AirXpress One
Self-contained Open-circuit Compressed Air apparatus

User Manual
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1. Safety Regulations

1.1 Correct Use

The MSA AirXpress One (referred to hereafter as device) is self-contained open-circuit compressed air apparatus operating independent of the ambient air.

Breathable air is supplied to the user from a carbon fiber composite cylinder via a pressure reducer, a demand valve and a full face mask. The exhalation air is released directly into the ambient atmosphere.

It is imperative that this operating manual be read and observed when using the product. In particular, the safety instructions, as well as the information for the use and operation of the product, must be carefully read and observed. Furthermore, the applicable national regulations applicable in the user's country must be taken into account for safety use.

Alternative use, or use outside this specification will be considered as non-compliance. This also applies especially to unauthorized alterations to the product and to commissioning work that has not been carried out by MSA or authorized persons.

<table>
<thead>
<tr>
<th>Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>● This product is for the protection of life and health. Any improper use, maintenance or service may affect the function of the product, even bring threaten to user's life. Before each use, user should take regular examination on the product. If any of the following cases occur, the product should be stopped for use: ● Product function is unqualified, or has been damaged, or the inspection on product was not by MSA authorized person, or the spare parts for service are not from MSA.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Danger</th>
</tr>
</thead>
<tbody>
<tr>
<td>This basic apparatus is not suitable for underwater diving.</td>
</tr>
</tbody>
</table>

1.2 Liability Information

This manual describes warnings, attentions, and how to operate and maintain the apparatus properly. It is imperative that this manual be carefully read and observed by the person who intends to use or to do maintenance to the apparatus. It can perform effectively to its originally designed purpose only when it is operated and maintained according to the manual. Violating instructions herein or inappropriate use will result in serious personal injury even death.

If the product is not operated, serviced or maintained in accordance with the instructions in this manual, the liability claims, warranties also as guarantees made by MSA with respect to the product are invalid.
2. Description
This device has one 6.8L cylinder, back plate assembly and mask.

2.1 Main technical specification
- Working pressure (MPa): 30
- Cylinder capacity (L): 6.8
- Air storage (L/30MPa): 2100
- Alarm pressure (MPa): 5.5±0.5
- Weight (Kg): 10.5
- Size (L×W×H) (mm): 630×350×230

2.2 Main materials
- Back plate: enforced fiber material, anti-static electricity.
- Strap: flame-resistant polychloroprene rubber.
- Reducer: brass, nick-coated, chrome-coated.
- Medium pressure hose, high pressure hose: rubber.
- Other auxiliary parts: stainless steel or plastic.

2.3 Compressed air cylinder
MSA compressed air cylinder consists of a carbon fiber composite cylinder [1] and cylinder valve [2].
Warning!

- Please read and understand all warning information and instructions on the cylinder before you use the cylinder product.
- Normally MSA carbon fiber composite cylinders must be inspected every three years. MSA recommends you to replace the cylinder valve after each scheduled hydrotest.
- Only authorized dealer or serviceman is allowed to repair and/or maintain cylinder, valve. User cannot tear down valve from cylinder without authorization.
- The cylinder should avoid the direct sunshine when filled with compressed air
- Do not modify or replace any component of the product.

Note:

Quality of air must meet one of following standards:

- Air grade I, ISO8753.1
- EN12021/ or DIN3188
- Grade D/E, CGA

The following table lists the air specifications in compliance with EN12021 for reference.

<table>
<thead>
<tr>
<th>Name of substances</th>
<th>Air specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen</td>
<td>(21±1) %</td>
</tr>
<tr>
<td>Oil</td>
<td>≤ 0.5mg/ m³</td>
</tr>
<tr>
<td>Odor</td>
<td>No abnormal odor obviously</td>
</tr>
<tr>
<td>CO₂</td>
<td>≤ 500ml/ m³ (500ppm)</td>
</tr>
<tr>
<td>CO</td>
<td>≤ 15ml/ m³ (15ppm)</td>
</tr>
<tr>
<td>Water</td>
<td>No liquid water</td>
</tr>
<tr>
<td></td>
<td>≤ 50mg/ m³ (40 ~ 200bar)</td>
</tr>
<tr>
<td></td>
<td>≤ 35mg/ m³ (&gt; 200bar)</td>
</tr>
</tbody>
</table>

The following table lists the recommended maximum moisture of compressed air.

