Catalogue

## 0. Introduction

Self-contained Air Breathing Apparatus(SCBA)

The SCBA is designed for protecting:

- Toxic particles and aerial fog
- Toxic gases
- The oxygen concentration is less than 17%
- The smog caused by fire disaster

Remark: The SCBA has the function of respiratory protection and face protection.

When used in bad working environment, be sure to use auxiliary protective equipment at the same time, such as: Protective Gloves, Safety Boots, Airtight Protective Clothing, Safety Helmets. Any question about the related products, please call us at +86-21-6815-0888.

The text marked in Grey color in the instruction is the warning of use. Any operation don't be strictly according to it will cause the user's life threatening and will damage the SCBA badly.

The user read:

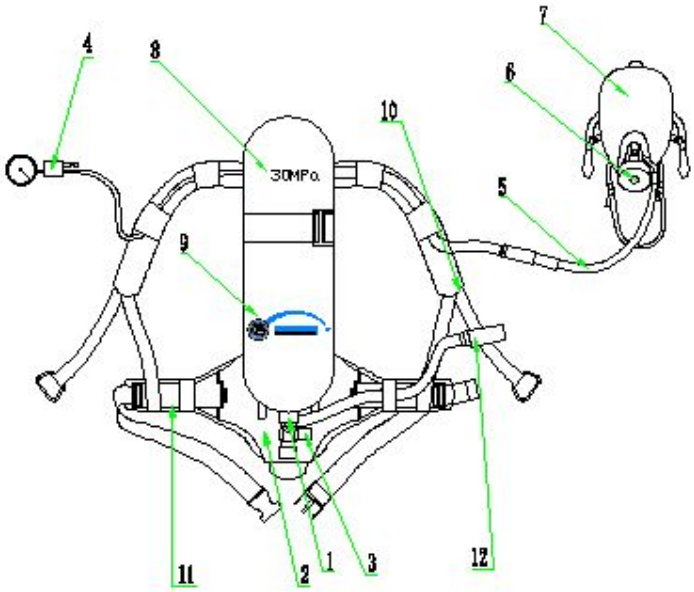
- Reading this instruction carefully before use
- Accept the specialist's training and guide

The SCBA must be:

- Maintained should be done in accordance with the instructions in the manual
- Make inspection records of the main components's maintenance

## 1. Product illustrations and performance description

### 1.1 Product illustrations




| No. | Item | No. | Item |
|---|---|---|---|
| 1 | Gas Cylinder | 7 | Full Face Mask |
| 2 | Back-plane | 8 | Sticker |
| 3 | Cylinder Valve | 9 | Trademark |
| 4 | Alarm whistle | 10 | Waist-belt |
| 5 | Medium-pressure Pipelines | 11 | Shoulder Belt |
| 6 | Air Supply Valve | 12 | Fast Interface |

### 1.2 Product Function Description

The SCBA is an assembled product, it consists of a variety of standard part, it can meet the needs of respiratory protection.

- The volume of gas cylinder (2L,4.7L,6L,6.8L,9L,12L etc), and quantity of gas cylinder (single / double )

- Full Face Mask
  Standard:EN136
  Quantity :single/double
  Material:EPDM rubber.

### 1.3 Function

The SCBA provides user sufficient air by equipped with one or two gas cylinder. The air is compressed to store in the gas cylinder (the pressure of the gas cylinder is 30MPa).But the air in the gas cylinder can't be breathed by user immediately. It must be decompressed twice through the related parts. First, the pressure regulator decompresses the high pressure air to 0.7MPa, and then transporting it into the medium-pressure pipelines, at last, through the air supply valve, the air is decompressed again to the positive air which can be breathed by the user.

Because the air provided by air supply valve is positive air, the pressure inside the face mask is always higher than outside working environment. So the toxic gas and aerosol and smog can't enter into the face mask, which fully protect the safety of users.

### 1.4 Back-plane and belt

The back-plane is designed according to ergonomics totally.

### 1.5 Alarm whistle

The thimble in the alarm whistle is fixed in the spring by the high pressure air, which is transported by pressure regulator and high-pressure pipelines, when opening the valve of gas cylinder. The thimble is for sealing, it can prevent the medium-pressure air into the alarm whistle and hence, the whistle won't alarm.

When the pressure in the gas cylinder is below 5.5±0.5MPa,the thimble detach the sealing position under the action of the string, the medium-pressure air enter into the alarm whistle at the speed of 5 L per minute. And then, the whistle alarms.

