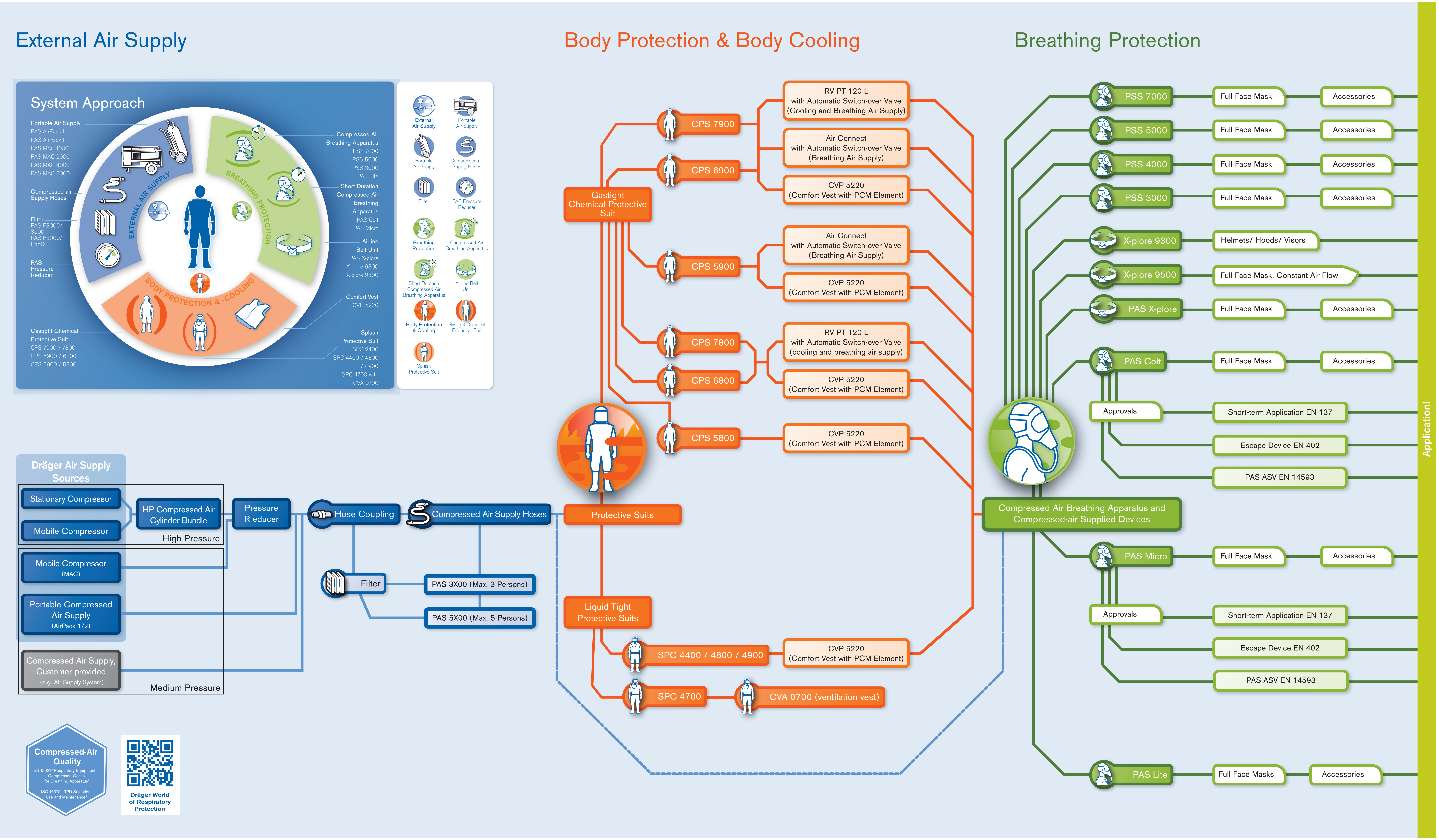
Professionally protected
Body protection, respiratory protected system and body cooling

Dräger



Air Supply System

Relevant approvals & Dräger options

External Air Source

Medium Pressure

Mobile Trolley

- **PAS® AirPack 1** (1 – 2 wearer)
- **PAS® AirPack 2** (1 – 4 wearer)

Mobile Compressor

- **PAS® Mac 1000** (1 wearer)
- **PAS® Mac 2000** (1 – 2 wearer)
- **PAS® Mac 3000** (1 – 4 wearer)
- **PAS® Mac 4000** (1 – 8 wearer)

Further electric driven versions

High Pressure

HP compressors

Bauer compressors
L&W compressors

+ **HP Air Cylinder** +

Pressure Reducer Panel (ES)

PAS Pressure Reducer

+

Air Transport

Hoses
3 m
5 m
10 m
20 m
25 m
30 m
45 m
50 m

Hose Drum:
50 m

Customer`s Own Source

e.g. ring line, fix compressor

+

Air Filtering (fixed or portable)

PAS® Filter Serie, F3000 / F3500, F5000 / F5500

+

Test Air Quality EN 12021

Aerotest Simultan HP (high pressure)
Aerotest System Alpha (medium pressure)
Aerotest 5000 (high & medium pressure)

Always consider the instructions for use!

