure to follow these warnings can result in serious injury or death.*

Depending on the cleaning policy adopted, either a designated person or the user should clean each device after each use. ANSI standards suggest that users should be trained in the cleaning procedure.
Confidence Plus® Cleaning Solution (P/N 10009971) from MSA is recommended. It cleans and disinfects in one operation. It retains its germicidal efficiency in hard water to inhibit the growth of bacteria.
It will not deteriorate rubber, plastic, glass, or metal parts. Refer to the label for user instructions.
If the SCBA is soiled (i.e. heavy smoke residue or dirt accumulation) use a sponge damp with mild soap solution or use a soft/medium bristle brush to remove deposits that may interfere with normal operation of:

- Harness (straps and buckles)
- Carrier (band and latch assembly)
- Cylinder (handwheel, gauge, outlet connection)
- Pressure reducer (bell and coupling nut connection)
- Control module/power module/battery module/speaker module
- Inspect the entire SCBA as it is reassembled. Follow the Inspection Instructions.

Preparing Solution
Follow the instructions with the Confidence Plus® Cleaning Solution.
If the Confidence Plus Cleaning Solution is not used, wash in a mild cleaning solution, rinse thoroughly, and submerge in a germicide solution for the manufacturer's recommended time.

11.1 Cleaning and Disinfection Facepiece

> ⚠ **Caution Hazard**
> *- Do not use cleaning products containing hydrocarbons or solvents [e.g. nitro-thinner].*
> *- Cleaned parts must not be dried in radiant heat [sun, radiators].*
> *- When using a drying cabinet, the temperature must not exceed 140 °F (+60 °C).*
> *- Perform a tightness test after every cleaning, disinfection and maintenance or after every exchange of parts.*
> *Failure to follow these warnings can result in serious injury or death.*

In general, only the facepiece requires cleaning and disinfecting after each use.

(1) Remove the facepiece mounted regulator from the facepiece.

> ⚠ **Caution Hazard**
> *The power supply for the HUD is not part of the G1 facepiece and is therefore not damaged during cleaning of the facepiece.*

Cleaning and Disinfection G1

Cleaning and Disinfecting by Hand

1. Prepare a bucket or sink with Confidence Plus® Cleaning Solution as described on the container.

2. The head harness can be removed to separate cleaning or as part of the face piece.

3. Submerge the face piece in Confidence plus Cleaning Solution for a minimum of 30 seconds. A soft brush or sponge can be used to clean the soiled face piece.

4. Rinse the face piece and components in clean, warm (110°F (43°C)) water (preferably running and draining).

5. Be sure to clean and rinse the pressure-demand exhalation valve by pressing in on the stem with a blunt object and flushing it with clean water.

6. Allow the face piece to air dry. Do not dry the parts by placing them near a heater or in direct sunlight.

7. Operate the exhalation valve by hand to be sure it works properly.

8. Perform a tightness test before putting the face piece back in service.

12 Cylinders

12.1 Safety Precautions for MSA Self-Contained Breathing Apparatus Cylinders

 - This system must be supplied with respirable [Quality Verification Level (Grade) D, see ANSI/
CGA G-7.1-1989] or higher quality air; and a dew point not to exceed -65°F/-54°C
(24ppm v/v) [Compressed Gas Association Specification G-7.1 for Quality Verification Level
(Grade) D Gaseous Air]. In fire service applications, MSA recommends breathing air quality in accordance with NFPA 1989.
- DO NOT drop the cylinder or bump the valve knob. An unsecured cylinder can become an airborne projectile under its own pressure if the valve is opened even slightly.
- Never carry or move a cylinder by the handwheel. If a cylinder is removed from a horizontal shelf by grasping the handwheel, the weight of the cylinder can cause the cylinder to rotate downward causing the valve to open slightly.
- Avoid dropping the cylinder or bumping the handwheel.
- Use the handwheel only to open and close the cylinder valve.
- A valve could partially open causing the cylinder to become an airborne projectile under its own pressure and result in serious personal injury or death.
- Remove from service if cylinder shows evidence of exposure to high heat or flame: e.g., paint turned to a brown or black color, decals charred or missing, gauge lens melted, or elastomeric materials distorted.
- Use this device only after receiving proper training in its use. Use in accordance with this label and MSA apparatus instructions.
- To maintain NIOSH approval, the cylinder must be fully charged with respirable air meeting the requirements of the Compressed Gas Association specification G-7.1 1989 for Quality Verification
Level (grade) D air or equivalent specification. In fire service applications, MSA recommends breathing air quality in accordance with NFPA 1989.
- Do not use unless the cylinder is filled to the maximum working pressure.
- Do not alter, modify, or substitute any components without approval of the manufacturer.
- Inspect frequently. Maintain according to manufacturer's instructions. Repair only by properly trained personnel.

Misuse can result in serious injury or death.

Breathing apparatus cylinders should be fully recharged as soon as possible after use.

Cylinders should not be stored partially charged:
- If used partially charged, the duration of the SCBA is reduced.
- The pressure relief device is only designed to protect a fully charged cylinder from the effects of a fire.
For maximum safety, the cylinders should be stored full or at a pressure above ambient but less than 100 psi.
Prior to recharging, cylinders must be examined externally for evidence of high heat exposure, corrosion, or other evidence of significant damage.
Additional information of value when performing external and internal inspections of cylinders may be found in the latest editions of CGA Publication C-6.2: "Guidelines for Visual Inspection and Requalification of Fiber Reinforced High Pressure Cylinders" available from the Compressed Gas Association,
Inc., 1725 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202-4102.
If there is any doubt about the suitability of the cylinder for recharge, it should be returned to a certified hydrostatic test facility for expert examination and testing.
Always check to be sure the retest date is within the prescribed period and that the cylinder is properly labeled to indicate its gaseous service. New labels are restricted items which are not available except through certified hydrostatic test facilities.
When replacing cylinder valves or after the retesting of cylinders, make sure the proper cylinder valve, burst disc, and o-ring are installed prior to cylinder recharging. Determine the maximum service pressure of the cylinder. All cylinders shall be filled to the designated service pressure only (as found on the DOT approval or stamping). For cylinders manufactured under a U.S. DOT exemption (i.e., DOTE- #####), the exemption should be consulted and is available from the Associate Administrator for Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 400 7th Street, SW, Washington, D.C. 20590-0001.

