SCBA USER MANUAL

Guidelines for the Correct Use of the Self-Contained Breathing Apparatus



T-ISS™ safety suppliers

a Heijboer Safety Group company

Self-contained Breathing Apparatus

A Self-Contained Breathing Apparatus (SCBA) is a device used to supply breathable air in environments where the surrounding atmosphere is unsafe or lacks oxygen. In the maritime industry, it is commonly used by firefighters and emergency responders during onboard incidents involving smoke, gas, or chemical exposure. The T-ISS SCBA provides an independent air source, allowing users to operate safely in such conditions. The alarm pressure is set at 5.0 - 6.0 MPa (50 - 60 bar).

The SCBA is designed for protection against:
- Toxic particles and aerial fog
- Toxic gasses
- The oxygen concentration is less than 17%
- The smog caused by fire disaster

The SCBA provides both respiratory and facial protection.

When operating in hazardous or harsh working environments, always use appropriate auxiliary personal protective equipment (PPE) in conjunction with the SCBA, such as protective gloves, safety boots, airtight protective clothing, and a safety helmet.

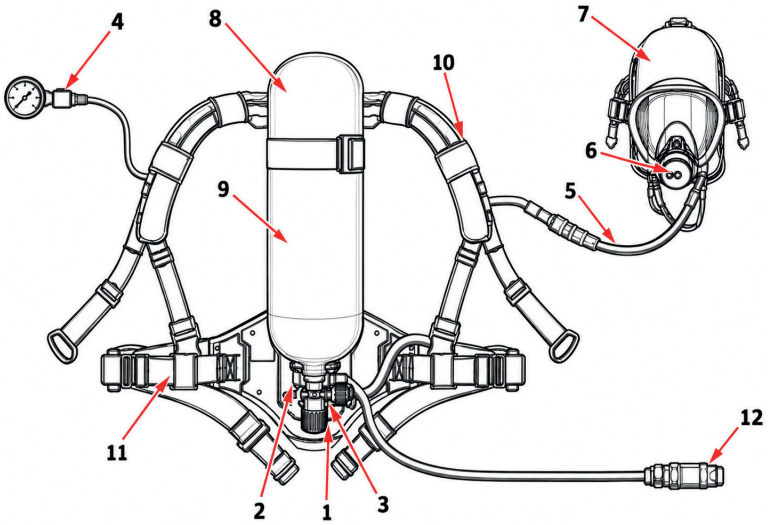
If you have any questions about the SCBA or related protective equipment, please contact us at +31 (0) 315 656060.

Technical data
Pressure: 300 bar
Gas cylinder: alloy steel, 6 liters
Full face mask: silicone, EN136
Working time: 60 minutes



Article number	Description	Dimensions	Weight
SCBA-RIZK6/30	Self-Contained Breathing Apparatus	700 x 300 x 480 mm	16 kg

Product illustration



No.	Item	No	Item
1	Air cylinder	7	Full face mask
2	Back plane	8	Sticker
3	Cylinder valve	9	Trademark
4	Alarm whistle	10	Shoulder belt
5	Medium-pressure pipelines	11	Waist belt
6	Air supply valve	12	Fast interface

Function

The SCBA provides the user with a continuous supply of breathable air from a compressed-air cylinder. The air is stored in the cylinder at a pressure of 30 MPa and must be reduced to a safe breathing pressure before it can be supplied to the user. Pressure reduction takes place in two stages.

First, the pressure regulator reduces the high-pressure air from the cylinder to approximately 0.7 MPa. The air then flows through the medium-pressure hose to the air supply valve, where the pressure is further reduced and the air is delivered to the face mask at a positive pressure suitable for breathing.

Because the pressure inside the face mask is maintained slightly higher than the pressure of the surrounding environment, contaminated outside air is prevented from entering the mask. This positive-pressure design helps protect the user from toxic gases, aerosols, smoke, and other airborne contaminants.

