

Basic Manual

M1 Modular SCBA System

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AS/NZS 1716:2012 Lic:
BMP No 713832
PRODUCT CERTIFICATION
BSI Certified Product



1 Safety Regulations

1.1 Correct Use

The MSA M1 - referred to hereafter also as device - is a pressure-demand self-contained breathing apparatus (SCBA) operating independent of the ambient air for use in firefighting in atmospheres immediately dangerous to life or health.

In combination with a certified facepiece (full face mask) the device protects the wearer against inhalation of hazardous substances and mixtures, harmful biological agents and oxygen deficiency.

Breathable air according to EN 12021 is supplied to the user from a compressed air cylinder via a pressure reducer, a lung governed demand valve and a facepiece. The exhalation air is released directly into the ambient atmosphere.

DANGER!

This device is a pure gas protection device. It is not suitable for underwater diving.

WARNING!

Only trained individuals should be allowed to use the device after ensuring sufficient knowledge on donning and general use of the device. Failure to follow this warning can result in serious personal injury or death.

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. Before use the product operability must be verified. The product must not be used if the function test is unsuccessful, it is damaged, a competent servicing/maintenance has not been made, genuine MSA spare parts have not been used.

1.2 Liability Information

MSA accepts no liability in cases where the device has been used inappropriately or not as intended. The selection and use of the device are the exclusive responsibility of the individual operator.

Product liability claims, warranties and guarantees made by MSA with respect to the device are voided, if it is not used, serviced or maintained in accordance with the instructions in this manual.

1.3 Safety and Precautionary Measures

- The device is approved beyond the specifications of EN 137:2006, for the temperature range between -40 °C and +60 °C as type 2 device (application for fire fighting). If the certification of the breathing connection has a different (lower) temperature range, this must be taken into account accordingly.
- The device may be used in potentially explosive atmospheres according to the class stated in the M1 Modular SCBA System operating manual.
- The ATEX class of any other equipment used together with this device has to be regarded as well. The lowest class sets the limit.
- If the device is used in a explosive atmosphere, dissipative clothes and footwear must be used in conjunction with dissipative grounds. When used in explosive atmospheres there must be direct contact between the head harness of the mask and the head. Do not use head coverings (e.g.fire hoods) under the head harness.
- Compatibility with other types of Personal Protective Equipment (PPE) worn during use of the device (e. g. clothing and helmets) has to be ensured according to Directive 89/656/EC.
- Use of the device in a vicinity that generates strong electrostatic charges in explosive atmospheres is not allowed.
- Do not expose the device to any substances that will or might attack any part of the SCBA, causing the SCBA to not perform as designed and approved.

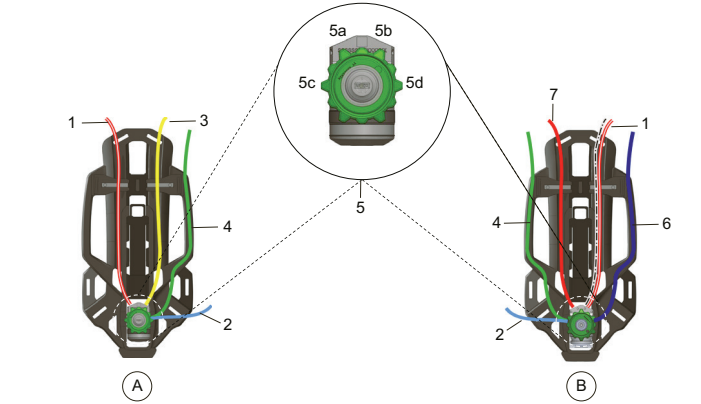
Only use breathable air quality in accordance with EN 12021 and other applicable national regulations.

2 Description

Breathable air is supplied to the user from a compressed air cylinder via a pressure reducer, a lung governed demand valve (LGDV) according to EN 137:2006 and a full face mask according to EN 136:1998 (see operating manuals of lung governed demand valve and full face mask). The exhalation air is released directly into the ambient atmosphere.

The M1 SCBA can be configured via an ATO code with SingleLine, classic pneumatic or fixed pneumatic (see M1 Modular SCBA System operating manual).

