



Operating Manual

G1

SCBA

NIOSH CBRN and NFPA 1981/1982

US



Order No.: 10158406/01



WARNING

Read this manual carefully before using the device. The device will perform as designed only if it is used and maintained in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed and persons who rely on this device for their safety could sustain serious personal injury or death.

The warranties made by MSA with respect to the product are voided if the product is not installed, used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions.

Please read and observe the WARNINGS and CAUTIONS inside. For any additional information relative to use or repair, call 1-800-MSA-2222 during regular working hours.

For alternate languages, please refer to part number 10162890.



The Safety Company

1000 Cranberry Woods Drive
Cranberry Township, PA 16066
USA
Phone 1-800-MSA-2222
Fax 1-800-967-0398

For your local MSA contacts please go to our website www.MSAafety.com

Contents

1 Safety Regulations 6

1.1 NIOSH Approval Information 6

1.2 NIOSH CBRN Approval Information 7

1.3 NFPA Approval Information 8

1.4 FCC Approval 8

1.5 Intrinsic Safety Approval Information 9

1.6 Industry Canada statement 9

1.7 Important Notice for Respirator Users and Respiratory Protection Program Administrators 9

1.8 Reference 9

1.9 Contact Information 10

2 Description 11

2.1 G1 Facepiece 12

2.2 G1 Regulator (also known as Demand Valve) 13

2.3 G1 Heads-Up Display (HUD) 13

2.4 Cylinder and Valve Assembly 14

2.5 G1 Pressure Reducer with Primary Low Pressure Warning Device 14

2.6 G1 PASS Device 15

2.7 G1 Harness and Carrier Assembly 17

2.8 G1 Speaker Module (Optional) 18

2.9 Optional Components 18

3 Size Selection 19

3.1 Respirator Fit Test 20

4 Visual Inspections 21

4.1 Facepiece 22

4.2 Regulator 22

4.3 Pressure Reducer 22

4.4 Cylinder and Valve Assembly 23

4.5 Carrier Assembly 23

4.6 Control Module 24

4.7 Power Module 24

4.8 Battery Module 24

4.9 ExtendAire II 25

4.10 Record Keeping 25



US

5 Functional Tests 26

5.1 Check that the Regulator and Facepiece Can Hold a Negative Pressure 26

5.2 Check Function of Regulator 26

5.3 Check Function of the Control Module, Power Module, HUD
and Primary Low Pressure Warning Device..... 27

5.4 Speaker Module Function 29

6 Donning 30

6.1 Approval Verification 30

6.2 Preparation 31

6.3 SCBA Donning Procedure 32

6.4 Facepiece Donning Procedure 36

7 During Use 41

7.1 Cold Weather Operation 43

8 G1 Heads-Up Display (HUD) 44

8.1 G1 HUD Pressure Status 44

8.2 G1 HUD Alarm Status 46

9 Control Module 48

9.1 PASS Device Functionality 48

9.2 Alarms 51

9.3 Secondary Alarm Icons 54

9.4 ID Tagging 56

9.5 Screen Displays During Tagging 58

9.6 Button Functions 58

9.7 Turning OFF the Control Module 59

10 After Use 60

10.1 Removing the SCBA 60

10.2 Removing the Facepiece 63

11 Cleaning and Disinfection 64

11.1 Cleaning and Disinfection Facepiece 65



12 Cylinders 67

12.1 Safety Precautions for MSA Self-Contained Breathing Apparatus Cylinders 67

12.2 Preparing Cylinder for Use 69

12.3 Installing Quick Connect Adapter to Cylinder 71

12.4 Changing the Cylinder 72

12.5 Charging Cylinders 73

13 UAC Fitting 74

13.1 Precautions 74

13.2 Filling Instructions 75

13.3 Transfilling between SCBAs 76

13.4 Leakage 77

14 G1 ExtendAire II EBSS 78

14.1 Instructions for EBSS Use 79

14.2 Inspection Before EBSS Use 79

15 Flow Test and Overhaul Requirements 82

16 Personnel ID Tag 83

17 Spectacle Kit 84

18 Telemetry Module 86

18.1 Using the SCBA with Telemetry Module 89

19 Maintenance 90

19.1 Batteries 90

19.2 Maintenance Instructions 93

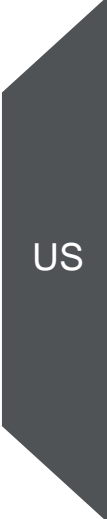
20 Safekeeping and Storage 94

20.1 Storage 94

20.2 Facepiece 94

21 Product Labels 95

22 MSA G1 SCBA Limited Warranty 98



1 Safety Regulations

This SCBA complies with the National Institute for Occupational Safety and Health (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).

1.1 NIOSH Approval Information


WARNING

Read and follow all NIOSH approval limitations. Misuse can result in serious injury or death.

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..