Alarm whistle

The alarm whistle provides an audible warning when the pressure in the air cylinder falls to a predetermined level. When the cylinder valve is opened and the cylinder pressure is above the alarm threshold, high-pressure air supplied through the pressure regulator and high-pressure line holds the sealing pin in the closed position against the spring.

In this position, the pin prevents medium-pressure air from entering the alarm whistle, and no alarm is produced. When the cylinder pressure decreases to 5.5 ± 0.5 MPa, the spring moves the sealing pin away from its sealing position. This allows medium-pressure air to flow into the alarm whistle at approximately 5 L/min, activating the whistle and providing an audible warning that the remaining air supply is low.

Operating Specifications

Alarm activation pressure: 5.5 ± 0.5 MPa
Air consumption: 5 L/min
Sound level: ⩾ 90 dB
Alarm frequency: 3,800 Hz

When the alarm whistle sounds, the user must immediately stop work and evacuate to a safe area. The whistle will continue to sound as the remaining air supply is consumed.

Pressure regulator

The pressure regulator provides a stable and consistent output pressure, regardless of changes in cylinder pressure or the user's breathing rate. It reduces the high-pressure air from the cylinder to a controlled medium pressure for delivery to the air supply valve.

The pressure regulator is fitted with a black protective seal cap to prevent unauthorized adjustment or maintenance. This cap must not be removed or tampered with. Inspection, adjustment, and maintenance of the pressure regulator may only be carried out by authorized and properly trained personnel.

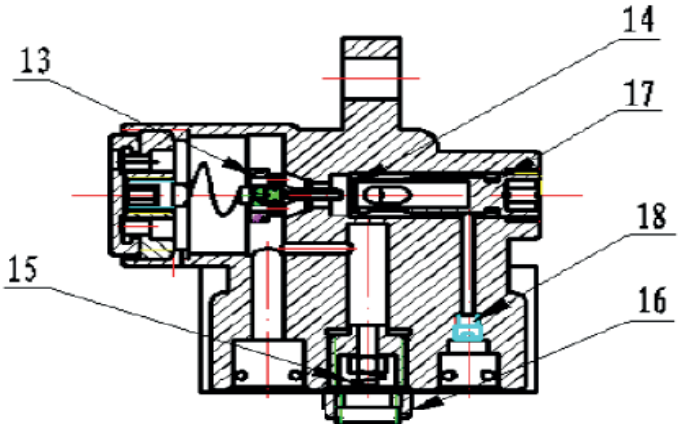
Main Components Connected to the Pressure Regulator:

- Air cylinder
- Medium-pressure hose – supplies air from the pressure regulator to the air supply valve
- High-pressure hose – connects the pressure regulator to the pressure gauge

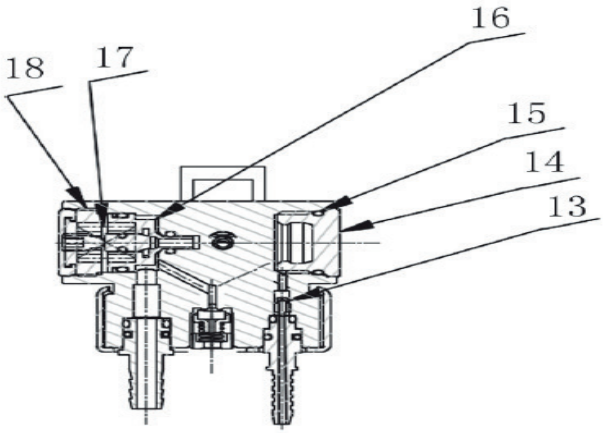
Technical Specifications

Maximum inlet pressure: 30 MPa
Output pressure: 0.7 ± 0.05 MPa
Safety valve opening pressure: 1.1 ± 0.2 MPa
Operating temperature: –30°C to +60°C (in accordance with EN 137)
Type: Dynamic balance

WARNING: The pressure regulator is a safety-critical component and must only be serviced, adjusted, or repaired by authorized personnel. Maintenance may be performed by the manufacturer's qualified technicians or by personnel who have received appropriate professional training and authorization from the manufacturer.