<table>
<thead>
<tr>
<th>Max. moisture</th>
<th>Moisture</th>
<th>Dew point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fill pressure (Mpa)</td>
<td>Moisture</td>
<td>Dew point</td>
</tr>
<tr>
<td>20</td>
<td>35</td>
<td>-51°C</td>
</tr>
<tr>
<td>30</td>
<td>27</td>
<td>-53°C</td>
</tr>
</tbody>
</table>

Note:

If you cannot control the quality of air for fill and have some suspicion that air mixed with moisture have gone into the cylinder, please carry out internal inspection every six months.
2.4 Back plate assembly

(1) The basic breathing apparatus is made up of backplate, shoulder strap, reducer, medium pressure hose, high pressure hose, pressure gauge and demand valve.

(2) Backplate is designed to use symmetrical plastic handles for convenient movement of device. Reducer is mounted under the back plate. Cylinder bracket is mounted in the guide groove at the upper part of back plate. Lengths of waist belt and shoulder strap can be adjusted.

(3) Material of the backplate is fiber reinforced material.

(4) Materials of the shoulder strap and waist belt are flame-resistant polyester webbing, flame-resistant fabric and flame-resistant padding material. Wide shoulder padding and waist protective padding make the wearing very comfortable.

(5) The metal on the backplate, straps and waist belt are made of stainless steel, are not easily rusted.

2.4.1 Reducer

The reducer is mounted in the lower area of the back plate. It reduces pressure of the high pressure air from the cylinder to mid pressure at about 0.7MPa. The air is delivered through mid pressure hose to demand valve, reduce the pressure again and then used by the user. Turn the hand wheel and connect the cylinder connector with the carbon fiber composite cylinder. Once the cylinder valve is switched on, the user can view the pressure indication from the pressure gauge as which is connected to the high pressure hose.
A pressure alarm device is equipped in the reducer. When the pressure of the cylinder is lowered to \(5.5 \pm 0.5\) MPa, it will give off audible alarm signal \(\geq 90\) dB. There is no air inhaled when alarm device give a alarm, so the alarm device will not lose its function even if in high humid atmosphere or under sprinkle water, or even in very low temperature. In addition, the air consumed for the alarm device's alarm is \(\leq 5\) L/min.

There is also a safety release valve \(\[6\]\), which is set to about 1.1 MPa. in case there is anything wrong and the medium pressure rises, the valve will switch on, release the over pressure to guarantee the performance of the demand valve.

**Warning**

- Once the air releasing phenomenon by the safety pressure release valve of the reducer is noticed, withdraw from the working place immediately and stop using this breathing apparatus. Send it to MSA authorized agency for inspection and repair. It can only be used after all trouble removed.
- It's forbidden to adjust any parts in the reducer by user.
- The breathing apparatus must be sent back to MSA authorized agency for repair if any failure occurs. It is no allowed to disassemble the reducer by the user.
- Don't damage the seal surface when replacing the seal O ring \(\[3\]\) on the high pressure connection.

**2.4.2 Demand valve**

The outer housing of the demand valve is made of high intensity engineering plastic to endure possible collision. The demand valve must be used with full mask.

**Note**

Don't push operating button and exhaust button at the same time.
2.4.3 Medium pressure hose
The explosion pressure for medium pressure hose is not less than 4 times of the reducer output pressure. Connection of the medium pressure hose with the demand valve is flexible and swiveling, which can automatically fit head movement of the operator.

2.4.4 High pressure hose
A high pressure gauge is connected with the high pressure hose. The pressure gauge surface is luminescent, so the pressure display can be viewed clearly even in the dark. Connection of the pressure gauge and the high pressure hose is swiveling and can turn in 360°, this makes easy for the operator to view the pressure gauge at any position.

Note
There is a small hole in the high pressure hose, which is safety hole. In case there is leak from the high pressure hose, air will be released from the small safety hole, thus to avoid the high pressure hose from exploding.

2.5 Full face mask
There are 2 types for full face mask, one is with rubber head harness, and another is with net head harness.
The full face mask is made up of mask body [1], lens [2], speaking diaphragm [3], air inlet [4], air outlet [5], nose cup [6], and rubber head harness [7.1], or net head harness [7.2]
3. Use


### Warning
- The device can be used only after fully maintained and tested. If malfunctions or defects were found before using, do not use the device.
- Prevent the respirator from sharp objects and prevent it from collision with any objects during the use.
- The device shall be checked and repaired by MSA authorized service centre.