Cylinders G1

12.2 Preparing Cylinder for Use

For remote connection, the cylinder must have the dove tail bracket attached prior to use. If the dove tail is not equipped, the following instructions must be followed.

1. Remove the old cylinder boot and insert (if present) from the cylinder.

2. Determine which cylinder retainer kit is needed (if you already have existing MSA cylinders). New cylinders with retainer kits already installed are available for purchase. Contact the local MSA Sales Manager or local distributor for more information and part numbers.

P/N	Cylinder	NIOSH Service Life Rating	Pressure	Retainer Type	Retainer Kit P/N
807586	L-30 Carbon	30 minutes	2216 psig	Type 4	10158401
807587	H-30 Carbon	30 minutes	4500 psig	Type 2	10158389
807570	H-45 Carbon	45 minutes	4500 psig	Type 4	10158401
10035644	H-45 LP Carbon	45 minutes	4500 psig	Type 3	10158390
807588	H-60 Carbon	60 minutes	4500 psig	Type 5	10158402

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Cylinders G1

3. Attach the retainer halves to the cylinder valve.

4. Apply 3 screws to retainer.
    *   The screws must be torqued to 4 inch-pounds.
5. Place the new rubber boot (P/N 10146897) over cylinder valve gauge and attach to retainer.

6. Ensure

retainer is not loose on cylinder valve.

12.3 Installing Quick Connect Adapter to Cylinder
NOTE: A torque wrench with 24 mm open end is required for installation.

1. Use only a fully charged cylinder and inspect the external thread of the cylinder valve to ensure they are not damaged and free of dirt and debris.
    - The bore of the cylinder valve must be undamaged and free from dirt and debris.
    - If the cylinder valve is damaged, remove from service and return it to a MSA trained or certified repair technician.

2. Inspect the it is not

    and

internal threads and nipple of the male adapter to ensure damaged and free of dirt and debris.
    - Ensure that the o-ring is installed on the nipple free of dirt and debris.

3. Thread the adapter onto the cylinder valve.
    - Securely hold the cylinder assembly and tighten the male adapter to the valve to a torque of 14 - 15 lbf ft (18 - 20 Nm) using the torque wrench.

12.4   Changing the Cylinder

Removing the Cylinder
(1)   Lay the backplate of the SCBA horizontal with cylinder facing up.
(2)   Ensure there is no pressure in the system before replacing a cylinder.
(3)   Close the cylinder valve.
(4)   Turn the regulator bypass counter-clockwise or press purge until air no longer discharges from the regulator.
(5)   Close the bypass by turning the knob clockwise.
(6)   Disconnect the the handwheel assembly:
■ Threaded connect:
    ▷ Unthread handwheel from cylinder valve assembly.
■ Quick connect:
    ▷ Turn the handgrip fully clockwise until it stops - hold in position.
    ▷ Pull back on the handgrip while pushing in on the handwheel manifold to release the quick connect from the cylinder.
(7)   Press the two side button on the cylinder band latch and lift to release the cylinder band from the cylinder

⚠ **WARNING**
The band will snap open quickly when the latch is released. Ensure your hands are not between the latch and the band when this occurs. Failure to follow this warning can result in serious injury.

(8)   Slide the empty cylinder out of the carrier.

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▷ Be sure that the adjustable cylinder band and latch is in the proper slot before inserting a new cylinder

Attaching the Cylinder
(1)   Lay the backplate of the SCBA horizontal with cylinder facing up.
(2)   Ensure the cylinder band latch is open and the band is set for the correct cylinder size.
(3)   Slide the fully charged cylinder into the carrier, with cylinder valve gauge facing away from the backplate, then align the retainer into the dove tail (if equipped).
(4)   Close the latch mechanism until the buttons lock in place.
NOTE: Be sure that the latch is closed when a cylinder is installed.
(5)   To check that the cylinder is secure, place one hand on the backplate and grasp the cylinder valve with the other hand. Try to pull the cylinder and valve down and out away from the carrier. Make sure that the band and latch holds the cylinder securely in the carrier.
NOTE: If the cylinder feels loose, check that the latch engages with the proper slot on the band. Ensure that the latch is fully tightened. Do not use the SCBA if the cylinder is not held securely in the carrier.
(6)   Align the handwheel assembly to the cylinder valve.

⚠ WARNING

Care must be taken to protect the quick connect coupling and adapter from damage, dirt, and debris during cylinder replacement. Dirt and debris can cause the cylinder connection seals to leak. Visually inspect the coupling and adapter prior to connection. If dirt or debris is observed, the material must be removed prior to connecting the cylinder.

Cylinder G1

■ Threaded connect:

▷ Before installing the threaded handwheel, check that the o-ring inside the handwheel coupling nut is present and free of damage. If the o-ring is damaged, it must be replaced before the SCBA is used.

▷ Thread the handwheel coupling nut onto the cylinder threads. The handwheel should be hand-tight (no tools).

■ Quick connect:

▷ Before installing ensure there is no dirt or debris on either the male or female end of the coupling. Ensure the adapter on the cylinder valve is tight.