Breathing Protection PPE (Personal Protective Equipment)

Compressed Air Line Breathing Apparatus	Breathing Connection	Headpiece	Body Protection (optional)
SCBA (Self-contained-breathing-apparatus) EN 137 – 1 for short duration EN 402 for escape **PAS® ASV*** **PAS® Micro** / **PAS® Colt**	**Lung Demand Valve** **Plus (PSS) LDV** (normal demand or positiv pressure)	**Full Face Masks** EN 136 **Panorama Nova** **X-plore® 6000** **FPS 7000**	**Gas-Tight Suits – Type 1** (Type 1a (SCBA inside) / Type 1b (SCBA outside) EN 943 -1 / -2, EN 14593/4 ASV * / Y-piece - 2nd medium pressure connection **CPS 5900 / CPS 5800** **CPS 6900 / CPS 6800** **CPS 7900 / CPS 7800**
SCBA (Self-contained-breathing-apparatus) EN 137 – 2 for standard duration **PAS® ASV*** **PAS® Lite** / **PSS® 3000 / PSS® 4000 / PSS® 5000 / PSS® 7000**			**Splash Protective Suits – Type 3 & 4** EN 14094 **SPC 2400 / SPC 4400 / SPC 4800**
Belt Unit (Compressed air line breathing apparatus lung demand) EN 14593-1 **PAS® X-plore**	**Lung Demand Valve** **Plus (PSS) LDV** (normal demand or positiv pressure)	**Full Face Masks** EN 136 **Panorama Nova** **X-plore® 6000** **FPS 7000**	**Gas-Tight Suits – Type 1b** (SCBA outside) EN 943 -1 / -2, EN 14593/4 ASV * / Y-piece - 2nd medium pressure connection **CPS 5800 / CPS 6800 / CPS 7800**
Belt Unit (Compressed air line breathing apparatus for continuous flow) EN 14594 **PAS® X-plore 9500**	**Mask Adapter** **Connector Hose**	**X-plore® 6300** **X-plore® 6570**	**Splash Protective Suits – Type 3 & 4** EN 14094 **SPC 2400 / SPC 4400 / SPC 4800**
Belt Unit (Compressed air line breathing apparatus for continuous flow) EN 14594 **PAS® X-plore 9300**	**Hoses** **X-plore® 8000 standard or flexible hose**	**Headpieces** **X-plore® 8000 hoods** **X-plore® 8000 visor** **X-plore® 8000 helmets**	**Splash Protective Suits – Type 3 & 4** EN 14094 **SPC 2400 / SPC 4400 / SPC 4800**
Belt Unit (Compressed air line breathing apparatus for continuous flow) EN 14594 **PAS® X-plore 9310**	**Ventilation Vest** EN 14594 **CVA 0700**		**Splash Protective Suits – Type 3 & 4** EN 14605, EN 14594 **SPC 4700**

*specific ASV needed when using CPS

Dräger

ST-9734-2008

Engineered for Safety.

DRÄGER PAS COLT
DRÄGER PAS MICRO
DRÄGER PAS AIRPACK 1
DRÄGER PAS AIRPACK 2
DRÄGER SPC 3800
DRÄGER WORKSTAR PVC

Dräger. Technology for Life®

ST-10002-2008

Quality air you can rely on.

Wherever you are and whatever you are doing, your ability to breathe should be as unencumbered and natural as possible. When dealing with leaks, handling chemical spillages and other tasks that can leave you exposed to harmful elements, the last thing you should be worrying about is something as straightforward as breathing.

Dräger airlines and chemical protection suits have been designed to ensure that every breath you take is easy, consistent and, above all, reliable. Compact and versatile, our systems combine quality with ergonomic design, and flexibility in use with durability. Offering reliable protection in practically any situation, they bring you fresh air that you truly can depend on.

Dräger takes care of your health so you can take care of yourself

Providing professional breathing apparatus to the professionals. As a global leader in the field of personal protection and gas detection technology, the products of Dräger are used to save lives under many different circumstances.