### 3.1 Wearing the air breathing apparatus
- Take out the apparatus from the carrying case, checking for the system completeness.
- Check the cylinder pressure. Watch the indicator of the high pressure gauge readings.

### Note
- Cylinder pressure should not be less than 27MPa. If below 27MPa, it will reduce service time. Thus, It is suggested to fill the cylinder after each use.
- If cylinder pressure is below 27MPa one month after re-filling, inspection must be done for the cylinder valve’s leaking condition. Inspection method: to immerse the cylinder into water after re-filling, watch whether there is any bubble appears. If bubble exists, contact MSA authorized agency for check, maintenance and repair.
- In order to check the pressure in the cylinder, connect the cylinder to the back plate and check the pressure via the gauge in front of the chest.

- To make the cylinder bottom near yourself, make the position of the left and right shoulder strap between your hands, grasp the left and right handle of the back plate with your two hands, raise the apparatus set over your head, then your two hands band backward and downward, lower the apparatus, making the left and right shoulder strap dropping on your shoulder. You can also wear your apparatus like a student to wear his schoolbag (figure 7).
- Pull the bottom shoulder strap to make the apparatus in a proper height, not necessary to be too high, just to make yourself feel comfortable (figure 8).
- Insert your waist strap properly, adjusting it to a proper tightness (figure 9).
- Insert the chest strap.
3.2 Checking the warning device

- Push the red button to make the demand valve switched off.
- Switch on the cylinder valve to about half circle. Switch off the cylinder valve until the pressure reading is stable (figure 10).
- Block the outlet of the demand valve with your left hand palm, leaving just a narrow gap; Then slightly push on the exhaust button on the demand valve to release air slowly. Watch the pressure gauge reading changes. When the pressure lowered to about 35MPa, reduce the air releasing flow, watch the pressure gauge indication and listen to the alarm whistle signal. The alarm whistle signal should starts when pressure lowered to between 5.5±0.5MPa (figure 11).
- After alarm function checking, switch on the cylinder valve at least 2 circles.

![Fig. 10](image1.png) ![Fig. 11](image2.png)

3.3 Donning the mask and checking its air-tight property

- Take out the mask, loosen all head harness straps.
- Place the neck strap around your neck.
- Pull the mask harness over your head, put your chin into the lower part of the mask (figure 12).
- Pull back the head harness until center of the head harness positioned at your overhead center.
- Tighten the two lower straps to a proper tightness. Pull them to backward direction (figure 13).
- Tighten the two middle straps to a proper tightness.
- Tighten the one top strap to a proper tightness.
- Check the air-tight property of the mask: block the inlet of the mask with your hand palm, make one deep inhaling. If you feel the mask is sucked in tightly against your face and no air flow inside the mask, it means the mask and your face sealed (figure 14).

![Fig. 12](image3.png) ![Fig. 13](image4.png) ![Fig. 14](image5.png)
3.4 Connecting the demand valve and entering the work place

- Align the demand valve outlet and the air inlet of the mask, and push the outlet of the demand valve into the mask. The connection of the demand valve and the mask is done when you hear the slight “click” sound (figure 15).
- Take a deep inhale breathing, to switch on the demand valve.
- Make several inhale and exhale breathing, if no uncomfortable feeling, you can enter work place now (figure 16).
- Pay attention to the change of the pressure gauge during working. If the pressure drops the level that activates the alarm whistle signal, you must withdraw immediately to return to the safe place.

3.5 Taking off the air breathing apparatus

- After working, return to the safe place.
- Release the demand valve: Press down black and red buttons at both sides of demand valve with thumb and first finger to close the demand valve (press on the red button closes the demand valve), and drag the demand valve out of the mask.
- Take off the mask: Poke outward the stainless steel buckle on the mask head harness with your forefinger to loosen the head harness. Grasp the mask air inlet and drag it outward to release the mask, take it off and place it aside properly (figure 17, figure 18).