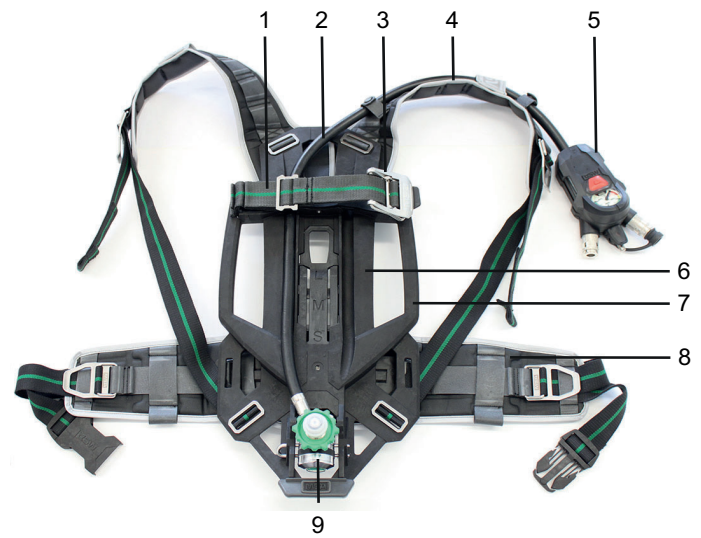
The following overview shows all options for the SingleLine and classic configuration:



A	SingleLine configuration	B	Classic configuration
1	SingleLine and warning signal	1	Front warning signal line and medium pressure coupling with SingleLine manifold or warning signal in pressure reducer
2	Air cascade connection**	2	Air cascade connection (option)*, **
3	Quick-Fill	4	Rescue line*
4	Rescue line	5	Pressure reducer
5	Pressure reducer	5a/b	SingleLine ports (medium pressure and high pressure)
5a/b	SingleLine ports (medium pressure and high pressure)	5c/d	Medium pressure ports (only)
5c/d	Medium pressure ports (only)	6	Main medium pressure line*
		7	High-pressure line

* In case of air cascade connection option, rescue line must be removed if warning signal is in use
** For air cascade applications, use hose with non-return nipple

Mirroring of displayed options is possible. A maximum use of three medium pressure couplings is allowed.



1	Cylinder strap	6	Backplate
2	SingleLine	7	Handle
3	Cylinder buckle	8	Hip belt
4	Shoulder strap	9	Pressure reducer
5	Manifold (here SingleLine SCOUT)		

The backplate consists of an anatomically designed plate of antistatic plastic with handles for easy transport of the apparatus. The pressure reducing valve is located in the lower section of the backplate. On the upper part of the backplate, a cylinder support is attached with integrated hose retainer. The shoulder straps and the hip belt are adjustable in length.

One or two compressed air cylinders can be placed on the cylinder support. The cylinder strap is freely adjustable and after inserting the compressed air cylinder(s), it is tightened and secured using the cylinder buckle.

The structure of the compressed air breathing apparatus is based on a modular design. This allows the user to configure the compressed air breathing apparatus from the modules available to match his specific requirements.

The M1 SCBA can be used with the G1 Facepiece, 3S and Ultra Elite full face mask. For more information, see relevant operating manual.

The M1 SCBA can be used with the following lung governed demand valves: M1-AE LGDV M45x3, M1-AS LGDV, M1-ESA LGDV, M1-AS-B LGDV. For more information, see LGDV operating manual.

3 Use

3.1 Visual Inspection

Conduct a visual inspection upon receipt.

WARNING!

- Do NOT examine the SCBA before it is decontaminated, cleaned, and disinfected if there is a risk of exposure to hazardous contaminants. Obey the applicable decontamination procedures, clean and disinfect the SCBA, then examine it.
- If the SCBA shows damage, deterioration, or any of the conditions listed in the Visual Inspections section, remove the SCBA from service and return it to an MSA trained and certified repair technician.
- Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by MSA. Failure to obey these warnings can result in serious personal injury or death.

WARNING!

If the SCBA shows any of the conditions listed in the Visual Inspections section, remove the SCBA from service. Make sure an MSA trained and certified repair technician corrects the unsatisfactory condition before returning the SCBA to service. 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 MSA. 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 straps, pull straps, hip belt, waist straps, full face mask head harness) for tears, cuts, wear, abrasion, missing buckles or straps.
3. Perform all component specific inspections listed below.

Cylinder

1. Check the test date on the cylinder approval sticker located on the cylinder neck or on the cylinder label.
 - a. Observe national regulations for inspection intervals.

Make sure that the cylinder in use is approved as part of the MSA M1 SCBA system and fulfills all requirements to be in operation according to the cylinder manual and relevant national regulations.

3.2 Functional Test

WARNING!