Fire fighting, mining, chemical and petrochemical production are just some of the areas where our products are put to the test on a daily basis. Our widespread global network, with over 40 offices around the world, representing Dräger in over 100 countries, allows Dräger products to be purchased, commissioned and serviced no matter where our customers are situated. Having access to this international infrastructure is also of great benefit when it comes to meeting the exact requirements of varied customer profiles.

Through constant customer consultation, we are able to produce products which address the user's traits and provide optimum assistance.

The PAS range of heavy duty airline is no different in this respect. Comprising the Dräger PAS AirPack 1, Dräger PAS AirPack 2, Dräger PAS Colt and Dräger PAS Micro, the system combines versatility, ease of use and the latest in material technology whilst matching the requirements of the customer.

More than an airline – a professional solution

The products of Dräger are tried and tested daily by professionals from around the world.

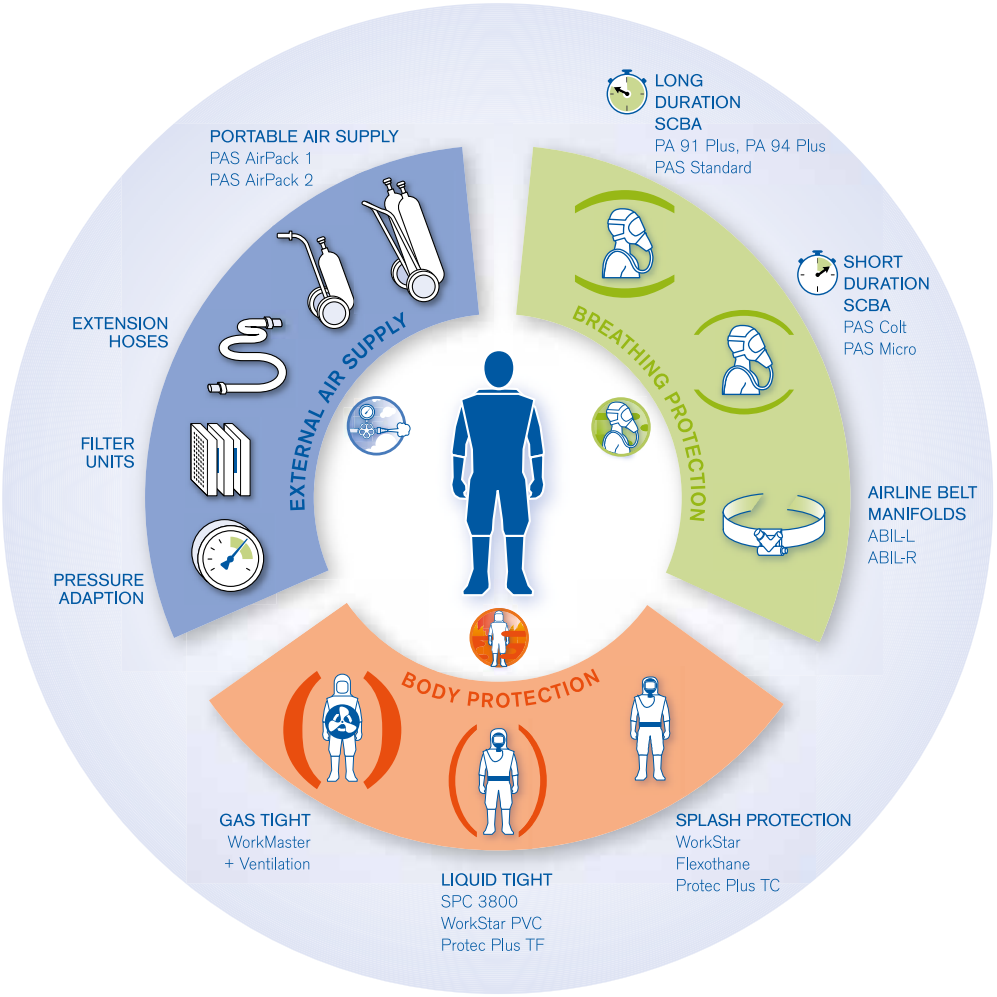
and your job.

The system has been designed to be as flexible as possible so that each element can be interchanged, when necessary, allowing many different sets of circumstances to be effectively dealt with.

Modular and lightweight, airline systems are worn in all kinds of environments and for all kinds of tasks. For decontamination and inspection purposes, for instance, the Dräger PAS range can also be worn with a wide range of coveralls such as the Dräger SPC 3800 and Dräger Protec Plus to protect against ultra-fine dusts and powders as well as acids and alkalis. In other circumstances, where liquid solvents and chemicals might be involved, they can be used in conjunction with the Dräger WorkMaster chemical protection suits. Featuring specially sealed seams and gas-tight zip fasteners, these suits can also be used in conjunction with the Dräger PAS airline system to provide a completely, self-contained, ventilated system.