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



No.	Item	No	Item
13	Current limiting screw 0.12 hole	16	Two stage piston
14	Quick charging plug	17	Secondary large piston spring
15	O-ring	18	Secondary pressure plate

Safety valve

The safety valve is integrated into the piston assembly of the pressure regulator. If the pressure in the medium-pressure circuit exceeds the specified limit, the safety valve opens automatically and releases excess air to the atmosphere, preventing excessive pressure from building up in the system.
Once the medium pressure returns to the normal operating range, the safety valve closes automatically.
Safety valve opening pressure: 1.1 ± 0.2 MPa

Use by two persons

The SCBA can be configured to provide breathing air to two persons simultaneously. For this purpose, a second full-face mask with an air supply valve, or a compatible ventilation hood, can be connected to the SCBA. When the SCBA is used by two persons, air consumption will increase significantly, reducing the available operating time.

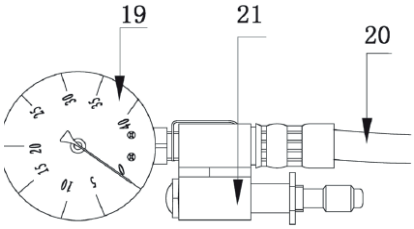
Pressure gage

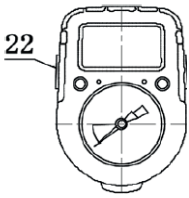
The pressure gauge continuously indicates the remaining pressure in the air cylinder. It is connected to the pressure regulator by a flexible high-pressure hose, allowing the user to monitor the available air supply during operation. The gauge has a diameter of 50 mm and a measuring range of 0–40 MPa. Fluorescent markings improve readability in low-light conditions, while the 0–5 MPa range is highlighted in red to clearly indicate a critically low air supply.

A protective rubber cover surrounds the gauge to provide additional protection against impact and shock.
The high-pressure hose is equipped with a flow-restricting device that limits the airflow to approximately 25 L/min in the event of hose damage or failure.

Main Specifications

Pressure gauge range: 0-40 MPa
Normal working pressure: 30 MPa
Gauge diameter: 50 mm
Low-pressure warning zone: 0-5 MPa, marked in red
Display: Fluorescent for improved visibility in low-light conditions
Protection: Impact-resistant rubber cover
High-pressure hose flow limitation: 25 L/min





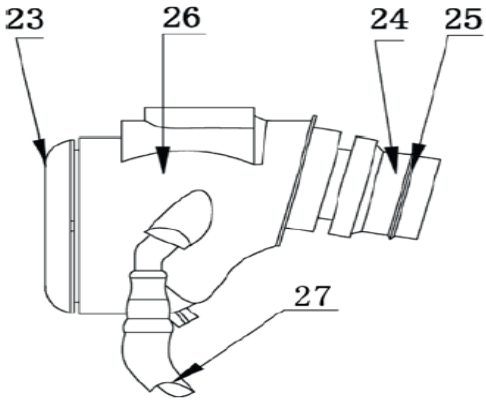
No.	Item	No	Item
19	Pressure gage	21	Alarm whistle
20	Hi-pressure pipelin	22	Electric pressure gage (optional)

Air Supply valve

The air supply valve features a compact design and is manufactured from flame- and impact-resistant materials. It can be quickly and securely connected to the full-face mask using the quick-connect mechanism.

The air supply valve is connected to the pressure regulator through the medium-pressure hose and supplies breathing air to the user according to demand.

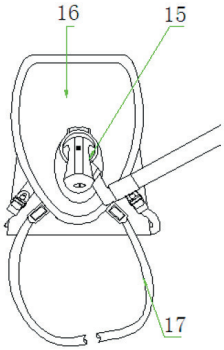
If the user requires an increased airflow, the “ON” button can be pressed to activate the supplementary air supply. The valve responds within a fraction of a second and can provide an airflow of up to 450 L/min.