▷ Push the quick connect coupling onto the cylinder valve adapter until an audible snap is heard. The handgrip will rapidly rotate approx. 45° counter clockwise indicating that the valve is connected to the pressure regulator.

▷ Grasp the handwheel firmly and pull on it to ensure the handwheel is fully attached.

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12.5   Charging Cylinders
(1)   Appropriately connect the cylinder to the filling system and refill.
▷ **NOTE**: For quick connect cylinder, the adapter must be removed before filling unless the filling system has been adapted for the quick connect.
(2)   Terminate the filling when the pressure reaches the maximum service pressure and allow the cylinder to cool to room temperature.
(3)   If necessary, top-off the cylinder such that the service pressure is attained with the cylinder at a temperature of 70°F (21°C).
(4)   Close the valves on the cylinder and the filling system and remove the cylinder.

(5)   Apply a leak solution to determine if there is any leakage between the cylinder and the valve.
  ▷ If there is no leakage, the cylinder is ready for use.

13   UAC Fitting

All NFPA 1981, 2013 Ed. approved SCBAs are equipped with a UAC (Universal Air Connection) fitting. The UAC fitting is a male Quick-Fill inlet for use by Rapid Intervention Teams for emergency filling operations. The system also includes an automatically resetting pressure relief valve. The SCBA can also be equipped with a waist mounted Quick-Fill System. For additional information on using the Quick-Fill System, refer to the Quick-Fill System section of the manual. The UAC fitting may be used for transfill operations as described in this manual. Only qualified, trained personal should perform operations using the UAC fitting. Standard Operating Procedures should be developed for use of the UAC fitting.

13.1   Precautions

- The UAC fitting can only be used to fill approved SCBA cylinders.
- The user is responsible for the air supply, which must meet the requirements of Compressed Gas Association Specification ANSI/CGA G-7.1, Quality Verification Level (Grade) D Gaseous Air or better, with a moisture dew point of not greater than -65°F/-54°C (24ppm water vapor, normal). In fire service applications, MSA recommends breathing air quality in accordance with NFPA 1989. Pressures at the inlet of the Quick-Fill hose must not exceed that of the SCBA (2216 psi or 4500 psi).
- The user also is responsible for connecting the Quick-Fill hose to an appropriate secondary air supply.
- The cylinder must be inspected for damage before charging.
- If topping off the cylinder using the UAC fitting, it is recommended to wait until after the cylinder has cooled from initial fill. Topping off a cylinder after it has cooled will ensure proper service time.

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Cylinders G1

⚠ **WARNING**

- DO NOT use the UAC fitting as a "Buddy Breather" such that two users are sharing the air supplied by one approved SCBA cylinder simultaneously; doing so will void NIOSH approval.
- The UAC fitting must be used by trained personnel only.
- DO NOT lubricate the UAC fittings. Do not permit oil, grease, or other contaminants to come in contact with the UAC fittings.
- The hose assemblies and fittings are designed to be used with Quality Verification Level (Grade) D or better air as defined by ANSI/CGA G-7.1.TRANSFILLING AIR FROM A SECONDARY AIR SUPPLY. In fire service applications, MSA recommends breathing air quality in accordance with NFPA 1989.

Misuse can result in serious injury or death.

NOTE: The UAC fitting may be used for transfill operations as described in this manual. Standard operating procedures should be developed for use of the UAC fitting.

The UAC fitting must be used only by qualified, trained personnel who have carefully read and understood these instructions, cautions, and warnings. NIOSH approvals of SCBA from MSA are maintained while transfilling air only if appropriate hose assemblies from MSA are used. UAC fitting or hose assemblies and fittings are rated for a maximum working pressure of 4500 psi. Use the following hose assemblies: 485331, 802687, 802688, 802689, 802690, and 485332, for filling cylinders in IDLH atmospheres.

13.2 Filling Instructions

A secondary air supply stores compressed breathing air until needed to refill SCBA air cylinders. When transfilling, the secondary air supply pressure must be greater than SCBA cylinder pressure. Examples of air supplies include: cascade air cylinder refilling systems; high pressure compressor systems with a fixed reservoir; or a portable air system such as the RescueAire™ System.

⚠ **WARNING**

DO NOT connect a high pressure SCBA to a secondary air supply with a pressure greater than 4500 psi. The high pressure SCBA is rated for a maximum working pressure of 4500 psi.

Misuse can result in serious injury or death.

NOTE: Rapid Intervention Teams should use a separate air supply such as MSA's Rescue Aire portable air supply system to fill the SCBA in an IDLH atmosphere.

(1)   Connect the Quick-Fill hose to the secondary air supply. ▷ Turn the air supply on.

CAUTION

If there are leaks from either female fitting, or along the hose, depressurize the hose and correct the problem. Such leakage can result in increased fill time.

Cylinder G1

Attach the Quick-Fill hose to the UAC fitting:
(2) Remove the rubber dust cap from the male inlet fitting on the UAC fitting. Be sure that the cylinder valve is fully opened.
(3) Remove the rubber dust cap from the female fitting on the Quick-Fill hose.
(4) Push the female fitting of the hose onto the male fitting of the UAC fitting until it snaps in place.
(5) Pull on the hose to be sure the connection is secure.
   ▷ Filling immediately begins when the female fitting fully engages with the UAC fitting.
   ▷ After approximately 60 seconds, the pressure between the secondary air supply and the SCBA cylinder will be equal.

⚠ **WARNING**

If serious leakage is noticed from either of the two female fittings, or anywhere along the hose, disconnect the female fittings and return to fresh air immediately.
Misuse can result in serious injury or death.