**Work function**

Work pressure of the alarm whistle: 5.5±0.5MPa

The whistle will alarm until the air exhaust.
Air consumption: 5 L/ minute
Sound level: 90db
Frequency: 3800HZ

When the whistle alarms, the user must leave the working place immediately and then evacuate to safe area.

### 1.6 Pressure regulator

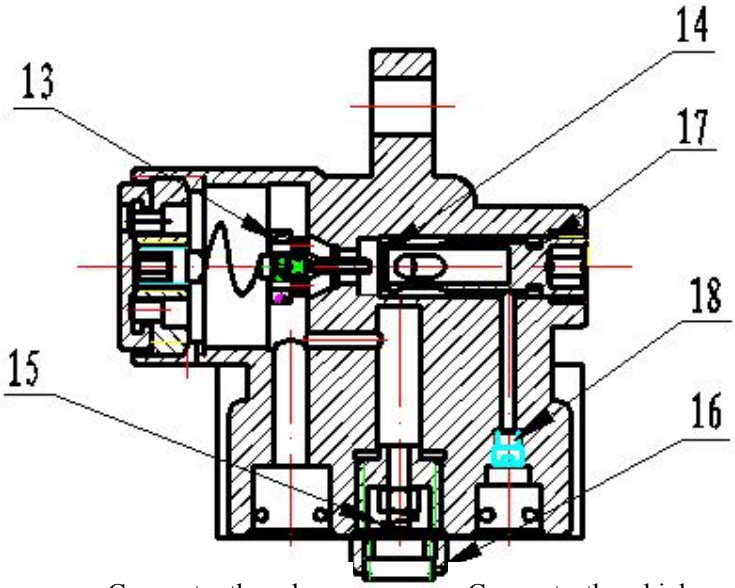
Whatever the change of air pressure in the gas cylinder and the user's breathing frequency, the pressure regulator can provide a stable output pressure. The black sealed cap guarantees the authorized maintenance of pressure regulator, it can't be removed privately, other wise, the person who removes the cap should suffer the consequence.

Mainly parts connected with the pressure regulator:

- One or two gas cylinder
- Medium-pressure pipeline, transporting the air to the air supply valve
- High-pressure pipeline, connecting with the pressure gage
- Technical specification

The maximum input pressure: 30MPa
Output pressure: 0.7±0.05MPa
Opening pressure of the safety valve： 1.1±0.2MPa
Working temperature: -30℃—+60℃ （According to the standard of EN137）
Type: Dynamic balance

Warning: The pressure regulator only can be maintained by designated person, they are our company's specialist and the maintenance personnel, or the person who has the professional training and get the authorized by our company.




**Pressure Regulator**

| No. | Item | No. | Item |
|---|---|---|---|
| 13 | Valve | 16 | Relied valve |
| 14 | Bolt gasket | 17 | Guide bolt |
| 15 | Safety valve spring | 18 | Current limiting bolt |

### 1.6.1 Safety valve

The safety valve is in the piston of the pressure regulator, when the pressure in the medium-pressure circuit is too high , the safety valve will open and exhaust the gas and relied the pressure to the environment. When the medium pressure is back to the normal value, the valve will close again. The set pressure of the safety valve: 1.1±0.2MPa.

### 1.6.2 Usage for two persons

In order to let two person use the SCBA at the same time, the SCBA can be connected with another set of face mask and air supply valve or ventilation hood.

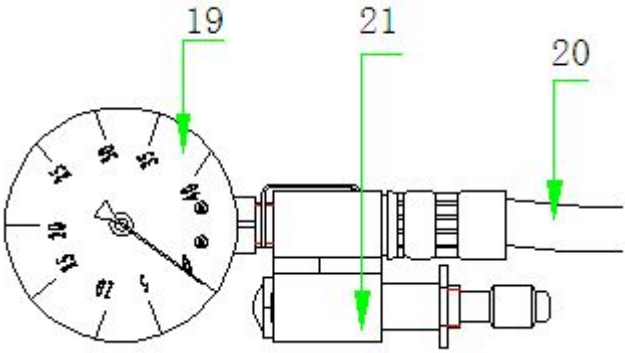
### 1.7 Pressure gage

The pressure gage always shows the pressure of the gas cylinder. It is connected with the pressure regulator through one high-pressure soft pipeline. The diameter of the pressure gage is 50mm, the pressure indication gage is 0-40MPa. The pressure gage is fluorescence, the outside rubber has the function of shock protection.