No.	Item	No	Item
23	Plastic cover	26	Plastic main shell
24	Plastic interface	27	Medium-pressure pipeline
25	O-ring		

Full face mask

- Adjustable and comfortable to wear
- Wide field of view
- Connected to the air supply valve via a quick-connect interface
- Innovative one-way exhalation valve reduces breathing resistance
- Adjustable head harness with tightening straps and quick-release clips
- Equipped with an inner oronasal mask to reduce carbon dioxide buildup
- Anti-fog facepiece design





No.	Item	No	Item
15	Air Supply valve	17	Belt
16	Face mask		

Air Cylinder

The 6.8 L air cylinder consists of a high-strength aluminum alloy liner fully wrapped with carbon-fiber composite material, providing high strength while maintaining a low overall weight. The 6 L air cylinder is made of steel.

Service time: The actual operating time depends on the amount of compressed air available in the cylinder and the user's air consumption. Air consumption varies according to the user's breathing rate, workload, and working conditions.

Work Nature	Air Consumption (L/min)	Work Nature	Air Consumption (L/min)
Rest	10 -15	High-intens work	45 - 55
Mild activity	15 - 20	Work for a longer period	50 - 80
Light work	20 - 30	Vigorous activity (a few minutes)	100
Intense work	30 - 40		

Volume of Breathable Air in the Cylinder

The approximate volume of breathable air available in the cylinder can be calculated using the cylinder capacity and working pressure. For example, for a 6.8 L cylinder filled to a working pressure of 30 MPa: Available air volume = 6.8 × 30 × 10 = 2,040 L.

If the user consumes approximately 30 L/min, the theoretical operating time is:
Theoretical operating time = 2,040 ÷ 30 = 68 minutes

For a more realistic estimate, a correction factor of 0.9 is applied:
Usable air volume = 2,040 × 0.9 = 1,836 L

Estimated operating time = 1,836 ÷ 30 = 61.2 minutes

This calculation provides an approximate operating time only. Actual operating time may vary depending on the user's breathing rate, workload, physical condition, environmental conditions, and other factors affecting air consumption.

Cylinder Volume	Working Pressure	Air Volume	Theoretical Time
L	MPa	L	Calculate the respiratory at 30L/min
6.0	30	1800	60 min
6.8	30	2040	68 min

Operating Instructions

Pre-use Inspection

Cylinder use

Fully open the cylinder valve and check the pressure gauge. At an ambient temperature of 20°C, a cylinder filled to a nominal pressure of 30 MPa should indicate 27–30 MPa. If the pressure is below this range, the available operating time will be reduced.

Cylinder Leak test

Open the cylinder valve and allow the system to pressurize, then close the valve. Observe the pressure gauge for one minute. The pressure must not decrease by more than 2 MPa during this period.

Alarm whistle

Inspection procedure:

- Close the air supply valve. It may be disconnected from the face mask if necessary.
- Open the cylinder valve and allow the system to pressurize completely, then close it.
- Press the "ON" button on the air supply valve to slowly release the air from the system while monitoring the pressure gauge.

When the pressure drops to 5.5 ± 0.5 MPa, the alarm whistle must sound.

WARNING: Before each use, the SCBA must be inspected according to the procedures described above to ensure that it is functioning correctly. Do not use the SCBA if any inspection requirement is not met, as equipment malfunction may result in serious injury or death.

Wearing the SCBA

Adjusting the Backplate

The backplate can be adjusted in two steps:

1. Put on the complete SCBA. Hold the adjustment straps on both sides, lean slightly forward, and pull the straps downward and backward until the shoulder straps and backplate fit securely against the body.

2. Fasten the waist belt and tighten it securely. When correctly fitted, the SCBA should remain securely positioned against the body without excessive movement or displacement. Before use, fully open the cylinder valve.



Wearing the Face Mask

Read the face mask instructions carefully before use.

1. Hold the face mask with one hand and position it securely against the face. With the other hand, pull the head harness over the head and tighten the straps evenly until a secure and comfortable seal is achieved.

2. Insert the air supply valve into the mask connection. Push it firmly into place until an audible click is heard and the quick-connect button returns to its locked position. This confirms that the air supply valve is correctly connected.