NOTE: If the secondary air supply does not have a sufficient volume of air, the SCBA cylinder will not reach full service pressure.
(6) Compare the cylinder pressure gauge and the remote pressure gauge to the secondary air supply pressure gauge reading.
   ▷ If the readings are the same, pressure is equal.
(7) To disconnect the Quick-Fill hose after transfilling, pull the gray sleeve back.
   ▷ The hose fitting and the UAC fitting will separate.

   ▷ A hiss or pop may be heard as the fittings separate and the high pressure air is sealed off. ▷ Listen for any leaks from the UAC fitting.
(8) Immediately install the dust cover on the UAC fitting.
   ▷ The SCBA cylinder is ready for service if the cylinder pressure gauge needle is on the appropriate color band.

13.3 Transfilling between SCBAs

The SCBA with the higher pressure reading is the donor. The SCBA with the lower pressure is the receiver. Transfilling between users of SCBAs should be performed only during life-threatening emergencies or simulated training exercises. Both donor and receiver must return to fresh air immediately following the procedure.

US

⚠ **WARNING**

DO NOT transfill if the donor's primary low pressure warning device is sounding or HUD/control module are flashing red. Failure to follow this warning can result in shorter escape time to return to fresh air, causing serious personal injury or death.

The low pressure warning device begins alarming and HUD/control module begins flashing red to indicate that the pressure in the cylinder has been reduced to 35% of its rated working pressure. Remaining service time must be used for escape to fresh air. If the donor's primary low pressure warning device begins ringing or HUD/control module begins flashing red during transfilling, the donor should disconnect and preserve his escape time.

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Cylinders G1

If the donor's primary low pressure warning device is not sounding and HUD/control module are not flashing and there is sufficient air to transfill to a receiver, (greater than 1000 psi for 2216 psi SCBAs and greater than 2000 psi for 4500 psi SCBAs), follow these steps:
- (1)   Remove the 3 foot emergency transfill hose from its protective pouch.
- (2)   Remove the rubber dust cover from both female fittings on the transfill hose assembly.
- (3)   Remove the rubber dust cover from the UAC fitting.
- (4)   Push the female fittings on to the male fittings until they click in place.
  - ▷ Pull on the hose to be sure it snapped in place.
  - ▷ After approximately 60 seconds, pressure between the SCBA cylinders will be equal.

⚠ WARNING
If serious leakage is noticed from either of the two female fittings, or anywhere along the hose, disconnect the female fittings and return to fresh air immediately. Misuse can result in serious injury or death.

- (5)   Disconnect the transfill hose from the SCBA by pulling the gray sleeve back on both ends.
  - ▷ A hiss or pop may be heard as the fittings separate and the high pressure air is sealed off.
- (6)   Immediately install the dust cover on the UAC fitting. The dust cover prevents dirt, water, and debris from entering the fitting, and acts as a redundant seal.

13.4 Leakage
When transfilling in fresh air and the dust cover will not stay on the male fitting because air is leaking:
1. Correct the condition before using the SCBA.

When transfilling in a contaminated atmosphere and the dust cover will not stay on the male fitting because air is leaking:
1. Immediately reconnect the Quick-Fill hose to seal off the leak and return to fresh air.
2. If the hose will not reconnect, reach behind and close the cylinder valve.
   - ▷ Air pressure in the regulator will drop, and the leak will slow down.
3. Quickly replace the protective dust cap on the male fitting.
   - ▷ This will form a redundant seal.
4. Open the cylinder valve and return to fresh air immediately.
   - ▷ The dust cover prevents dirt, water, and debris from entering the fitting, and acts as a redundant seal.

Emergency Transfill Hose Storage
Preparing the Emergency Transfill Hose for storage:
1. Press in on the center of the quick-disconnect dust cap to release any pressure in the transfill hose.
2. Roll up the hose and place it in its protective pouch.

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14 G1 ExtendAire II EBSS

General Information
Two air masks equipped with a G1 ExtendAire II System can share a common air supply during emergency escape.

NOTE: Activation of EBSS changes both the donor and receiver to Escape Only, and the user must immediately evacuate to fresh air outside the hazard zone.
Users can couple the G1 Second Stage Regulator from one user to the intermediate pressure manifold of the other user. Both users will receive intermediate pressure air from the donor's pressure reducer and cylinder. The duration of the remaining air supply will be reduced by at least half.
NOTE: The National institute for Occupational Safety and Health (NIOSH) did not approve the interconnection of apparatus using "Buddy Breathers" or EBSS prior to NFPA 2013-edition standard units.
Interconnection of pre-2013 edition SCBAs with an EBSS device results in a non-approved NIOSH configuration.

⚠ WARNING

Users must be trained in the operation of EBSS in accordance with a training program conforming to NFPA Standards 1404 and 1500 prior to any attempt to use such equipment in an emergency situation. Misuse can result in serious injury or death.

⚠ CAUTION

Use this emergency escape breathing system for life threatening emergencies and simulated training exercises only. All other adequate means of escape must be considered before using this device.

- During use, the air supply and consequentially the remaining service time is reduced approximately in half. Before connecting two users make sure the air supply is sufficient for both users to escape; otherwise do not use the system.
- DO NOT use the system is the donor's low pressure warning device is alarming (ringing). Using the system at this time can result in both users running out of air during escape.
- Exercise extreme care while connected together. Mobility and range of motion will be limited when donor's and receiver's air masks are connected.
- Maintain slack in the air lines during maneuvering and while connected together. DO NOT pull on the hoses. Pulling on the rescue hose to the intermediate pressure hose could separate the hoses from fittings and result in air leaks.

If the above measures cannot be followed or to provide greater escape protection, use the Quick-Fill System. Use of Quick-Fill maintains approval while transfilling and does not exhibit the above hazards.