The complete system.

Promote safety by using a complete Dräger airline system. Flexible in design, the Dräger airline system can be configured with different breathing systems and chemical protection suits to meet your needs. Easy to use and easy to achieve – a professional solution for professional users.



For short duration hazardous work, when you need reliability and quality, the Dräger PAS Colt is right by your side.

Combining the very latest harness design with advanced materials and smaller, lightweight cylinders, the versatile Dräger PAS Colt is both easy to use and comfortable to wear.

ST-3557-2003

Dräger PAS Colt:
A compact, hip-mounted life saver.

From hazardous chemical spills and decontamination procedures to routine tasks, the Dräger PAS Colt is approved for use as a short duration entry unit, an airline emergency escape breathing apparatus, or a dual function unit.

Worn on the hip, the lightweight harness is quick and easy to don in any environment. An innovative drop down feature, which enables the cylinder to be unclipped from the waistbelt, provides additional manoeuvring capabilities in confined space entry applications or where space is tight.

Suitable for use in extreme conditions and able to retain its shape in a wide range of temperatures, the harness is made from an anti-static material that is inert to chemicals and oil, and impervious to most acids and alkalis. Durable and machine washable, it also has a high resistance to heat and abrasion and meets the requirements of EN137 heat and flame resistance.

Featuring state-of the-art technology inherited from Dräger's advanced PSS range of breathing apparatus, as used by professional firefighters around the world, the Dräger PAS Colt makes an ideal partner in practically any environment. Approved to EN137 standards as a short duration entry unit, it also carries EN402 approval as an airline emergency escape unit.

ST-10648-2008

ST-10648-2008

Dräger PAS Colt:
This Hip-mounted breathing device is suited to short term operations.

Compact and versatile, the Dräger PAS Micro is ready wherever and whenever you need it.

Developed by Dräger to combine ergonomic design with comfort and ease of use.

Dräger PAS Micro:
A compact, back-mounted life saver.

Increasing both wearer comfort and stability, the back-mounted Dräger PAS Micro has been ergonomically designed to follow the natural contours of the back. To maximise its streamlined shape and to reduce snagging whilst protecting the pressure reducer, the hose and pressure reducer have both been integrated into the backplate. In addition, to further improve the compact design, the buckles follow the contours of the set and, for maximum safety and flexibility, are easy to locate and quick to adjust, even when wearing gloves.
Easy and quick to don and ideal for use in difficult conditions, the lightweight harness has been specially designed to retain its form in a wide range of temperatures. Utilising a flexible, anti-static material that is inert to chemicals and oil, and impervious to most acids and alkalis, it also has a high resistance to abrasion. Durable and machine washable, it also meets the requirements of EN137 heat and flame resistance.

Offering dual functionality, the Dräger PAS Micro is approved to EN137 standards as a short duration entry unit and carries EN402 approval as an airline emergency escape unit. Based upon state-of-the-art technology inherited from the advanced Dräger PSS range of breathing apparatus used by professional firefighters around the world, it offers optimum versatility as well as high quality performance.

When worn as a short duration entry unit, for example, the pressure gauge can be mounted at the waist to provide an immediate visual update of the remaining air supply. Alternatively, when used independently or in conjunction with the Dräger PAS AirPack 1 or 2 airline systems, the gauge can be integrated into the cylinder valve to allow easy periodical inspection.

Strong, reliable and constant

Reliable and Constant, the Dräger PAS AirPack 1 Airline System for use where extended duration breathing air is called for.

The Dräger PAS AirPack 1 ensures that chemical tank cleaning, toxic spillage and other longer duration tasks are all made easier.

ST-3560-2003

Dräger PAS AirPack 1:
Extended duration breathing apparatus at its best.