Note

- If the mask and your face are not well sealed, the readjustment must be made until a good seal is achieved.
- The beard or sideburns on the face may affect the air-tight seal.
- Hairs got in between the mask and your face will affect the air-tight seal.
- Not necessary to pull the head harness too tight, which will make you feel uncomfortable.
- When in cold weather, once your mask is on your head, fog may appear on the lens. As long as you start breathing after connecting the demand valve, the fog will disappear.
3.6 Removing, installing, filling and emptying cylinder

1) Removing the carbon fiber composite cylinder
- Place the compressed air breathing apparatus in a horizontal position with the cylinder facing up.
- Hinge up cylinder buckle at cylinder strap (figure 21, arrow 1) to loosen the strap (figure 20, arrow 2).
- Unthread cylinder valve from reducer and remove the cylinder.
- Remove carbon fiber composite cylinder from reducer and pull out from the cylinder strap.

2) Mounting the carbon fiber composite cylinder
- Insert the cylinder into the cylinder strap.
- Erect the cylinder and the back plate (easy to mount, figure 22).
- Align the cylinder valve outlet center with the reducer hand wheel center.
- Turn the hand wheel, to connect the reducer with the cylinder.
Note
Not to make it too tight, just hand-tight. Don’t use any tools.

Warning!
- Filling pressure cannot exceed the rated working pressure of cylinder.

3) Filling the carbon fiber composite cylinder

Inspection before air fill
- Validity of cylinder. Cylinder must be identified with the date of latest inspection, testing mark by designated authority and inspection schedule
- Cylinder does not have any appearance damage.
- The connection threads must be dry, the seal ring must be no manage, and inside of empty cylinder are dry.
- Cylinder valve should not have any appearance damage and switch functions is effective.
- Keep the filling device intact and connection with cylinder valve airtight.
- Tighten filling connector and cylinder valve before filling the air.

Note!
- Heat emission of composite cylinder will take a longer time than traditional metal cylinder during the period of air fill because the material of composite cylinder is the thermal insulated material. The temperature of cylinder maybe exceed 30°C when the filling pressure reaches the working pressure, but when the cylinder temperature drop down to the same with the environment temperature, pressure in the cylinder will drop as well, and the cylinder is not filled enough as specified. So, air filling can be continued until it is fully filled.
4) Emptying the compressed air cylinder
- Do not direct valve outlet of G5/8 to any person, and exhaust slowly.

<table>
<thead>
<tr>
<th>Note!</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Fix the cylinder stably during the period of air emptying to prevent cylinder from rotation.</td>
</tr>
</tbody>
</table>

3.7 Arranging and placing the air breathing apparatus
- Lock tightly the fastener of the cylinder strap.
- Loose the shoulder strap and waist strap, to make it easy for the next wearing.
- Loose the head harness of mask, to make it easy for the next wearing.
- To place the apparatus and the mask into the carrying case. Close the carrying case.
- Place the apparatus correctly according to requirement, such as hang the apparatus on wall, for use at any time.

4. Maintenance

<table>
<thead>
<tr>
<th>Note!</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The user who buy the whole SCBA must make annual regularly checking plan and implement. The regularly checking should be one time every year.</td>
</tr>
</tbody>
</table>

4.1 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.
- Do not use organic solvents such as nitroglycerine solution, alcohol, alcohol solution, gasoline and trichloroethylene etc. When drying/washing, do not exceed the maximum permissible temperature of 60°C.

<table>
<thead>
<tr>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>• MSA recommends the following maintenance intervals. If necessary considering the usage, tasks may be at even shorter intervals than indicated.</td>
</tr>
<tr>
<td>• For any doubt, ask your local MSA authorized service centre.</td>
</tr>
</tbody>
</table>
Below is the requirement for the maintenance schedule for each part. Testing for the mask and demand valve should be done on the complete set of the apparatus, and cylinder pressure should not be lower than 12MPa.

<table>
<thead>
<tr>
<th>Part name</th>
<th>Maintenance items</th>
<th>Minimum intervals for checking, maintenance and repair</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Before delivery</td>
</tr>
<tr>
<td>Mask</td>
<td>Cleaning and disinfection</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Outside appearance, function &amp; leak test</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace the exhalation disc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voice vibration diaphragm replace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Self inspection by the user</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full-function check</td>
<td></td>
</tr>
<tr>
<td>Demand valve</td>
<td>Cleaning and disinfection</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Check diaphragm</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Replace diaphragm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tightness check</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Checking closing pressure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full-function check</td>
<td></td>
</tr>
<tr>
<td>Reducer</td>
<td>Alarm device</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Replace high pressure seal ring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Full-function check</td>
<td></td>
</tr>
<tr>
<td>Medium- and high-pressure parts</td>
<td>Appearance</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Sealing property</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cleaning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pressure gauge</td>
<td></td>
</tr>
<tr>
<td>Carbon fiber composite cylinder</td>
<td>Appearance and cleaning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinder valve</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Legal inspection</td>
<td></td>
</tr>
<tr>
<td>Breathing device</td>
<td>Complete set cleaning</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Function test, leak test</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Completeness inspection</td>
<td></td>
</tr>
</tbody>
</table>
4.2 Maintenance for the full face mask