⚠ WARNING

DO NOT use the Quick-Fill System, URC assembly or G1 ExtendAire II System accessories if there is any possibility that the environment contains a CBRN warfare agent. These air mask accessories are not approved for the use in atmospheres containing CBRN warfare agents.
Failure to follow this warning can result in serious personal injury or death

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14.1 Instructions for EBSS Use

The G1 ExtendAire II System contains two quick-connection fittings, capable of connecting with both male and female fittings on another user's manifold.
1. Quick connects are single action to connect: To engage, push the coupler firmly over the plug.
2. Quick connects require two actions to disconnect.
    ▷   Push the two sides of the quick-connect towards each other. The plug should advance into the coupler end an additional 1/8".
    ▷   Slide the coupler's outer sleeve away from the plug. Pull the plug out of the coupler. Ensure that the Quick-connect plug on the manifold black is protected by the supplied dust cap.

> ### ⚠ WARNING
>
> DO NOT install or attempt to use any hose assembly or fitting other than those supplied by MSA for the G1 ExtendAire II System. Misuse can result in serious injury or death.

14.2 Inspection Before EBSS Use
Emergency Breathing Hose

1. Inspect the elbow connection to the G1 First Stage Regulator as well as the hose connection to the elbow. Ensure that the hose is properly secured.

2. Inspect the dust cover. Ensure that the cover is securely attached to the male and female quick-connect fittings.

3. Ensure that the emergency breathing hose is coiled in the pouch such that it is not twisted. Position the manifold end of the hose toward the flap opening to ensure that is accessible in an emergency situation

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G1 ExtendAire II EBSS

Pouch

(1)   Inspect the pouch for cuts, tears, abrasions or signs of damage due to heat or chemical exposure. Verify that the pouch can securely stow and protect the emergency breathing hose. Verify that the pouch is securely attached to the carrier and harness.
(2)   Verify that each snap on the pouch flap is in place and securely fastened.

Hose Restraint

(1) Inspect the abrasions or exposure.
(2) Verify that attached to the backplate.

hose restraint for cuts, tears, damage due to heat or chemical

the hose restraint is securely emergency breathing hose and to the

Preparation for Use
Before Entering a Toxic Environment

(1)   Ensure proper ExtendAire II connection to the first stage regulator, as described in the Inspection before Use.
(1)   Don the apparatus as described in the donning.

Providing or Obtaining Emergency Breathing Support

⚠ **WARNING**

Follow these procedures to connect and disconnect the emergency breathing system hardware. Individual development of operating procedures and sufficient training is required to use this equipment in actual emergency conditions. Misuse can result in serious injury or death.

G1 ExtendAire II EBSS

Hose Connection Procedure

(1) Open up the snaps and hook and loop fastener on the flap of the waist-mounted storage pouch.
(2) Locate the manifold end of the emergency breathing hose and remove it from the pouch.
(3) Remove the dust cover from the quick-disconnect fittings on the donor's manifold.
(4) Open up the snaps and hook and loop on the flap of the receiver's waist-mounted storage pouch.
(5) Locate the manifold end of the emergency breathing hose and remove it from the receiver's pouch.
(6) Connect the donor's and receiver's manifold blocks using a male and female quick-connect fitting with a single action.

NOTE: Each manifold has both male and female quick-connect fittings to either supply or receive air.
  ▷   Check that the hose is properly routed and not tangled with any other part of the apparatus (IE. Neck strap, chest strap, etc.).
  ▷   Check for full engagement by pulling at the quick-disconnect to ensure that female socket does not separate from the male plug.
(7) Upon reaching a safe, non-toxic atmosphere, a staging area or performing other egress procedures, uncouple the receiver's hose at the quick disconnect.
(8) Replace the dust cap on the manifold fittings.

⚠ **WARNING**

The receiver's facepiece or regulator must be removed upon disconnection from the donor's air supply. Misuse can result in serious injury or death from suffocation.

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15 Flow Test and Overhaul Requirements
The regulator and primary low pressure warning device must be flow tested at specific time intervals.
These maintenance procedures must be performed by a certified repairperson or at an MSA service center.
Contact your MSA sales representative or call the MSA Customer Service Center at 1-877-
MSA-3473 for more information about these requirements.
Annual flow tests are stated as a requirement in NFPA 1852, Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA), 2013 Edition, which further emphasizes their importance. Although this standard relates to SCBA used in the fire service, MSA requires that a flow test be performed at least annually on all fire service and non-fire service SCBA and combination respirators that use a regulator.
MSA recommends the routine inspection of all elastomeric materials including, but not limited to those in the Visual Inspection and Functional Check section of this manual.
A decision to retire apparatus should be based on an SCBA's performance data and whether that data meets the specified level of performance as defined in maintenance requirements from MSA.
MSA recommends overhauling the SCBA every 600 hours of on air usage. The amount of on air usage can be found in the service mode of the SCBA.

16 Personnel ID Tag

An ID Tag is used to assign a user's name to the SCBA. The name assigned to the SCBA will be displayed for that SCBA on the MSA Accountability System Software and data log within the SCBA.
The name ID Tag must be scanned into the power module at the start of each shift (every 24 hours by default) or prior to each use.

NOTE: The MSA A2 Software can be used to change this default to allow a name ID to be permanently assigned to the SCBA until a new name ID Tag has been scanned.