- 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

 DANGER
<p>Use in conjunction with personal protective ensembles that provide appropriate levels of protection against dermal hazards.</p> <p>Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness, or death.</p> <p>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.</p> <p>The respirator should not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.</p> <p>FAILURE TO FOLLOW THE ABOVE ITEMS IN ADDITION TO ALL ESTABLISHED CBRN PROTECTIVE MEASURES CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.</p>

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.



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.
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.
- T-
- 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.

NOTICE

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

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 intrinsic 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.

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	MSA Canada	MSA de Mexico, S A De C V
1000 Cranberry Woods Drive Cranberry Township, PA 16066	16435 118th Avenue Edmonton AB T5V 1H2	Fraccionamiento Industrial Avenida Del Conde #6 76240 El Marques, Queretaro
Phone 1-800-MSA-2222 Fax 1-800-967-0398	Phone 1-800-MSA-2222 Fax 1-800-967-0398	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

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).

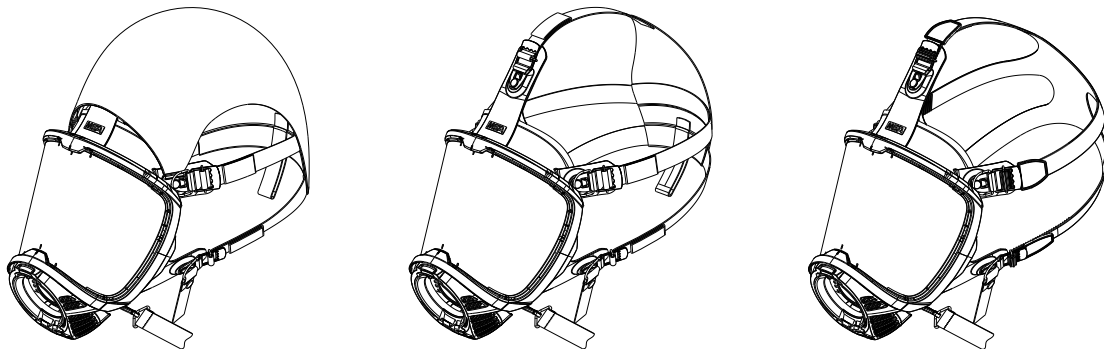
The facepiece is equipped with a mechanical speech diaphragm that enhances speech communication. The HUD is provided inside the facepiece through light pipes from the regulator.

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.



Facepiece Versions

The facepiece is available with different head harnesses; fabric (both SpeeD-ON[®] and 5-point) or rubber (5-point).



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).



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.

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 $35\% \pm 2\%$. 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

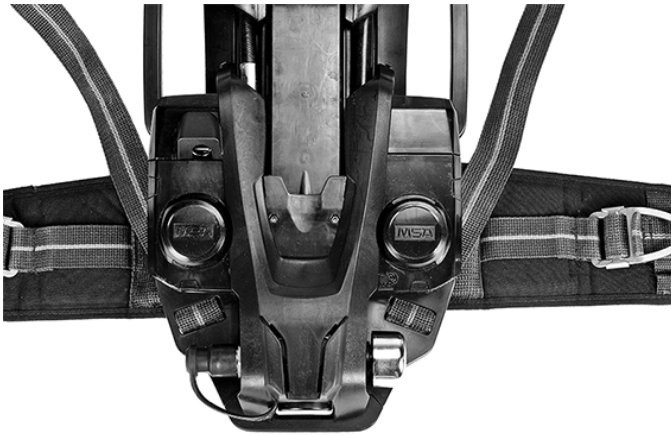


The G1 control module is the user's interface with the SCBA and PASS device.

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).

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

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.

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.

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.

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



WARNING

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.

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.



WARNING

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.



WARNING

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.



WARNING

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, abrasion, missing buckles or straps.
- (3) Perform all component specific inspections listed below.

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.



WARNING

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.

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 be 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.

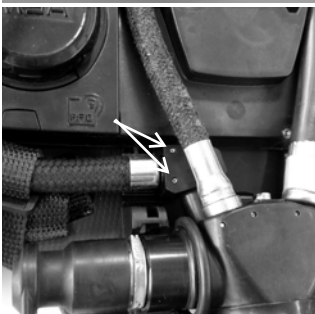


- (2) Remove the battery module from the power module.
- (3) Check the battery module for visible damage, ensure that the connection seal is in place and undamaged.
- (4) Reinsert the battery module and turn off the PASS device.

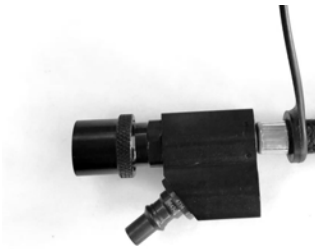
4.9 ExtendAire II



- (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



WARNING

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.

- (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


WARNING

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.

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.



- (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.

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.