The high-pressure pipeline has the limiting device, it can limit the air flow at 25 L per minute.

**Main performance**

Pressure gage reading: 0-40MPa, with safety opening.
With fluorescence function, the area of 0-5MPa marked in red.
Working pressure: 30MPa




**Pressure Gage**

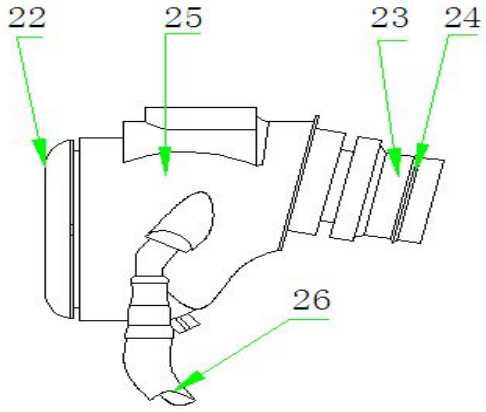
| No. | Item | No. | Item |
|---|---|---|---|
| 19 | Pressure Gage | 21 | Alarm Whistle |
| 20 | High-pressure Pipeline | | |

### 1.8 Air supply valve

The air supply valve weights light, has compact structure and is made of the fire impact-resistant material. It can fast connect with the face mask through the string button and fast interface. The air supply valve connects with the pressure

gage through the medium-pressure pipeline. When it occurs the disordered breathing on the user, press the red “ON” button and the air supply valve will increase the amount of gas automatically to 450 L per minute (the air supply valve will reach this gas amount within tenths of a second)

The maximum amount of gas: 450L/minute

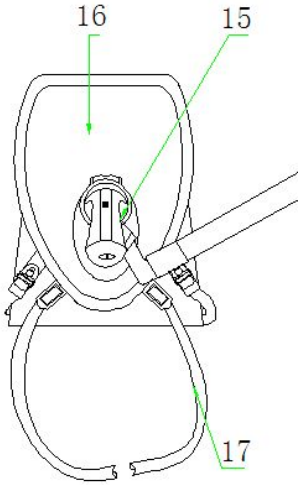



| No. | Item | No. | Item |
|---|---|---|---|
| 22 | Plastic cover | 25 | Plastic main shell |
| 23 | Plastic interface | 26 | Medium-pressure Pipeline |
| 24 | O -Ring | | |

**Air supply valve**

### 1.9 Full face mask

- Adjustable, comfortable to wear
- Wide view
- Connected with the air supply valve through the fast interface
- Novel one-way exhalation valve to reduce the breathing resistance
- There is tightening belt and quick clip, so the headband is easy to be adjusted.
- With mouth and nose mask, to reduce the carbon dioxide content
- The mask is anti-fog.




**Full face mask**

| No. | Item | No. | Item |
|---|---|---|---|
| 15 | Air supply valve | 17 | Belt |
| 16 | Face mask | | |

### 1.10 Gas Cylinder

(2L, 4.7L,6.8L,9L,12L) It is composed of high-strength aluminum alloy liner and fully wrapped carbon fiber composite material, which is high strength, light weight. The gas cylinder for 6L is in steel material.

Service time: It depends on the amount of compressed air and the air consumption of the user and the air consumption depends on the user's work nature.

| Work nature | Air consumption (L/Min) |
|---|---|
| Rest | 10-15 |
| Mild activity | 15-20 |
| Light work | 20-30 |
| Intensity work | 30-40 |
| High-intensity work | 45-55 |
| Work for a long time | 50-80 |
| Vigorous activity( few minutes) | 100 |

The amount of breathable air in the gas cylinder

The user can get the value by calculating the product of the volume of gas cylinder and working pressure.

For example: the working pressure of a 6.8L gas cylinder at 30MPa, the air volume is 6.8*30*10=2040L

When the user is in intensity work, the theory time of this gas cylinder is:

$$\frac{\text{The volume of breathable air (L)}}{\text{The volume of air consumption (L/Min)}} = \frac{2040}{30} = 68 \text{ Min}$$

This calculation method doesn't consider the purity of air, so it needs add a 0.9 coefficient to correct. The actual air volume in the gas cylinder is: 2040*0.9=1836L. According to this calculation method, the actual use of time is 61.2 minutes. The user can roughly calculate the the working time before or in the progress of using the gas cylinder.