A team ID Tag can also be used to assign a team/truck and position to the SCBA. If a team ID Tag has been scanned into the control module but a name ID Tag has not been scanned, the team ID will be displayed on the SCBA monitoring software to provide accountability even if the firefighter forgot to scan the name ID Tag. Once a team ID Tag has been scanned into the control module, the team
ID will remain with the SCBA until another team ID Tag has been scanned. If a team ID or name ID has not been assigned to the SCBA, the power module serial number will be displayed as the firefighter's
ID when logged onto the base station.
A base station ID can be used to assign a specific base station ID to an SCBA. When more than one base station is present and actively monitoring at an incident, an SCBA with an assigned base station will search for the preferred base station first to log on to, and if it does not find the assigned base station within 20 seconds, it will search for the first available base station and log on to it. If a base station ID has not been assigned to the SCBA, it will log on to the first base station that it finds once the unit has been turned on. Once a base station ID tag has been scanned into the power module, this base station ID will remain with the SCBA until another base station ID tag has been scanned.
The ID Tag has a space for the user to place a label in which the ID information can be written on the outside of the ID Tag for easy identification.
Before using the ID tag, inspect for damage or cracks in the case. If damage is found, discard and replace the ID tag.
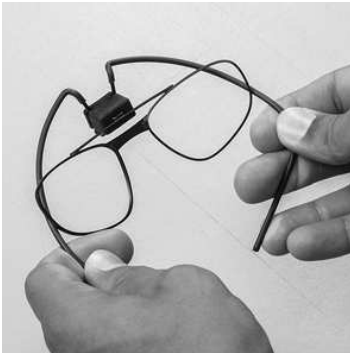
17 Spectacle Kit

⚠ **WARNING**

Before using a spectacle kit, an optometrist must inspect the spectacle kit and prescribe the correct lenses to fit into the lens frame on the spectacle kit. Failure to follow this warning could result in serious personal injury or death.

(1)   Flip the head harness over the front of the facepiece so the harness is covering the lens of the facepiece.
▷   This will open up the faceblank to make it easier to install the spectacle kit.

(2)   Squeeze in on the wire frame of the spectacle kit at the large bends about 2" from the ends.

(3)   Push the top part of the frame into the lens. The faceblank has three rubber tabs to grab the frame.
▷   Place the frame in the middle of the lens with the smaller tabs grabbing the wire frame.

Spectacle Kit G1

(4)   Take one end of the wire frame and push it up into the facepiece so it follows the edge where the lens and the faceblank meet.

▷   The end of the wire frame must be positioned into small pockets in the faceblank on the edge of the lens.

(5)   Repeat step (4) on the opposite side.

(6)   The lens depending on adjust to frame can be adjusted up/down and in/out the facial features. Don the facepiece and optimize visibility.

18 Telemetry Module

The telemetry module is designed to allow the SCBA to communicate with a remote base station while in use. The SCBA with telemetry module installed will transmit vital statistics such as cylinder pressure, thermal alarm (if thermal alarm is enabled), service time remaining, and PASS alarm to the base station. The base station also has the ability to send an evacuation command to the SCBA. The telemetry module uses a special version of the power module.

All basic functions of the SCBA are the same as those described in the During Use section of this manual except for the following differences:

- **Turning the control module ON**: When the control module is activated in the presence of a remote base station, the SCBA automatically begins to log on to that base station. When the SCBA is successfully logged on to the base station, a radio link indicator will appear on the display of the control module.
- **Evacuation Signal:** The SCBA has the ability to receive an evacuation signal from the remote base station after it has been successfully logged on to the base station. When an evacuation signal has been sent by the base station, the "running man" icon will appear, and flash, on the display of control module and a unique audible alarm will be emitted from the power module. The evacuation signal must be manually confirmed by the user by pressing the reset button (green) twice within approximately one second. This confirms the evacuation signal by sending a confirmation signal back to the base station. Once the evacuation signal has been manually confirmed by the user, the "running man" icon will stop flashing and remain on the display until the control module has been turned off.
- **PASS Alarm:** The PASS alarm will sound and function normally with the telemetry module. When the SCBA emits a full PASS alarm, a signal is automatically sent to the base station to alert Incident Command.
- **Thermal Alarm:** When the SCBA is exposed to temperature conditions that warrant a thermal alarm, a signal is automatically sent to the base station to alert Incident Command.
- **Low Battery:** When the power module reaches a low battery condition, a signal is automatically sent to the base station to alert Incident Command.
- **Data Log:** The data logging feature of the control module logs the status of the radio link to the base station as well as any evacuation signals that the SCBA has received.
- **Radio Link Indicator:** The control module has a radio link indicator on the secondary screen.
When this icon is displayed, the SCBA is logged on to a base station and within range. When the radio link indicator is red, it means the radio contact has been lost or interrupted. When the radio link indicator is grey, it means the radio contact was never established.
- **Turning the control module Off:** To turn the control module off, press the reset button (green) twice within approximately one second. If the SCBA is logged on to the base station, there will be a delay between the two presses of the reset button and the actual shutdown of the device. Before the control module completely turns off, the base station must remove the SCBA from its registry.
This causes the slight delay between pressing the reset button and the actual shutdown of the device.

Scanning the ID Tag into the Power Module
Prior to pressurization of the SCBA and during use, the user can "tag in" to the SCBA. The most recent ID Tag data that is stored in the power module will be used as the identification for the SCBA in the data log or on the MSA Accountability System Software. If no ID Tag data has been assigned to the SCBA, the power module serial number will be used as its identification on the base station PC screen.

SUBJECT: BREATHING APPARATUS AND AIR UNITS

Tagging In when Unit is Off

(1) Take the ID tag and place in hand as shown.
(2) Move hand to the RFID reader location on the power module. It is located on the user side of the backplate on the left side.

(3) Press and hold the green reset button until the RFID symbol appears.

(4) Keep the tag located at the power module until the blue bar moves across the screen.
  ▷   If the tag was successful, the information will be displayed on the tag. If it is not, repeat the steps above until the tag information is displayed on the screen.

(1) Take the ID tag and place in hand.
(2) Move hand to the RFID reader location on the power module. It is located on the user side of the backplate on the left side.

(3) Press and hold the green reset button until the RFID symbol appears.