- Cleaning/ Disinfection
  - The dirty mask is cleaned with lukewarm water containing a neutral detergent. Before washing, remove inhalation and exhalation valve discs, remove the nose cup and unscrew the speaking diaphragm. These components need to clean separately and reassembled only after drying. Cleaned parts must not be dried in radiant heat (sunlight, radiators). When using a drying cabinet the temperature must not exceed 50 °C.
  - Masks should be disinfected after having been cleaned as described above.
  - The MSA disinfectant (P/N:10129719) is recommended. Information about the concentration and time is contained in the Instructions for use of disinfectant. After disinfecting thoroughly flush all components with water, dry and reassemble.

- Appearance, function and seal performance inspection
  - Maintenance includes testing the functioning and tightness of the mask, as well as replacing components.

![Note!]
- Only MSA spare parts must be used for repair.

- Replacing the Exhalation Valve Disc
  - In case of the exhalation valve disc leak and need to replace, open the bottom cover/door, carefully, remove the spring retainer complete with spring and pull off valve disc complete with pin. Replace valve disc with pin and assemble spring retainer with spring again.

- Leak Test
  - After maintenance need to do leakage test to on the mask to ensure the mask is qualified

![Note!]
Regularly used mask should be cleaned and disinfected as often as required. They should be cleaned as soon as possible after each use because perspiration or saliva could cause malfunctions. The mask must be disinfected at least before it is used by another person.

4.3 Maintenance for the demand valve

- Maintenance Instructions
  - The product should be regularly checked and serviced by specialists. Inspection and service records must be maintained. Always use original parts from MSA.
  - Rubber parts are subject to aging and must be inspected and replaced at regular intervals.
  - Do not use organic solvents like thinner, alcohol, white spirit or petrol.
**Cleaning/Disinfection**

<table>
<thead>
<tr>
<th>Warning!</th>
</tr>
</thead>
<tbody>
<tr>
<td>While cleaning make sure that no fluids penetrate the Demand valve through the medium pressure line. Fluids can damage the components on the inside.</td>
</tr>
</tbody>
</table>

- Switch off Demand valve, connect to the medium pressure line.
- Clean device on the outside, using neutral detergent (P/N: D2055765). Ensure that not dirt penetrates the inside.
- Clean demand valve in the wash basin and rinse with plenty of water.

**After cleaning/disinfection**

- Connect switched off demand valve to medium pressure.
- Turn on green button, fully blow out the moisture for at least 20s.
- Uncouple from medium pressure.
- Dry apparatus completely in a drying cabinet at max. 60°C.

<table>
<thead>
<tr>
<th>Note!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand valve maintenance must be carried out by authorized service centers or by MSA.</td>
</tr>
</tbody>
</table>

**4.4 Maintenance for the reducer**

**Alarm whistle**

Please check the warning device according to section 3.2.

**High pressure seal ring**

Inspect the high pressure seal ring on the reducer and the connecting place with the cylinder. If damaged, it must be replaced, and at least replace it once every year.

**Overall inspection**

An overall inspection to the reducer must be made every 6 years. This must be done by the manufacturer or an authorized test center. During overall inspection, all the rubber parts and all parts found with wearing or cracks must be replaced. A readjustment and lead seal should be made after replacement.

**4.5 Maintenance for the high and medium pressure hose**

User must pay attention to connections and surrounding areas and check if performance of high and medium pressure hose is loss because of normal aging, improper working conditions, wrong operations or accident.

Stop to use the apparatus if there is any of following defects:

- Hole, split, tearing and burst of reinforced layer
- Crack of ozone layer
Partial deformation, air bubble and bulge under pressure
Soft or sticky

Leak test for the high and medium pressure hose
- Turn on the cylinder valve, cylinder pressure (30MPa) should be more than 27MPa.
- Then turn off the cylinder valve, pressure decrease should be less than 1MPa in one minute.