3. Once the above steps have been completed, breathe normally and verify that the mask and air supply system are functioning correctly.

WARNING: A proper face seal is essential. Facial hair, glasses, scars, or facial features may compromise the seal. Do not use the SCBA if a secure seal cannot be achieved.

Precautions during use

Continuously monitor the pressure gauge while using the SCBA. When the cylinder pressure drops to 5.5 ± 0.5 MPa, the alarm whistle will sound. The user must immediately leave the area and proceed to a safe area. The alarm will continue to sound as the remaining air in the cylinder is consumed.

In an emergency, such as injury, breathing difficulty, or when additional airflow is required, press the "ON" button to activate the supplementary air supply. The airflow can increase to a maximum of 450 L/min.

WARNING: Never ignore the alarm whistle or continue working in a hazardous atmosphere after the alarm has activated. Failure to evacuate immediately may result in serious injury or death.

Procedures After Use

1. Press the quick-connect release buttons and disconnect the air supply valve from the mask.
2. Loosen the head harness and remove the face mask.
3. Release the waist belt buckle.
4. Loosen the shoulder straps and carefully remove the SCBA.
5. Close the cylinder valve completely.
6. Press the "ON" button to release all remaining pressure from the system.

IMPORTANT: Handle the SCBA carefully after use. Do not drop, throw, or place the equipment down forcefully, as this may cause serious damage to the SCBA and its components.

Daily Maintenance

Air Cylinder

The compressed-air cylinder must be inspected and periodically tested in accordance with applicable national regulations and inspection requirements. Periodic inspections and testing must be performed by qualified and authorized personnel or an approved inspection organization. All required inspection and test records must be properly maintained.

The cylinder valve is a safety-critical component and should be visually inspected after each use for signs of damage, wear, or leakage.

Common causes of malfunction include:
- Cylinder or cylinder valve leakage
- Cylinder valve not fully tightened
- Loose connection between the cylinder valve and pressure regulator

Air Quality

When filling the cylinder, only breathing air complying with EN 12021 shall be used. The compressed breathing air must meet the applicable requirements for air quality and purity specified by this standard.

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%

Humidity is an important factor in ensuring the reliable operation of the SCBA. Excessive moisture in the compressed air may adversely affect the performance of the equipment. For this SCBA, the water content of the compressed air must not exceed 35 mg/m^3 when measured at normal atmospheric pressure.

NOTICE: It is recommended to maintain a small amount of residual pressure in the cylinder rather than completely emptying it.

Drying the Cylinder

NOTICE: Do not completely depressurize the cylinder. A residual pressure of at least 0.5 MPa should be maintained. If the cylinder has been completely depressurized, it must be thoroughly dried before refilling.

If an air dryer or cylinder drying oven is used, the drying temperature must not exceed 90°C.

Filling the Cylinder

- Cylinder filling must be carried out in accordance with applicable national regulations and safety requirements.
- The cylinder must be periodically inspected by an authorized inspection organization or qualified personnel, and the date of the next required inspection must be confirmed.
- Only approved and compatible components may be used. Do not use unauthorized replacement parts, as they may create a safety risk.
- Do not store or fill the cylinder in a wet or excessively humid environment. Keep the cylinder valve and connections clean and dry.

1. Cylinder filling must comply with all applicable regulations governing the filling and handling of high-pressure gas cylinders.
2. Personnel responsible for filling the cylinder must be properly trained, qualified, and authorized in accordance with applicable national requirements.
3. Cylinder valve tightening torque: 55 ± 5 N·m

Transport, Storage and Handling

When the air cylinder is not installed on the SCBA, observe the following requirements during transport, storage, and handling:

- Keep the cylinder securely restrained during transport and protect the cylinder valve from impact or damage.
- When manually handling the cylinder, maintain a secure grip and use appropriate handling techniques.
- Do not drop, throw, roll, strike, or subject the cylinder to strong impacts during transport or handling.

Cleaning

The straps can be removed from the backplate for cleaning, decontamination, and disinfection.