(4) Keep the tag located at the power module until the blue bar moves across the screen.
  ▷   If the tag was successful, the information will be displayed on the tag. If it is not, repeat the steps above until the tag information is displayed on the screen.

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> ## ⚠ WARNING
>
> When using an ID Tag with the G1 power module, the ID Tag must touching the power module during this process. If the tag is not, the PASS device can lockup. To fix the lockup, the batteries must be removed for 30 seconds and then reinstalled. Misuse can result in serious injury or death.

Using the Base Station with the Telemetry Module

The telemetry module is designed to work in conjunction with a remote base station unit. This base station unit must be connected to a personal computer or notebook computer before use. Refer to the MSA A2 Software Instructions (P/N 10162374) for more information.

> ## ⚠ WARNING
>
> Follow the PC or notebook computer manufacturer's recommendations for exposure to environmental conditions to prevent damage to the system.
> Failure to do so may cause system failure and the loss of monitoring capability on the PC or notebook computer.

18.1   Using the SCBA with Telemetry Module
Logging the SCBA on to the Base Station
(1)   Turn on the control module on by opening the cylinder valve or by pressing and holding the alarm button.
(2)   An icon representing the user of the SCBA will appear on the base station PC screen.
(3)   When the base station has established contact with the SCBA and all initial information has been obtained, the radio link indicator will appear in the upper left corner of the control module display.
(4)   Periodically check the status of the radio link indicator on the display of the control module. If the signal indicator turns yellow, this means that the SCBA is out of range from the base station. The signal strength indicator will stop flashing when the SCBA returns within range of the base station.

> ## ⚠ CAUTION
>
> If the signal strength indicator does not appear on the control module display or the base station has not logged the unit on, the base station cannot monitor the status of that user.

Logging the SCBA off of the Base Station

(1)   Once the user has returned to fresh air the control module may be turned off.
(2)   Close the cylinder valve and purge the remaining air from the system using the regulator bypass. When the pressure falls below 200 psi, turn the control module off (sleep mode) by pressing the reset button twice in approximately one second. (When the SCBA is logged on to a base station, there may be a delay between the two rapid presses of the reset button and the actual shutdown of the control module. Before the control module completely turns off, the base station must log off the SCBA and send out a final confirmation signal.

Evacuation Signal

If the SCBA is logged on to the base station, the incident command will have the ability to send an evacuation signal to the SCBA. When an evacuation signal is sent to the SCBA, the power module will begin to beep repeatedly and a flashing evacuation icon will appear on the control module display. The evacuation alarm will continue to sound until the reset button on the control module has been pressed twice within approximately one second. This confirms the evacuation by sending a confirmation signal back to the base station. The evacuation alarm can only be reset on the SCBA after the unit has been turned off and restarted.

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19   Maintenance

19.1   Batteries

<table>
<tr><td colspan="2" align="center">⚠ WARNING</td></tr>
<tr><td>
- Replace the batteries following the use of the SCBA were the low battery alarm became active.
- Changing of alkaline batteries must be performed in a non-hazardous environment.
- Battery modules must only be removed and installed in a non-hazardous environment.
- Use only approved batteries in the battery module.
- Use of other batteries, or a combination of batteries from different manufacturers, will affect the performance of the unit and void the Intrinsic Safety Approval.

Failure to follow this warning could result in serious injury or death.
</td></tr>
</table>

⚠ **WARNING**

DO NOT dispose of the batteries in fire. They may explode. Contact the local municipality for proper disposal of batteries.
Misuse can result in serious injury or death.

⚠ **WARNING**

Use only approved alkaline batteries in the battery module. Use of other batteries, or a combination of batteries from different manufacturers, will affect the performance of unit and void the Intrinsic Safety Approval.

CAUTION

Do not use force to remove or replace the battery pack, otherwise the power module could get damaged.

ⓘ   Battery status can be checked while the SCBA is still in the jump seat, the battery pack can also be replaced without taking the SCBA out of the jumpseat.

List of approved batteries that can be used in the alkaline battery pack

- Duracell Procell PC1400
- Duracell MN1400
- Panasonic Evolta C-LR14
- Panasonic Industrial LR14XWA
- Industrial Panasonic Powerline
- Rayovac Ultra Pro LR14
- Rayovac LR14
- Energizer EN93
- Energizer E93

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NOTE: The temperature class is T4 when the above alkaline cells are installed within the alkaline battery pack, except the temperature class is T3C when the Energizer EN93 alkaline cells are installed within the alkaline battery pack.

Replacing the Batteries in the Battery Module
The battery module is installed on the user side of the SCBA in the middle of the backplate.

(1) Unlock the battery module with the battery removal tool.
　▷　Push the removal tool into the slot in the battery module and click into place.
　▷　Pull the removal tool and the battery module out of the power module.
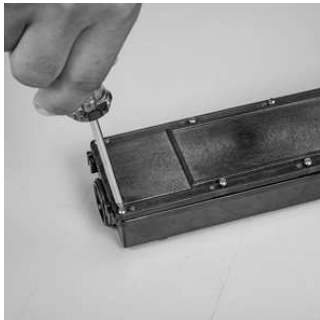
Open the battery module:
　(2) Loosen the Torx screws in the battery housing lid.

(3) Remove the battery housing lid.

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(4) Remove all 6 batteries.

(5) Check the inside of the battery module for damage, battery acid, corrosion, dirt and debris.

(6) Ensure the battery contacts are in place and secure.

(7) Insert 6 fresh C-cell batteries, ensuring the + contacts are in alignment.

(8) Check the cover of the battery module for damage, dirt and debris, make sure the gasket is still in place and does not have any nicks or tears.
  ▷   Replace cover if necessary.

Close battery module:

(9) Place the battery lid on the housing and install the screws until the lid makes contact with the standoffs (4 in-lbs max torque).