Cleaning
- To keep the surface of rubber hose clean, it can be washed with lukewarm water containing a neutral detergent. After washing, dry it with a drying cloth.

4.6 Maintenance for the carbon fiber composite cylinder
- Checking and clean
  - 1. Cylinder
    - No any damage was found from appearance by visual inspection.
    - The dirt, pollutant and the loose surface protective layer on the surface of cylinder shall be washed with neutral detergent and lukewarm water, its temperature shall be less than 60°C.
  - 2. Valve
    - No metal deformation was found on the valve. Black sealing paint on the joint between cylinder body and valve should not be destroyed, as the fig. 23, (Good sealing paint represents it passed factory quality inspection).

Warning!
If there appears some crack or offset on the sealing paint, it indicates that the valve has ever been torn down from the cylinder, stop its service immediately.

- Opening and closing the valves. When operating the handle of the common valve anticlockwise a little, the sound of air exhaust in normal conditions could be heard, and while closing the valve immediately, no abnormal voice appeared.
- Legal inspection.
  - Normally inspect MSA carbon fibre composite cylinder product every three years. Regular inspection must be conducted by national authorized party in accordance with applicable national standards.
- Please check the cylinder earlier if the corrosion, damage or some unsafe aspects happened to the cylinder during application.
- Please check the cylinder carefully if the cylinder missed the regular inspection more than one inspection interval such as long time storage or service stop, etc.

**Note**

- User is permitted to deal with minor damage and surface contamination of cylinder. Please contact MSA after sale service or authorized agency if there are other undefined damages. Otherwise MSA is not liable for consequence of product application with irregular operating.

- Clean contamination, corrosion products, loose protective layer and other foreign matters that may affect the appearance inspection with mild detergent or clean water below 60°C.
- Generally a carbon fibre composite cylinder is acceptable or repairable if its carbon fibre layer is intact though glass layer is damaged.
- No repair is required if the thickness of abrasion on the glass fiber layer is less than 0.25mm, as illustrated in the figure 24.
- No repair is required if the cut in the glass fiber layer is less than 0.25mm and/or a small area of glass fiber layer is tarnished because of collision, as illustrated in the figure 25.
- Continuous use is permitted if peeling of glass fiber layer does not exceed 50mm².
- Continuous use is permitted if cylinder is cleaned and base layer is found intact after oil paint or composite material is just contaminated by smoke or other debris.

![Fig. 24](image1.png) ![Fig. 25](image2.png)

**Warning!**

Do not use organic solvent such as coal oil, gasoline, strong base, acid or other substances that may damage composite cylinders to clean the surface.

- Stop the service of a carbon fibre composite cylinder if it is damaged seriously.
- Stop the service of a cylinder if the composite material is worn out along the section of fiber, as illustrated in the figure 26.
- Stop the service of a cylinder if cut in the composite material is deeper than 0.25mm and along the section of fiber, as illustrated in the figure 27.
Stop the service of a cylinder if a large area of fiber is tarnished, peeled or damaged structurally because of collision, as illustrated in the figure 28.

Stop the service of a cylinder if peeling of glass fiber layer exceeds 50mm², as illustrated in the figure 29.

Stop the service of a cylinder if it is overheated, as illustrated in the figure 30.

Stop the service of a cylinder if there any bulge, pit or deformation on valve connection appears, as illustrated in the figure 31.

Stop the service of a cylinder if it is exposed to the aggression of chemicals, as illustrated in the figure 32.
4.7 Spare parts list

<table>
<thead>
<tr>
<th>Item No</th>
<th>Descriptions</th>
<th>P/N</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demand valve</td>
<td>10045051-CN</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Medium pressure hose component</td>
<td>10123681</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>High pressure hose component</td>
<td>10152466</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>O-ring (for Medium pressure hose, assembly with reducer)</td>
<td>D0013966</td>
<td>Φ7×1.5</td>
</tr>
<tr>
<td>5</td>
<td>O-ring (for Medium pressure hose and assembly with demand valve)</td>
<td>10038229</td>
<td>9.5*1.8</td>
</tr>
<tr>
<td>6</td>
<td>O-ring (for High pressure hose)</td>
<td>D0013693</td>
<td>Φ2.9×1.8</td>
</tr>
<tr>
<td>7</td>
<td>Back-up gasket (for high pressure hose)</td>
<td>D4075157</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Pressure gauge (chest gauge)</td>
<td>10109410</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>O-ring (for reducer)</td>
<td>3445007</td>
<td>Φ11×2.5</td>
</tr>
<tr>
<td>10</td>
<td>O-ring (for reducer)</td>
<td>3449107</td>
<td>Φ7×1.5</td>
</tr>
<tr>
<td>11</td>
<td>Check valve disc (for mask nose cup)</td>
<td>D2033151</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Exhalation valve disc</td>
<td>D4901320</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Spring and holding plate</td>
<td>D2056725</td>
<td></td>
</tr>
</tbody>
</table>