If the SCBA does not operate correctly for all functional tests, remove the SCBA from service. Make sure an MSA trained and certified repair technician corrects the unsatisfactory condition before returning the SCBA to service. Failure to obey this warning can result in serious personal injury or death.

If the SCBA has passed the visual inspection successfully, conduct the functional tests.

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.

Tightness Check of the Pressure Reducer

1. Connect compressed air cylinder.
2. Open cylinder valve and check operating pressure on pressure gauge. *The pressure value must read minimum 270 bar for 300 bar cylinders.*
3. Close cylinder valve. *After 60 seconds the pressure drop in the pressure gauge must not exceed 10 bar.*
4. Check warning device:
 - a. Connect LGDV.
 - b. Pressurize the system by opening the cylinder valve.
 - c. Close the cylinder valve.
 - d. Observe the pressure gauge.
 - e. Activate flushing mode of lung governed demand valve, releasing all air pressure. *Warning must sound at 55 bar ± 5 bar for a 300 bar system.*

WARNING!

- Before entering the hazardous area, the device must be put on.
- Before entering the hazardous area, check the M1 electronic devices for mechanical damage.
- 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 repair person before using.
- The full face mask may not seal properly with your face if you have a beard, gross sideburns or similar physical characteristics. An improper facial seal may allow contaminants to leak into the full face mask, reducing or eliminating respiratory protection. Do not use this device if such conditions exist.
- The full face mask seal must be checked before each use.
- A nosecup must be installed in the full face mask.
- In order to guarantee a proper fit for those wearing glasses, a spectacle kit must be worn since ordinary glasses cannot be worn under the full face mask.
- Never remove the full face mask 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.

3.3 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:

Threaded connect:

- Check that the handwheel is hand-tight (no tools).

alphaCLICK 2 (Quick connect):

- Ensure secure connection by pull on quick connect coupling.
3. Pull on the cylinder strap assembly to ensure the cylinder strap is attached securely.
 4. Fully extend the shoulder straps and the hip belt.
 5. Adjust height of the hip belt (if height adjustment is available):
 - a. Pull the lever on the backplate and push up or down depending on the adjustment needed.
 - b. Release the tab and pull up or down to ensure the hip belt is locked in.

3.4 SCBA Donning Procedure



- Slide the right arm through the right shoulder strap. Slide the left arm through the left shoulder strap.
 - Check correct orientation of shoulder straps.
- Bend forward slightly; resting the carrier on the back. Pull down shoulder straps to pre-tighten SCBA.
- Fasten the hip belt and pull forward on the waist strap pull tabs to tighten for a snug fit (exxtreme and advanced harness). For basic harness, pull sideways on the waist strap pull tabs to tighten.
 - Most of the SCBA weight should be carried on the hip.
- Stand up straight. Pull down on the shoulder strap pull tabs to tighten straps. Adjust the hip belt if necessary. Fasten chest strap (if used).
- Grab the LGDV and push the side buttons to release the LGDV from the LGDV retainer.
- Make sure the LGDV is switched off before opening the cylinder valve(s).
- Reach behind and fully open the cylinder valve(s).

3.5 During Use

Periodically check the pressure indicated on a chest mounted pressure indicator during use. When the needle on the pressure indicator reaches the red zone on the gauge face, the primary low pressure warning device alarms.

The primary low pressure warning device indicates when cylinder pressure drops below these approximate values:

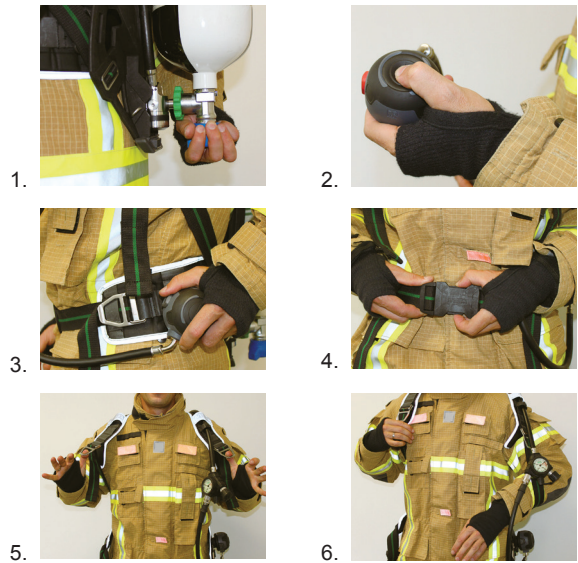
- 55bar +/- 5 bar for a 300 bar system

Immediately return to fresh air if:

- SCBA free-flows (provides air when not inhaling).
- Low pressure warning device sounds.