| Cylinder Volume | Working Pressure | Air Volume | Theoretical time |
|---|---|---|---|
| L | MPa | L | Calculate the respiratory at 30L/Min |
| 2.0 | 30 | 600 | 20min |
| 4.7 | 30 | 4100 | 47min |
| 6.0 | 30 | 1800 | 60min |
| 6.8 | 30 | 2040 | 68min |
| 9.0 | 30 | 2700 | 90min |
| 12.0 | 30 | 3600 | 120min |

## 2. Using steps

### 2.1 Fast detection before use

#### 2.1.1 The pressure of the compressed air in the gas cylinder

Open the bottle valve completely, the pressure gage must show the pressure as below；

In the environment of 20 ℃, the bottle at the pressure of 30MPa must show the pressure of 27-30MPa, otherwise, the effective using time will be shortened.

### 2.1.2 The tightness of the gas cylinder

When open and close the bottle valve, inspect the pressure gage, the value of pressure can't decline more than 2MPa within one minute.

### 2.1.3 Alarm whistle

Detection steps:

- Close the air supply valve (Get away from the mask is Okay)
- Open the bottle valve, let the pipeline full of gas, and then close the bottle valve.
- Open the mandatory supply valve (Press the ON button), release the gas in the pipeline slowly and inspect the change of the pressure gage.
- When it shows 5.5±0.5MPa, the whistle must alarm.

Before using, the user must test if the SCBA is normal according to above detection steps, otherwise, it will cause the life-threatening of the user.

## 2.2 Wearing

### 2.2.1 The regulation of the back-plane

There are two steps to adjust the back-plane.

1. Wear the whole device, hold back the D ring at two sides, leaning forward, tighten the D ring under the backward until the belt and back-plane fit the body.
2. Buckle the belt, tighten it.
    - Only when the whole device is worn correctly, it won't appear the loose and displacement, the position won't change.
    - Open the cylinder valve at least one ring.
    -

### 2.2.2 Wear the mask

Please read the instruction carefully before wearing the face mask

Using steps

- Use one hand hold the face mask, make the face mask fit user's face, use another hand pull the head belt backward to cover user's head, tighten the belt.

- Pull the air supply valve into the supply port, when hearing a sound of a click, the button of the fast interface will reset, that means the face mask is connected correctly.
- After finishing above steps, the user can breathe.

To ensure the effective protect, the face mask must be worn correctly, the bearded and the person wear glasses is forbidden to use the SCBA.
If the tightness of the face mask can't be guaranteed due to the facial shape or scar, it is forbidden to use the SCBA in this situation.

### 2.3 Precautions in the process of using

When the whistle alarms, the user must evacuate the toxic working environment and enter into the safety area, otherwise, it will cause life risk.

The change of pressure gage must be focused in the progress of working. When the cylinder pressure reaches at 5.5±0.5MPa, the whistle won't stop alarming until using up the rest air in the cylinder.

Under the badly and emergency situations (such as injured or breathing difficult) or the user need extra air, open the mandatory air supply valve ( press the "on" button), the breathing flow will increase to 450L/Min.

### 2.4 Steps after using

- Press the buttons of the fast interface on both sides, separate the face mask and air supply valve.
- Open the mouth of head belt, and then take off the face mask.
- Open the buckle of waistband
- Loose the shoulder belt and take off the SCBA
- Close the cylinder valve
- Open the mandatory air supply valve to vent all the air in the pipeline.

Important Notification: Do not throw the SCBA on the floor at random, otherwise, it will damage the SCBA seriously.

## 3. Daily Maintenance

### 3.1 Gas Cylinder

The gas cylinder which storing compressed air must be inspected regularly according to the relevant national laws and regulations, and must be tested by professional and authorized agency and staff, and they must make the related records

The cylinder valve is vulnerable, so it must be visually observed after each use, The main reason caused the functional disorder is:

- The unsealed bottle or leakage
- Did not tighten the cylinder valve
- Pressure regulator valve did not tighten

#### 3.1.1 Air quality

When aerating the cylinder, the breathable air must be in accordance with the standard of EN-132, which makes a strict provision on the use condition.

| Composition | Mass percent (Drying air) | Percentage by volume (Drying air) |
|---|---|---|
| Oxygen | 23.01% | 20.93% |
| Nitrogen | 75.51% | 78.10% |
| Argon | 1.29% | 0.9325% |
| Carbon dioxide | 0.04% | 0.03% |
| Hydrogen | 0.001% | 0.01% |
| Neon | 0.0012% | 0.0018% |
| Helium | 0.00007% | 0.0005% |
| Krypton | 0.0003% | 0.0001% |
| Xenon | 0.00004 | 0.000009% |

The air humidity conditions is also the important factor for the SCBA, whether the SCBA can be operated well or not depends on it.