5. Cleaning
Contaminated apparatus after usage must be cleaned thoroughly.
If necessary, wash the back plate with warm water. For cleaning, disassemble the reducer from the carrying plate (loosen the fixing screws). Do not immerse the reducer into the water. The air for drying the apparatus should be less than 60°C. When cleaning, never to use any organic solvent, such as nitroglycerine solution, alcohol, alcohol solution, gasoline, trichloroethylene, etc.
If there is too much dirt, the carry straps, including metal parts, could be machine-washed with water not above 40°C. Buckles should be well-inserted during washing. After washing, hang them in a ventilated place for a naturally dry.

6. Storage
● The apparatus should be stored in a clean, dry and well ventilated place.
● Put the apparatus into the package and keep it away from long-term exposure to sunshine, heat radiation, electromagnetic field and devices that may produce ozone, electrical spark or silent discharge device.
● Do not store the apparatus with oil, acid, alkali or other corrosive substances, no heavy press on the apparatus.

7. Shipment
● Protect the apparatus from impact, heavy load, rain and sunshine during the shipment. Cylinder must be empty when it is shipped as common goods. If cylinder is shipped with air, observe applicable transportation regulations.
### 8. Trouble shooting list

<table>
<thead>
<tr>
<th>Troubles</th>
<th>Possible causes</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a continuing air flow inside mask</td>
<td>No face-to-mask seal, leak exists</td>
<td>Re-donning the mask, and re-adjust the head harness</td>
</tr>
<tr>
<td>No air flow when inhaling or too much resistance</td>
<td>Cylinder valve not fully turned on</td>
<td>To turn the cylinder valve fully</td>
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<tr>
<td></td>
<td>Reducing valve failure or reducer trouble</td>
<td>Return to MSA for repair</td>
</tr>
<tr>
<td>Too much resistance when breathing</td>
<td>Exhalation valve disc sticky or losing function</td>
<td>Inspect and clean exhalation valve kit.</td>
</tr>
<tr>
<td>Air lost when the cylinder valve turned off</td>
<td>Cylinder valve leaks</td>
<td>Return to MSA for repair</td>
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<tr>
<td></td>
<td>Cylinder neck part leaks</td>
<td></td>
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<tr>
<td>System leaks</td>
<td>Connecting point between reducer and the cylinder valve leaks</td>
<td>Check whether there is any foreign thing on the connecting place surface, O-ring is in good condition</td>
</tr>
<tr>
<td></td>
<td>Connecting point between reducer and the low pressure hose leaks</td>
<td>Turn off the screw connector with a wrench, check the connector to see whether the upper rubber washer is in good condition</td>
</tr>
<tr>
<td></td>
<td>Connecting point between reducer and the alarm device leaks</td>
<td>Return to MSA for repair</td>
</tr>
<tr>
<td></td>
<td>Pressure gauge and the inside tube leaks</td>
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<tr>
<td>Alarm device alarm pressure not correct</td>
<td>Alarm device failure</td>
<td></td>
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</tbody>
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9. Usage record

<table>
<thead>
<tr>
<th>Date of usage</th>
<th>Time of usage</th>
<th>Places of usage</th>
<th>Operator's name</th>
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Equipment description:
Cylinder serial number:
Back plate serial number:
## 10. Inspection record (After each use)

<table>
<thead>
<tr>
<th>Date</th>
<th>Condition and remedies</th>
<th>Inspector's name</th>
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</table>

Equipment description:
Cylinder serial number:
Back plate serial number:
11. Approval agency information:
   Approval agency name:
   SAI Global Assurance Services Ltd.

   Address:
   Partis house, Ground Floor, Davy Avenue, Knowhill.
   Milton Keynes, MK5 8HJ.
   United Kingdom.

   Notified Body: 2056
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Constantly improve product technology, current data is only for reference
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