Decontamination and Disinfection

The required level of decontamination or disinfection depends on the type and degree of contamination. Cleaning and disinfecting agents must not adversely affect the SCBA or damage any of its components.

Particular attention should be paid to the compatibility of the cleaning or disinfecting agent with materials such as:

- Straps
- Hoses
- Backplate
- Face mask and other components

Cleaning

After each use, contaminated SCBA components must be cleaned with warm water and a suitable pH-neutral cleaner (pH 7). Always follow the cleaner manufacturer's instructions regarding concentration, application, and contact time.

IMPORTANT: Before using any cleaning or disinfecting agent, verify that it is compatible with the materials of the SCBA. Do not use cleaning agents that may corrode or otherwise damage components. Organic solvents must not be used on rubber or plastic parts, as they may cause deterioration or permanent damage.

Drying

After cleaning, disinfecting, and rinsing, all SCBA components must be thoroughly dried. Components should be dried at an ambient temperature of 15-30°C and must not be exposed to direct heat sources, such as sunlight, heaters, or drying ovens.

Particular attention should be given to components where residual moisture could affect performance, such as the pressure regulator and medium-pressure hose. If compressed air is used for drying, ensure that it is clean, dry, and suitable for the components being dried.

Inspection

The SCBA must be inspected after each cleaning procedure and whenever components have been replaced. Check the diaphragm of the air supply valve and inspect all rubber and plastic components for signs of aging, deformation, deterioration, cuts, adhesion, or other damage. All threaded and rotating connections must also be inspected for damage and correct operation.

To ensure that the SCBA remains in optimal operating condition, a comprehensive inspection and functional test should be carried out at least once a year by the manufacturer, an authorized service center, or appropriately qualified personnel. All safety-critical components and functions of the SCBA must be thoroughly tested.

Storage

The SCBA must be properly stored and protected when not in use. All decontamination, disinfection, cleaning, inspection, and maintenance activities must be fully documented.

- Store the SCBA in a clean, dry, cool, and dust-free environment, protected from direct sunlight, extreme temperatures, moisture, chemicals, corrosive substances, and other hazardous materials.
- The recommended storage temperature is 15–30°C.
- Storage and maintenance must be carried out by trained and authorized personnel.
- Store the SCBA in a suitable protective case or container that protects the equipment against impact, pressure, contamination, and other potential damage.
- Access to the SCBA storage area should be restricted to authorized personnel.
- When an SCBA is stored for immediate emergency use, ensure that the storage conditions do not adversely affect its function. The equipment must remain readily accessible and in a serviceable condition, and all safety-critical components must be checked regularly.

IMPORTANT: Unauthorized disassembly, modification, improper maintenance, or misuse of the SCBA may compromise its safety and performance. The manufacturer cannot be held responsible for damage resulting from unauthorized disassembly, modification, or improper use.

SCBA Troubleshooting and Common Faults

CAUTION: The troubleshooting information provided below is for reference only and is intended to assist qualified personnel in fault diagnosis and maintenance. It must not be considered a substitute for authorized service procedures or used as a guide for on-site repairs.