- When the pressure warning device indicates 35% cylinder pressure, immediately return to fresh air.
- If the air flow in the SCBA is reduced: Immediately keep purge pressed. Immediately return to fresh air.

3.6 After Use



- Close the cylinder valve(s) fully.
- Press the purge button to release system pressure.
- Stow the LGDV in the LGDV retainer when it is not in use.
- To remove the carrier and harness, press both buttons of the hip belt buckle.
- Disconnect the chest strap buckle by pressing both buttons at the same time (if used). To loosen the shoulder straps, lift the pull tabs and push them out and away from the body.
- Slip the left arm out of the shoulder strap first, then remove the harness.

3.7 Cylinder Fitting and Removing

Removing the Cylinder(s)

- Lay the backplate of the SCBA horizontal with cylinder(s) facing up.
- Ensure there is no pressure in the system before replacing a cylinder.
 - Close the cylinder valve(s).
 - Press the purge button of the LGDV until air no longer discharges.
- Hinge up cylinder buckle at cylinder strap and thus loosen the strap.
- Disconnect the cylinder(s):

Threaded connection:

- Unthread handwheel from cylinder valve assembly and/or T-piece.

alphaCLICK 2 connection:

- Turn the handwheel on the coupling side first clockwise, when the stop is reached, push downwards in the direction of the pressure reducer.
- The cylinder adaptor releases from the alphaCLICK 2 coupling.

- Lift cylinder(s) at the valve and pull out of cylinder strap.
- Close high pressure connection cylinder valve(s) with protection cap (not required for alphaCLICK 2).

Attaching One Cylinder

- Lay the backplate of the SCBA horizontal with cylinder facing up.
- Slide the fully charged cylinder into the carrier.
- Open cylinder buckle on the cylinder strap eliminating any tension and extend the strap (if necessary).
- Push compressed air cylinder through the cylinder strap with the cylinder valve toward the pressure reducer, so that it lies on the cylinder cradle.

Threaded connection:

- Thread cylinder valve to the pressure reducer, if necessary, bring the SCBA with valve up into a vertical position.

alphaCLICK 2 connection:

- Align the compressed air cylinder with the alphaCLICK 2 axially to the coupling and fit on the alphaCLICK 2 coupling.
- Close the coupling by pushing together using a light force.

**CAUTION!**

Never push the coupling system together using excessive force.

- Tighten cylinder strap by pulling the free end.
- Check position of compressed air cylinder, retighten if necessary.

NOTICE

Damage can occur when using excessive force to close the cylinder buckle and the SCBA might not be ready for use.

- Do not overtighten the cylinder strap.

- Hinge cylinder buckle down until it catches. If strap tension is too high during hinging of the cylinder buckle, re-adjust the strap length at the cylinder buckle. If the strap tension is too low, re-adjust the strap length at the cylinder buckle.
 - Fasten end of the cylinder strap by moving the small buckle.
 - Briefly open cylinder valve and check for escaping air, retighten if necessary.
 - To check that the cylinder is secure, place one hand on the backplate and grab 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 strap holds the cylinder securely in the carrier.
- NOTE:** If the cylinder feels loose, check that the latch engages with the proper slot on the strap. Ensure that the latch is fully tightened. Do not use the SCBA if the cylinder is not held securely in the carrier.
- Align the handwheel assembly to the cylinder valve.

Threaded connection:

- Before installing the threaded handwheel, check that the O-ring inside the handwheel coupling nut is present, clean and free of damage. If the O-ring is damaged, it must be replaced before the SCBA is used.
- Thread the handwheel onto the cylinder threads. The handwheel should be hand-tight (no tools).

alphaCLICK 2 connection:

- Before installing check that the male and female end of the coupling are clean and free of damage. Ensure the adapter on the cylinder valve is tight (torque 20 to 30 Nm).
- If necessary, thread the alphaCLICK 2 cylinder adapter with a specific torque of 20 to 30 Nm into the cylinder valve.
- Push the alphaCLICK 2 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.
- Grab the handwheel firmly and pull on it to ensure the handwheel is fully attached.

Attaching Two Cylinders

**CAUTION!**

Never push the coupling system together using excessive force.