For this SCBA, the content of water in the cylinder can't exceed 35g /cbm under normal atmospheric pressure of 30MPa.

**Notice: It is better to remain few breathable air in the cylinder**

### 3.1.2 Drying Cylinders

Notice: Don't emptying the air in the cylinder (it should have 0.5MPa at lease). If there is no air, the cylinder must be drying before aerating.

If need the air dryer or cylinder drying oven to drying the cylinder, the highest temperature can't exceed 90 centigrade.

### 3.1.3 Filling

- In accordance with the related national standards
- The cylinder must be inspected regularly by authorized agency and staff and confirm the next inspecting time.
- Never use the parts provided by other company, to avoid the potential security risks.
- Don't put the cylinder in humid environment (such as the water drops at the connection of cylinder)

1. When aerating the cylinder, it must be accordance with the rules of Gas Cylinder Safety Supervision rule and Gas Cylinder Safety Supervision procedures.
2. The staff aerating the cylinder must have the national recognized certificate of Special equipment operator.
3. Tightening torque of the bottle valve is 55±5N.m

3.1.4 Transport, Storage and Moving

When the gas cylinder is not fixed on the SCBA, it should obey below rules during transporting and storage.

- The gas cylinder must be placed vertical (the bottle valve must be upward) when transporting.
- The gas cylinder must be held tight by two hands when moving.
- Don't hit, scroll and throw the gas cylinder when transporting and moving.

3.2 Clean

The ties can be decontaminated, disinfected and washed after taken off from

the back-plane.

3.2.1 Decontamination or disinfection

The level of pollution will be different because of different usage. Please be noticed that it can't image the SCBA when decontaminating and disinfecting, especially the disinfectant can't damage the material of different parts, for example:

- Ties
- Soft pipeline
- Back-plane
- Facemask etc.

3.2.2 Cleaning

After each use, the polluted SCBA must be cleaned with warm water and the cleaner (PH=7). It must be pay attention to the concentration of the cleaner and service time.

Important Notification：Checking if the use progress and the cleaner will corrode the part ( eg. The Organic solvent will damage the rubber or plastic part.)

3.2.3 Drying

After disinfecting, clean and rinsing, the SCBA must be dried.

All parts should be dried under the conditions of 15-30℃, and must be avoided any heat radiation (Solar radiation, drying oven and the heater).

It is strongly recommended that using compressed air to dry some important parts of the SCBA (pressure regulator and medium-pressure pipeline etc) in order to avoid damaging the SCBA.

3.3 Inspect

The SCBA should be inspected after every washing and changing the parts.

Checking the diaphragm of the air supply valve to see if the rubber and plastic part

is aging, deformation and adhesive, be cut -or other bad condition. All rotating interfaces (screws) can't be damaged.

In order to keep the SCBA in the best service status, it is better to inspect the SCBA in our company's testing room or the approved repair station.

All the parts and product feature of the SCBA must be tested comprehensively every year.

3.3.1 Air tightness test under low pressure

3.3.2 Static positive pressure test of the air supply valve

3.3.3 Storage

The respirator must be strictly classified stored.

Notice: The respirator only can be stored according to below operating procedures.

The procedures of decontaminating, disinfecting, washing, checking and maintain must be all recorded.

- The ideal storage conditions: dust free, shady and cool, no high temperature and low temperature, moisture proof, no chemicals, no corrosion or Dangerous substances places.
- The temperature for storing must be between 15℃ to 30℃,and the environment must be dry.
- The maintenance and storage must be done by our company's professional trainers.
- The SCBA must be stored in suitable box, which is anti-pressured.

  The place for storing SCBA's is forbidden to enter into, except for the professional trainers.

  When the SCBA is placed in the spot and ready to be used at any time, it should be assured that the working place won't damage the product function, and all the parts should be extra tested.

Our company won't guarantee the damage of the equipment caused by user's disassembling and abusing.