Phenomenon	Possible Cause	Remedy
System leaks	Connecting point leakage of pressure reducing valve and bottle valve.	Check joint for debris, O-ring condition and seating in PRV groove. Replace if damaged or aged. Tighten connection shaft if loose.
	Connecting point leakage of medium pressure pipe and pressure reducing valve	Remove thread connector of medium-pressure pipe with wrench; check the gasketring; replace it in case of damage.
	Quick connector leakage	Check air supply valve medium-pressure pipe plugs for damage or deformation.If intact, suspect quick connector socket leakage. Remove pipe and return to manufacturer for inspection and repair.
	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 O-ring: Hold expiratory valve, press spring with thumb, and pull out air supply valve with other hand.
	Pressure reducing valve body leakage	Remove the valve from the backplane; return to manufacturer for inspection and repairs.
Air loss after 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.	Safely release cylinder pressure without excessive venting. Remove handwheel cover and valve top, replace valve head, and reassemble.
	Aging gasket of bottleneck and cylinder valve connecting thread.	Safely depressurize cylinder, secure with soft padding, remove cylinder valve, and replace gasket ring.
	Safety valve: Connecting point leakage	Tighten safety valve.
	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	Refit mask and tighten headband to ensure a proper facial seal.
	Air supply valve mouth leakage	Repeated inserting and pulling out air supply valve.
	Accidental rupture of air supply valve diaphragm	Replace 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 air supply valve with a known-good unit. If inhalation resistance remains high, replace pressure reducing valve.
	Pressure reducing valve failure	Return to manufacturer for debugging and repair.
Mask leak	Mask double seal ring doesn't fit face well.	Adjust the mask position.
	Mask and air supply valve connecting parts leakage	Remove air supply valve, clean and lubricate rubber ring, then refit mask. If leakage persists, replace ring. If unresolved, return to manufacturer for repair.
	Leakage between mask and the ring.	Replace mask components.
Large expiratory resistance	Expiratory valve diaphragm is sticky.	Check and clean expiratory valve components.

Detail list of wearing spare parts

No.	Name	Specifications	Units	Amount
1	Rubber O-ring	Ø8*1.9	pc	1
2	Rubber O-ring	Ø14*1.9	pc	1
3	Rubber O-ring	Ø16*2.4	pc	1
4	Rubber O-ring	Ø18*2.4	pc	1
5	Rubber O-ring	Ø30*3	pc	1

Regular Operation Inspection Records

Specification Model: _____

Product No: _____

No.	Inspection Item	Date	Date	Date
1	Mask			
2	Air supply valve			
3	Back-plane			
4	Cylinder components			
5	Regulator			
6	Alarm and pressure gage			
7	Performance inspection			
8	Clean			
9	Other			

Tag example: O = qualified Q = qualified after maintenance

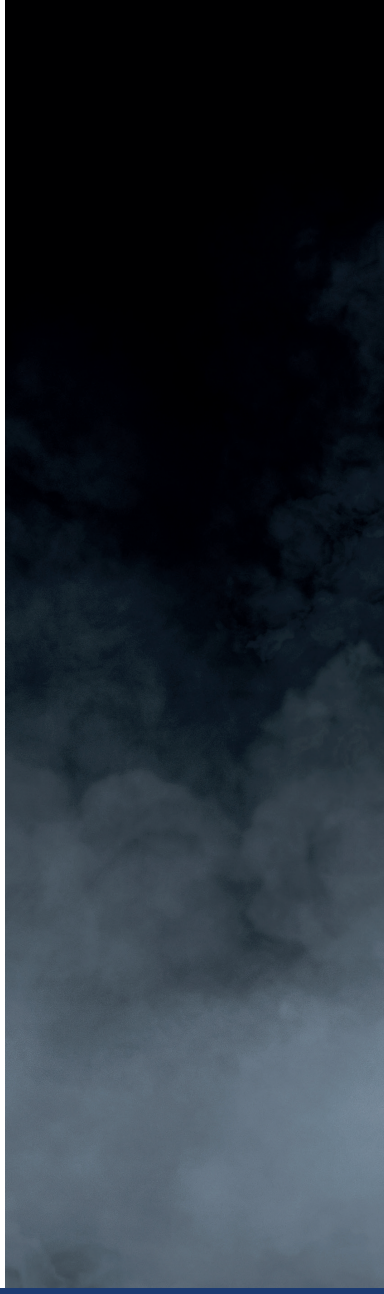
CONTACT INFORMATION

SALES DEPARTMENT
T-ISS Safety Suppliers
Helmkamp 56
7091 HR Dinxperlo
The Netherlands

T +31 (0) 315 65 60 60
E sales@t-iss.com
I www.t-iss.com

HEADOFFICE & WAREHOUSE
T-ISS Safety Suppliers
Storkstraat 1 - 3
2722 NN Zoetermeer
The Netherlands

T +31 (0) 79 330 1000
E sales@t-iss.com
I www.t-iss.com



T-ISS.COM

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