- Open cylinder buckle on the cylinder strap eliminating any tension and extend the strap (if necessary).
- Push one compressed air cylinder through the cylinder strap with the cylinder valve toward the T-piece, so that it lies on one of the outer supports.
- Thread the cylinder valve onto the T-piece.
- Push a second compressed air cylinder through the cylinder strap so that the cylinder valve points to the T-piece and lies on the outer supports.
- Thread the second cylinder valve onto the T-piece.
- Before installing the threaded handwheels, check that the O-rings inside the handwheel coupling nut on the pressure reducer and the T-piece are present, clean and free of damage. If the O-rings are damaged, they must be replaced before the SCBA is used.
- Thread the handwheel onto the cylinder threads and T-piece. The handwheel should be handtight (no tools).
- Align the compressed air cylinders with the T-piece and retighten handwheels if necessary.
- Tighten cylinder strap by pulling the free end.
- Check position of compressed air cylinder, retighten if necessary.
- Hinge cylinder buckle down until it catches. If strap tension is too high during hinging of the cylinder buckle, re-adjust the strap length at the cylinder buckle. If the strap tension is too low, re-adjust the strap length at the cylinder buckle.
- Fasten end of the cylinder strap by moving the small buckle.
- Briefly open cylinder valves and check for escaping air, retighten if necessary.
- To check that the cylinders are secure, place one hand on the backplate and grab the cylinder valves with the other hand. Try to pull the cylinders and valves down and out away from the carrier. Make sure that the strap holds the cylinders securely in the carrier.

NOTE: If the cylinders feel loose, check that the latch engages with the proper slot on the strap. Ensure that the latch is fully tightened. Do not use the SCBA if the cylinders are not held securely in the carrier.

4 Maintenance and Care of the SCBA

4.1 Maintenance Intervals

Component	Work to be performed	Before use	After use	Annually	Every 120 months*
M1	Cleaning		X	X	
	Visual, functional and tightness check	X	X	X	
	Overhaul				X or after 600 hours of active use**
alphaCLICK 2 coupling	Cleaning		X		
	Lubricate			X***	
	Check by user	X			

- * Applicable national regulations must be observed (e.g. GFPA German Fire Protection Association directive 0840, attachment 2).
- ** For SCBA apparatus that are frequently used, MSA recommends a complete overhaul after approx. 600 hours.
For example, this corresponds to 1200 applications with a duration of 30 minutes.
- *** Lubricate alphaCLICK 2 coupling every 500 coupling cycles at least.
See "Maintenance alphaCLICK 2 high pressure coupling".

5 Storage

**WARNING!**

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 and ambient conditions 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 available) if the SCBA is not intended for service. If the SCBA is in service, ensure that the batteries in the electronic components (if available) 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.
- Ensure the entire SCBA is clean and dry.
- Ensure the SCBA harness and full face mask 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 (if available) and housings to prevent battery corrosion. Store the units in a cool, dry place.

6 Certification

6.1 Complete Device

Approvals	The compressed air breathing apparatus conforms to the Regulation (EU) 2016/425 and the Directive 2014/34/EU. It is a selfcontained open circuit compressed air breathing apparatus in accordance with EN 137:2006, type 2, for the extended temperature range from -40 °C to +60 °C. The function of the electronic components were not assessed for the certification in accordance with Regulation (EU) 2016/425, because even in case of a complete failure of all electronic components, the respiratory protection provided by MSA M1 remains unchanged.
	0158
DEKRA	Dinnendahlstr. 9,44809 Bochum, Germany

The Declaration of Conformity can be found under the following link:
<https://MSAsafety.com/DoC>

6.2 Marking

For ATEX marking for use in potentially explosive atmospheres see M1 Modular SCBA System operating manual.

For CBRN application and component selection see M1 Modular SCBA System operating manual.

Full face mask: see operating manual for Full Face Mask and Mask/ Helmet Combination. The ATEX class of any other equipment used together with this device has to be regarded as well. The lowest class sets the limit.

7 Ordering Information

For this product, order numbers have been replaced by an ATO (Assemble To Order) code. See M1 Modular SCBA System operating manual.

Manual	Part Number
Operating Manual Modular M1 SCBA System	10195758
Operating Manual M1 LGDV	10190261
Operating Manual G1 Facepiece	10161150
Operating Manual alphaBELT	10156929
Operating ManualSingleLine SCOUT	10186539
Operating Manual 3S and Ultra Elite full face masks	10126346
Cleaning and Disinfection Guidelines M1 Modular SCBA System	10203757

See MSAsafety.com.



When exchanging compressed air cylinders of the same diameter, only the cylinder buckle needs to be opened.