NOTE: This is the position of the battery lid to the housing once the screws are tightened.

Install the battery module in the power module:

(10)   Make sure before inserting the battery pack that the power module is clean and that no pins or grooves are damaged.

(11)   Insert the battery pack into the power module, ensure to align it with the grooves in the power module.
  ▷   Release the battery module and push in its top.
  ▷   The battery module will click into place.
(12)   To make sure that the battery pack fits securely, push on the opposite side of the power module, the battery pack should not move.

19.2 Maintenance Instructions

This product should be regularly checked and serviced by trained specialists. Inspection and service records must be maintained. Always use original parts from MSA.

Repairs and maintenance must be carried out only by authorized service centers or by MSA. Changes to devices or components are not permitted and will result in an unapproved configuration. MSA is liable only for maintenance and repairs carried out by MSA.

> **i** MSA recommends maintenance intervals which follow the overhaul and flow test requirements. Observe national laws and regulations!
> If in any doubt, ask your local MSA contact person.

20   Safekeeping and Storage

20.1 Storage

> ⚠️ **WARNING**
>
> -   Prior to storage of the SCBA at temperatures below 0°F (-18°C), verify that the power module is equipped with full charge batteries. Verify that the control module displays a full charge battery status icon and that the HUD does not display low battery status indicators.
>
> -   DO NOT drop the cylinder or bump the valve knob. An unsecured cylinder can become an airborne projectile under its own pressure if the valve is opened even slightly.
>
> Misuse can result in serious injury or death.

Do not store the SCBA or spare cylinders within or near an area where the SCBA can or might be exposed to any substances that will or might attack any part of the SCBA, causing the SCBA to not perform as designed and approved.

Prior to storing the SCBA in a jumpseat, ensure there is no interference between the SCBA and the seat. Ensure the SCBA and cylinder can be removed easily without damaging the components.

Do not store the SCBA for extended periods with the batteries installed in the electronic components if the SCBA is not intended for service. If the SCBA is in service, ensure that the batteries in the electronic components have an adequate charge.

Do not store the SCBA with an empty or partially filled cylinder. Always install a fully-charged cylinder so that the SCBA is ready for use.

Complete Inspection and Cleaning and Disinfecting Procedures outlined in this manual. Ensure the entire SCBA is clean and dry.

Ensure the facepiece head harness adjustment straps are fully extended. Place the complete SCBA in the storage case or suitable storage location so it can be easily reached for emergency use.

For prolonged storage of the SCBA, remove the batteries from all electronic components and housings to prevent battery corrosion. Store the units in a cool, dry place.

NOTE: Fresh batteries must be installed in the power module prior to storage of the SCBA at cold temperature for an extended period of time.

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20.2   Facepiece

⚠️ **WARNING**

In order to avoid damage to or the deformation of the facepieces keep no additional loose objects in the facepiece container. Failure to follow this warning can result in serious injury or death.

For the safekeeping of the facepiece, a facepiece pouch or container should be used.

MSA rubber products are protected by an anti-ageing agent that can become visible as a light coating. This coating is harmless and can be removed.

To ensure a long life of rubber components, follow ISO 2230 by storing them in a cool, dry place protected from ultraviolet radiation.

21   Product Labels

NFPA 1981 (SCBA)/CBRN

NFPA 1982 (PASS)/INTRINSIC SAFETY/FCC (Power Module)

With Telemetry   Without Telemetry

2216 Pressure   **4500 Pressure**

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SUBJECT: BREATHING APPARATUS AND AIR UNITS

Facepiece G1

G1 Tag

User Removable PASS Warning (Battery Pack)
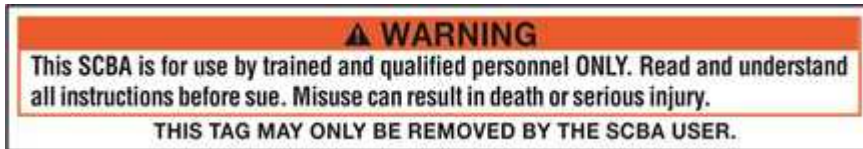
Battery pack
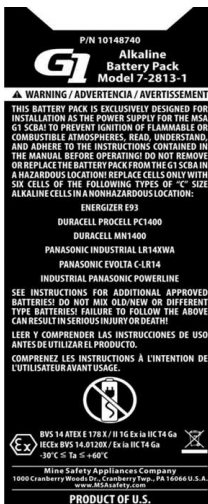
22 MSA G1 SCBA Limited Warranty

MSA - The Safety Company (MSA) warrants MSA G1 SCBA (SCBA) to be free from defects in materials and/or faulty workmanship for a period of fifteen (15) years from the date of sale by MSA. This warranty applies to all components of the SCBA including all accessories and optional equipment purchased and supplied at the time of the original sale of the SCBA, except consumable parts, as defined by the terms of sale. MSA's obligation under this warranty is limited to the repair or replacement, at MSA's option, of the SCBA or components shown to be defective in either workmanship or materials.

No agent, employee or representative of MSA may bind MSA to any affirmation, representation or modification of the warranty concerning the goods sold under this contract. MSA makes no warranty concerning components or accessories not manufactured by MSA, but will pass on to the Purchaser all warranties of manufacturers of such components.

MSA shall be released from all obligations under this warranty in the event that repairs or modifications are made by persons other than its own or authorized service personnel, or if the warranty claim results from accident, alteration, misuse, or abuse.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTEES, EXPRESSED, IMPLIED, OR STATUTORY INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN ADDITION, MSA EXPRESSLY DISCLAIMS ANY LIABILITY FOR ECONOMIC, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN ANY WAY CONNECTED WITH THE SALE OR USE OF MSA PRODUCTS, INCLUDING, BUT NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS.