




1 For your safety

1.1 General safety statements

- Before using this product, carefully read the Instructions for Use.
- Strictly follow the Instructions for Use. The user must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the Intended Use section of this document.
- Do not dispose of the Instructions for Use. Ensure that they are retained and appropriately used by the product user.
- Only fully trained and competent users are permitted to use this product.
- Comply with all local and national rules and regulations associated with this product.
- Only trained and competent personnel are permitted to inspect, repair and service the product. Dräger recommend a Dräger service contract for all maintenance activities and that all repairs are carried out by Dräger.
- Properly trained service personnel must inspect and service this product as detailed in the Maintenance section of this document.
- Use only genuine Dräger spare parts and accessories, or the proper functioning of the product may be impaired.
- Do not use a faulty or incomplete product, and do not modify the product.
- Notify Dräger in the event of any component fault or failure.
- The air supply shall meet the requirements for breathing air according to EN 12021.

1.2 Definitions of alert icons

Alert icons are used in this document to provide and highlight text that requires a greater awareness by the user. A definition of the meaning of each icon is as follows:

- **WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**
Indicates a potentially hazardous situation which, if not avoided, could result in physical injury or damage to the product or environment. It may also be used to alert against unsafe practices.
- **NOTICE**
Indicates additional information on how to use the product.

2 Description

2.1 Product overview

The Dräger PAS® Series of airline respiratory protection equipment provides respiratory protection for working in a contaminated environment using an airline.

The features of the equipment are:

- There are two harness types available: a bandolier harness (Fig 1) that has a waist belt and a shoulder strap, or waist belt only harness (Fig 2).
- The airline connector (Fig 1, Item 4) is a male quick coupling that is used to connect an independent air supply.
- The equipment is available with or without a low-pressure whistle. When the equipment has a low-pressure whistle, it is on the airline manifold (Fig 1, Item 2), and sounds during use to warn the wearer that the supply pressure from the airline is low.
- The medium-pressure hose is available with or without a quick coupling (Fig 1, Item 3) (shown on the bandolier harness only). The quick coupling allows rapid removal and fitting of the lung demand valve when required.
- The lung demand valve (Fig 1, Item 1) is described below.

2.1.1 Lung demand valve (LDV)

A variety of Dräger lung demand valves are compatible with this equipment, with the coupling (Fig 3, Item 1) selected to match the face mask coupling (see table below):

| LDV coupling | Face mask coupling | Type | Coupling type |
|--------------|--------------------|-------------------|---|
| A | P | Positive pressure | Push-in – Dräger specific |
| AE | PE | Positive pressure | Screw-in – M45 x 3 to EN 148-3 |
| N | RA | Negative pressure | Screw-in – 40 mm round thread to EN 148-1 |

During use, the lung demand valve activates automatically as the wearer breathes, and then regulates the breathing air supply into the face mask in response to the breathing rate of the wearer.

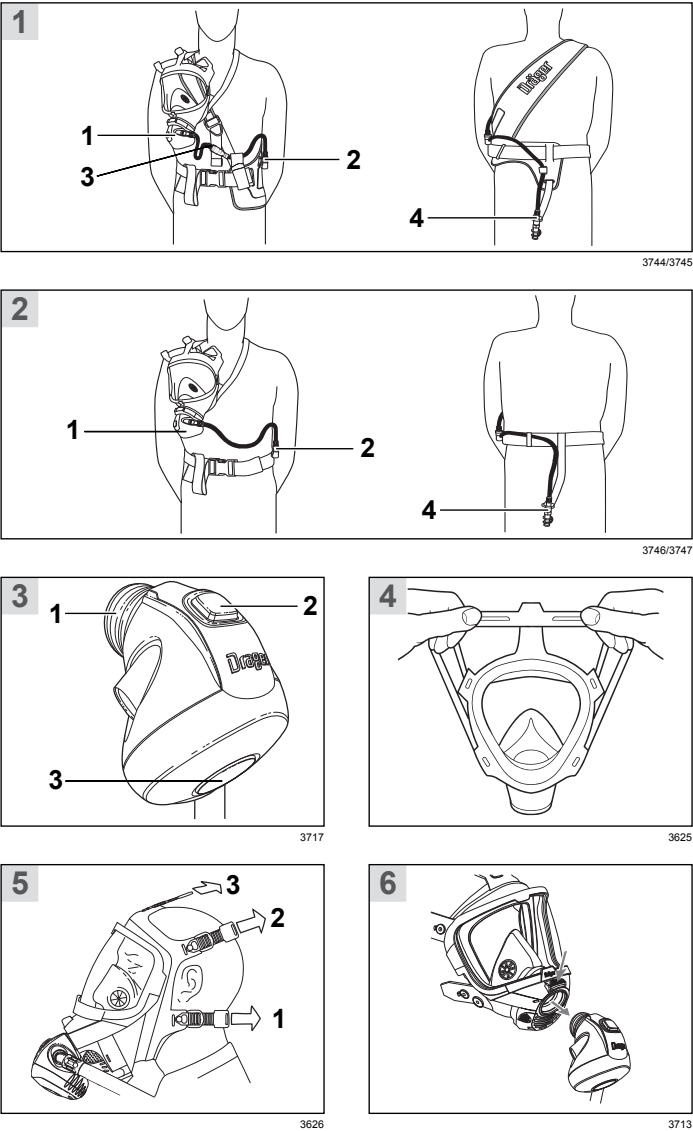
- On positive-pressure systems, when the lung demand valve is activated, the internal valve remains open until closed by the user. Positive-pressure valves have a reset button (Fig 3, Item 2) that closes the valve when required. Pressing the reset button closes the internal valve to switch off the air flow through the lung demand valve.
- On negative-pressure systems the internal valve closes automatically to switch off the air flow through the lung demand valve.

The lung demand valve can also be activated manually by pressing the front button (Fig 3, Item 3) to open the internal valve and activate air flow when required. The front button can be pressed during use to deliver additional air (supplementary air) into the mask when required by the wearer.

2.2 Intended use

When this product is used with an approved face mask, lung demand valve and independent air supply, it provides the wearer with respiratory protection for working in, contaminated or oxygen-deficient conditions. It is intended for use in applications where a high level of respiratory protection is required. The equipment is intended to be used only for airline applications.

The face mask (full face mask conforming to EN 136 Class 2 or Class 3) and other accessories used with this product must be certified Dräger components, assembled in an approved configuration; otherwise the operation of the device may be impaired. Contact Dräger for further information.



2.3 Limitations on use

This product is not approved for use in CBRN applications.

Use in potentially explosive atmospheres

The PAS® Series are type tested as suitable for use in potentially explosive atmospheres. Electronic sub-assemblies are ATEX certified. The combinations are suitable for use in hazardous areas up to and including zone 0 and zone 20. The combinations can be used in atmospheres containing gases of the gas explosion group IIC, with the exception of combinations using the f 2 range of facemasks, which are only suitable to be used in atmospheres containing gases of the gas explosion group IIB.

2.4 Approvals


The European standards, guidelines, and directives according to which this product is approved are specified in the declaration of conformity (see declaration of conformity or www.draeger.com/product-certificates).

PED Important note: The PAS® Series of airline respiratory protection equipment is designed for use with airline breathing-air supply systems only and is classified as safe and suitable for use under the PED regulations – category SEP (Sound Engineering Practice). The equipment cannot be certified to PED regulations.

2.5 Explanation of type-identifying marking and symbols

Where appropriate, the marking “F” on the apparatus and CAST (compressed-air supply tube) indicates that both can be used where flammability may be a risk. Marking on the compressed-air supply tube indicates that the tube is heat resistant (H) and/or antistatic (S).

3 Use

- **WARNING**
The airline air quality shall meet the requirements for breathing air according to EN 12021. Do not use oxygen or oxygen-enriched air. The moisture content of breathing air should be controlled within the EN 12021 limits to avoid freezing the apparatus.

Carry out a risk assessment of the workplace to ensure that it is not possible to connect to any airline supply other than breathable air (e.g. Nitrox).

Before using airline equipment, ensure that the independent air supply meets the air quality requirements, and complies with the airline pressure, flow and hose requirements in the technical data (see Section 8), and has been issued with a permit for use if necessary.


Position the source of the independent air supply in a safe and uncontaminated area. Dräger recommend that a controller should monitor and maintain the independent air supply throughout any operation.

3.1 Preparation for use


3.1.1 Visual inspection

Carry out a visual inspection, checking the full breathing apparatus including all component parts and accessories. Check that the equipment is clean and undamaged, paying particular attention to pneumatic components, hoses and connectors. Typical signs of damage that may affect the operation of the breathing apparatus include impact, abrasion, cutting, corrosion and discoloration. Report damage to service personnel and do not use the apparatus until faults are rectified.

3.1.2 Functional testing

- **WARNING**
If the breathing apparatus fails to meet any of the standards or parameters described in the functional tests, or if an immediate leak is evident, there is a system fault. Report the fault to trained service personnel or contact Dräger. Do not use the breathing apparatus until the fault condition is rectified.

1. Positive-pressure systems: press the reset button (Fig 3, Item 2) to switch off the valve.
2. Connect the independent air supply to the male coupling (Fig 1, Item 4), and if the independent air supply has a shut-off valve, open the valve.
3. Check for audible leaks. If there is any leak, investigate and repair the leak before use (see Section 4). If necessary, use a soapy solution to locate the leak.

- **WARNING**
Do not direct the air flow on to the face, eyes or skin.


4. Press the front button (Fig 3, Item 2) to activate air flow from the valve for 3–5 seconds. Unobstructed air will flow from the outlet of the lung demand valve.
5. Positive-pressure systems: press the reset button (Fig 3, Item 2) to switch off the valve.
6. Isolate the independent air supply.
7. Leak test: Carry out this test only if the independent air supply has a medium-pressure gauge and/or a high-pressure gauge; otherwise proceed to Step 8.
 - After isolating the independent air supply, wait one minute and then observe the gauge and reapply the independent air supply.
 - A medium-pressure gauge should not show an increase in pressure of more than 1 bar. A high-pressure gauge should not show an increase in pressure of more than 10 bar. If there is any leak, investigate and repair the leak before use (see Section 4). If necessary, use a soapy solution to locate the leak.
 - After testing, again isolate the independent air supply.
8. Whistle test: Carry out this test only if the PAS® Series apparatus is fitted with a low-pressure whistle; otherwise proceed to Step 9.
 - Positive-pressure systems: cover and seal the lung demand valve outlet with the palm of the hand. Press the front button (Fig 3, Item 3) to activate air flow and then lift the hand to very slowly vent.
 - Negative-pressure systems: carefully press the front button (Fig 3, Item 3) to very slowly vent.
 - The low-pressure whistle will briefly sound as the pressure decreases. (If the independent air supply has a medium-pressure gauge, check that the whistle commences in the range 5 bar to 4 bar. Note also that if the independent air supply has a low-pressure warning device, this may also activate/sound during this test.)
9. Press the front button (Fig 3, Item 3) to fully vent the system.
10. Disconnect the independent air supply.
11. Positive-pressure systems: press the reset button (Fig 3, Item 2) to switch off the valve.


3.1.3 Putting on the PAS® Series equipment (ready position)

See also Fig 1 (bandolier harness) and Fig 2 (waist belt harness) which show the PAS Series equipment worn in the ready position.

1. Put on the harness:
 - Bandolier harness:
 - i. Open the waist belt buckle and fully extend the waist belt and shoulder strap.
 - ii. Place the left arm through the shoulder harness, taking the harness over the head and on to the right shoulder, positioning the strap diagonally across the body.
 - iii. Loop the waist belt around the waist and fasten the buckle – do not tighten.
 - iv. Grip the airline manifold with the left hand and lift until the waist belt is in line with the waist. Tighten the waist belt strap until the equipment is secure and comfortable on the waist. Pull down to adjust the shoulder strap.
 - Waist belt harness:
 - i. Open the waist belt buckle and fully extend the waist belt.
 - ii. Loop the waist belt around the waist and fasten the buckle.
 - iii. Position the belt strap on the waist and tighten the waist belt strap until the equipment is secure and comfortable on the waist.
2. Check that the face mask port, and the lung demand valve coupling and O-ring are clean and undamaged.
3. Connect the lung demand valve to the face mask as follows.
 - Push-in coupling: press into the port of the face mask until it latches in position. Check the attachment by gently attempting to pull the coupling apart.
 - Screw-in coupling: screw into the port of the face mask and tighten hand tight. When the lung demand valve is fitted to the face mask, the connector can swivel to allow for head and body movement of the wearer.
4. Put the neck strap of the face mask over the head, and then insert the neck strap stud into the hole in the centre strap of the head harness.

3.1.4 Putting on the face mask

- **WARNING**
Correct fit of the face mask can only be achieved if the complete mask seal makes contact with skin. Head hair, facial hair (including beard stubble and sideburns), earrings, other facial piercings and normal spectacles will interfere with the mask seal and are not permitted in the sealing area. Additionally, head hair that could affect the face mask fit (buns, pony-tails, hairpieces, etc.) is not permitted.

- **NOTICE**
Refer also to the face mask Instructions for Use.


1. Positive-pressure systems: press the reset button (Fig 3, Item 2) to switch off the valve.
2. Connect the independent air supply to the male coupling (Fig 1, Item 4). If the independent air supply has a shut-off valve, open the valve.
3. Detach the neck strap stud from the centre strap of the head harness.
4. Spread the head harness (Fig 4). Place the chin into the chin cup of the face mask and pull the harness over the head locating the harness centre plate on the back of the head.
5. Referring to Fig 5, tighten both lower (1) and then upper straps (2) evenly towards the back of the head. If necessary, tighten the centre strap (3).
6. Breathe normally and carry out the mask function check.

Mask function check

- 1. Isolate the independent air supply (close the valve or disconnect) and breathe normally to empty the system of air. As the pressure decreases, the low-pressure whistle (if fitted) will sound. When the system is empty, the face mask should hold on to the face to indicate a positive seal.
- 2. Immediately reapply the independent air supply and breathe normally.
- 3. Inhale and hold your breath – there should be no audible leak. If a leak is detected, readjust the head harness and retest.
- 4. Recommence breathing – exhaled air should flow easily out of the exhalation valve.
- 5. Briefly press the front button (Fig 3, Item 3) to check the supplementary air supply into the mask.

When the function check has been satisfactorily completed, breathe normally and proceed to the work area.


3.2 During use

**WARNING**


At very high work rates the pressure in the face mask may become negative at peak inhalation flow.

- If additional air is required, briefly press and release the front button (Fig 3, Item 3) to deliver a single jet of supplementary air into the mask.
- When the task is complete or when advised by a controller leave the hazardous area. Hold and carefully withdraw the airline hose.

Evacuation procedure (independent air supply failure)

**WARNING**

If the PAS® Series apparatus is fitted with a low-pressure whistle, the whistle sounds during use to indicate that the independent air supply has fallen below the required pressure.


**NOTICE**

If the low-pressure whistle sounds and then stops, the air supply pressure could have been restored. The wearer **must** confirm that the correct pressure (6 to 10 bar) is available, or leave the hazardous area as described below.


If the low-pressure whistle sounds, or if the independent air supply fails, immediately leave the hazardous area by the shortest and safest route – remain connected to the independent air supply and carefully withdraw the airline hose.

When in a safe area, remove the lung demand valve from the face mask if necessary and continue to breathe normally.

3.3 After use

**WARNING**

Do not remove the equipment until in safe area, clear of hazard.

**CAUTION**

Do not drop or throw down equipment as damage could occur.

- 1. Loosen the face mask straps.
 - Positive-pressure systems: as the seal between the mask and the face is broken, press the reset button (Fig 3, Item 2) to switch off the valve.
- 2. Remove the face mask and fully extend all of the straps of the head harness.
- 3. Isolate and disconnect the independent air supply.
- 4. Press the front button (Fig 3, Item 3) to fully vent the system.
- 5. Remove the lung demand valve from the face mask (Fig 6 – push-in coupling shown).
- 6. Open the waist belt buckle, lift the shoulder strap buckle to loosen the bandolier harness, and then remove the equipment.
- 7. Carry out the after use maintenance tasks in the maintenance table (see Section 5.1).

4 Troubleshooting

The troubleshooting guide shows fault diagnosis and repair information applicable to breathing apparatus users. Further troubleshooting and repair information is available in Instructions for Use supplied with associated equipment (e.g. face mask).

Contact service personnel or Dräger when the remedy information indicates a service task, or if the symptom remains after all remedy actions have been attempted.

| Symptom | Fault | Remedy |
|---|---|--|
| Air leak or failed leak test | Loose or dirty connector | Disconnect, clean and reconnect the couplings and retest |
| | Faulty hose or component | Substitute user replaceable accessories and retest |
| Air leak from medium-pressure hose connection at the airline manifold (safety relief valve) | Faulty O-ring, retainer, spring or pressure reducer | Service task |
| Poor sounding whistle | Whistle dirty | Clean whistle flute and retest |
| Whistle not functioning correctly | Activation mechanism fault | Service task |

5 Maintenance

5.1 Maintenance table

Service and test the breathing apparatus, including out-of-use apparatus, in accordance with the maintenance table. Record all service details and testing. Refer also to the Instructions for Use for the lung demand valve, face mask and other associated equipment.

Additional inspection and testing may be required in the country of use to ensure compliance with national regulations.


| Component/System | Task | Before use | After use | Every month | Every year |
|--------------------|--|------------|-----------|-------------|------------|
| Complete equipment | Visual inspection (see Note 1 and Section 3.1.1) | | ○ | ○ | |
| | Functional test (see Section 3.1.2) | | ○ | ○ | |
| | Breathing cycle and static tests (see Note 2) | | | | ○ |
| Lung demand valve | Check push-in type connectors for lubricant (see Note 3) | ○ | | | |

Notes

- Dräger recommendations

- 1. Clean the equipment if it is dirty. If it the equipment has been exposed to contaminants, disinfect any components that come into direct and prolonged contact with the skin.
- 2. These maintenance tasks may only be carried out by Dräger or trained service personnel. Details of the tests are contained in the Technical Manual which is issued to service personnel that have attended a relevant Dräger maintenance course.
- 3. For type A check the O-ring on the lung demand valve; and for type ESA check the outer surface of the male part of the push-in connector on the lung demand valve. As a guide, lubricant should be felt on the fingers but not seen. If relubrication is required, lightly apply Dow Corning® Molykote® 111 (other lubricants are not tested and may damage the equipment).


5.2 Cleaning and disinfecting

**CAUTION**

Do not exceed 60 °C for drying, and remove components from the drying facility immediately when dry. Drying time in a heated dryer must not exceed 30 minutes.

Do not immerse pneumatic or electronic components in cleaning solutions or water.

If water is trapped and then freezes inside the pneumatic system of the breathing apparatus (such as the lung demand valve), operation will be impaired. Prevent any liquid from entering, and thoroughly dry the breathing apparatus after cleaning to prevent this from occurring.



For information about suitable cleaning and disinfecting agents and their specifications refer to document 9100081 on www.draeger.com/IFU.

Refer to the Instructions for Use for the lung demand valve, face mask and other associated equipment.

- Use only clean lint-free cloths
- 1. Clean the breathing apparatus manually using a cloth moistened with cleaning solution to remove excess dirt.
 - 2. Apply disinfecting solution to all internal and external surfaces.
 - 3. Rinse all components thoroughly with clean water to remove all cleaning and disinfecting agents.
 - 4. Dry all components using a dry cloth, in a heated dryer or in air.
 - 5. Contact service personnel or Dräger if disassembly of pneumatic or electronic components is required.

6 Storage

6.1 Storage preparation

- Extend the shoulder straps, waist belt and the straps of the face mask.
- For storage, place the face mask in a protective bag (contact Dräger for supply of a suitable bag).
- Route rubber hoses in such a way that the bend radius is not too acute and the hose is not stretched, compressed or twisted.

6.2 Storage conditions

- Store the equipment between -15 °C and +25 °C. Ensure that the environment is dry, free from dust and dirt, and does not subject the equipment to wear or damage due to abrasion. Do not store the equipment in direct sunlight.
- Fix the breathing apparatus securely to any raised mounting point to prevent it from falling.

7 Disposal

When required, dispose of the PAS® Series in accordance with national or local regulations for waste disposal.

8 Technical data

- Independent air supply (single user):
 - Airline pressure and flow requirements: pressure 6 to 10 bar, air flow rate at least 550 litres/minute. **Important note:** do not exceed 10 bar.
 - Airline hose requirements: maximum of 100 m of Dräger approved hose. **Important note:** no more than four individual hoses (a maximum of five hose connections) are permitted in the airline.
- Low-pressure whistle operation:
 - Whistle commences in the range: 5 to 4 bar.
 - Whistle ceases in the range: 1.75 to 0 bar.
 - Whistle volume: >90 dBA.