4. The reason of breathing apparatus's fault and troubleshooting

Caution: All the troubleshooting listed below is only for reference when maintaining and troubleshooting, it is not a guide for on-site maintenance.

| Phenomenon | Possible Cause | Remedy |
|---|---|---|
| System leaks | Connecting point leakage of pressure reducing valve and bottle valve | Check whether there are objects on joint area; whether O-ring is intact and within the PRV grooves; cracking or aging O-ring should be replaced with new one; re-tighten connection shaft in case of loose. |
| | Connecting point leakage of medium-pressure pipe and pressure reducing valve | Remove thread connector of medium-pressure pipe with wrench; check the gasket ring; replace it in case of damage. |
| | Quick connector leakage | See if there is damage and deformation on plugs of air supply valve medium-pressure pipe. If there is not, it must be quick connector socket leakage; remove the medium-pressure pipe and return it to manufacturer for inspection and repairs. |
| | Medium-pressure relied valve and pressure reducing valve junction | Tighten medium-pressure relief valve with opening wrench; or replace the gasket ring. |
| | Mask socket and air supply valve plug leakage. | Replace the O-ring, one hand holding expiratory valve with |

| | | | |
|---|---|---|---|
| | | | thumb pressing the spring; the other hand pulling the air supply valve out. |
| | Pressure reducing valve body leakage | | Remove the valve from the backplane; return to manufacturer for inspection and repairs. |
| Air loss after the gas cylinder is closed. | Hand wheel of gas cylinder is tightened. | | Re-tighten hand wheel in clockwise direction again. |
| | Sealing surface of cylinder valve is damaged. | | Release compressed air in the bottle, pay attention not to deflate too much gas; remove the hand wheel cover and valve top respectively, replace with new valve head and assembly other parts. |
| | Aging gasket of bottleneck and cylinder valve connecting thread. | | Release compressed air in the bottle, pay attention not to deflate too much gas; wrap and fix cylinder with soft materials; remove cylinder valve and replace gasket ring. |
| | Safety valve | Connecting point leakage | Tightened safety valve |
| | | Security diaphragm rupture | Release compressed air in the bottle; remove the safety valve; replace security diaphragm. |

| Phenomenon | Possible Cause | Remedy |
|---|---|---|

| | | |
|---|---|---|
| Constant air flow inside after wearing the face mask | Leakage between face and face mask | Re-wearing mask, fasten elastic headband to fit face and mask. |
| | | Remove beard and long hair on the temples |
| | Air supply valve mouth leakage | Repeated inserting and pulling out air supply valve |
| | Accidental rupture of air supply valve diaphragm | Replacing diaphragm |
| Inhale failure or resistance is too large | Cylinder valve switch is not fully turned on | Fully turn on cylinder valve switch |
| | Medium-pressure pipe blockage | Return to manufacturer for repairs |
| | Air supply valve failure | Replace the tested air supply valve with a good one; if inhaling resistance is still too large, the air supply valve is good, and pressure reducing valve should be replaced. |
| | Pressure reducing valve failure | Return it to manufacturer for debugging and repairing. |
| Mask leak | Mask double seal ring doesn't fit face well. | Re-wear the mask; adjust the mask position. |
| | Mask and air supply valve connecting parts leakage | Remove air supply valve from mask; clean and grease rubber ring and re-wear mask.. If the leak is still evident, replace the ring with new one. If the leak persists, return it to manufacturer for repairs. |
| | Leakage between mask and the ring | Replace mask components. |

| | | |
|---|---|---|
| Large expiratory resistance | Expiratory valve diaphragm is sticky. | Check and clean expiratory valve components. |

**5. Detail list of wearing spare parts**

| No. | Name | Specification | Units | Amount |
|---|---|---|---|---|
| 1 | Rubber O-ring | Φ8*1.9 | pc | 1 |
| 2 | Rubber O-ring | Φ14*1.9 | pc | 1 |
| 3 | Rubber O-ring | Φ16*2.4 | pc | 1 |
| 4 | Rubber O-ring | Φ18*2.4 | pc | 1 |
| 5 | Rubber O-ring | Φ30*3 | pc | 1 |

**6. Regular operation of inspection records**

# Regular operation of inspection records

Specification Model:_____ Product No:_____

| Item | | Record | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inspection date | | | | | | | | | | | | | |
| The Inspected Components | Mask | | | | | | | | | | | | |
| | Air supply valve | | | | | | | | | | | | |
| | Back-plane | | | | | | | | | | | | |
| | Cylinder components | | | | | | | | | | | | |
| | Regulator | | | | | | | | | | | | |
| | The alarm and the meter | | | | | | | | | | | | |
| | Performance Inspection | | | | | | | | | | | | |
| | Cleanliness | | | | | | | | | | | | |
| | Others | | | | | | | | | | | | |

Tag example: O for qualified Q for qualified after maintenance