Combining trolley mounted cylinders that provide the user with an uninterrupted air supply via a hose reel, and a portable design for easy relocation, it can be positioned in safe zones within close proximity to the user.
A major benefit is its flexibility in use. For sporadic or short duration inspection work, for instance, it can be used with a lightweight harness such as the Dräger PAS Colt. For regular use and extended duration work when cleaning silos or vats, however, it can be quickly connected to the Dräger PAS Standard breathing apparatus. Orthopaedically designed to reduce backstrain, stress and fatigue, the Dräger PAS Standard features adjustable, padded shoulder straps and an anti-static, impact and chemical resistant backplate to ensure wearer comfort over longer periods. Air can be delivered in many ways, for example, direct from cylinders, from a factory ring main or from a mobile compressor. Able to accommodate up to four 200 or 300 bar compressed air cylinders, each providing up to 12 litres capacity, the Dräger PAS AirPack 1 is supplied with a 50 metre length of hose as standard and can be extended up to 100 metres. Designed with reliability in mind, the trolley hose reel connector is protected by a cover to minimise inadvertent damage. A smooth winding handle enables the hose to be rewound easily after use, and outgoing hose distribution is controlled via a braking system to prevent possible entanglement. Incorporating Dräger's tried and tested pneumatics system, the Dräger PAS AirPack 1 also features a safety pressure relief valve and, for additional safety, the pressure reducer is shrouded in a protective plate.
Where the site has an installed supply of air, the Dräger AF1400 air filter unit can be used to provide clean air, free from dust and particles, with the Dräger PAS AirPack 1 acting as back-up.

ST-9786-2008

Heavy workloads call for the heavy duty Dräger PAS AirPack 2 Airline system.

Freedom of movement and less stress and fatigue.

ST-3149-2003

Dräger PAS AirPack 2: Extended duration breathing apparatus at its best.

Lengthier tasks in hazardous environments call for extended duration breathing air. Allowing the wearer freedom of movement and causing less stress and fatigue than full breathing apparatus over longer periods, the heavy-duty Dräger PAS Airpack 2 is ideal for use in chemical tank cleaning and toxic spillage applications. At home on or offshore, this trolley-mounted system is able to accommodate up to two compressed air cylinders of 50 litres. A 50m length of hose is supplied as standard with optional extensions from 3 to 50 metres.

The trolley hose reel connector is protected with a cover to minimise accidental damage and the reel is also equipped with a handle to facilitate easy rewinding. Outgoing hose distribution is also controlled with a braking system which prevents inadvertent unwinding and minimises entanglement. For those applications where elevated working may be unavoidable, it can also be supplied with a fully approved lifting eye for safe transfer to height.

For additional flexibility, the Dräger PAS AirPack 2 can be supplied with either one or two pressure regulators and two hose reels to allow joint use of the system, or for two completely independent systems to be run simultaneously.

Flexibility is the key to airline safety

A host of accessories are available to turn the Dräger PAS AirPack 2 into the ideal partner. Belt Manifolds, known as ABIL-L and ABIL-R, can be selected for use with breathing hoses or positive pressure breathing apparatus to suit the application concerned. Similarly, different Dräger PAS harnesses such as the Colt, Micro and Standard can be used without cylinders to deliver air directly from the airline trolley. Enabling users to connect breathing apparatus to the airline supply, the Dräger ASV brings a new level of safety to airline users. Developed to ensure safety should the external supply fail, this innovative valve will automatically, and without interruption, switch from the airline to the back-up supply. This full switching capability also means that a dedicated airline can be used as a back-up source, supporting emergency sets and full breathing apparatus.

Approved to EN14593 part 1 and EN139 standards, the ASV is approved for use with compressed air breathing apparatus approved to EN137 and EN402 standards.

ST-10323-2008

ST-10002-2008

ST-9701-2008

Dräger Ventilation Systems for use where quality or loss of air isn't the only hazard.

All-round protection with complete ventilation for Dräger WorkMaster range.

Every Dräger WorkMaster chemical protective suit can be turned into a completely ventilated system with Dräger Breathable Air Supply and Ventilation Units. Depending on the type of suit and the nature of the application, a number of options are available and include the Aerotec AL, Aerotec BA and the control valve RV PT 120L

Featuring Euro couplings for an easy fit to both the suit and the air supply, each of these systems is also easy to use. The rate of ventilation is operated by an integral control valve and can be adjusted to provide 0, 5, 30 or 120L/min with a supply pressure of 7.5 bar.
For maximum versatility, different connectors are available for use with different airline systems, from compressed air cylinders and facepieces to CABA with lung demand valves and compressed airlines. In addition, the system can be fitted with the ASV automatic switch over valve. Should the primary air source fail, the ASV will automatically switch off the ventilation to conserve the back-up air supply and ensure uninterrupted breathing air.

ST-10396-2008

Protect yourself from hazardous liquids with the disposable Dräger SPC 3800 Splash Protective Coverall.

Light, comfortable, liquid-tight protection.

ST-630-2003

Dräger SPC 3800 Splash Protective Coverall

Designed for disposable use and made of tough yet comfortable Tychem®* F material, the Dräger SPC 3800 Splash Protective Coverall offers entire body protection against solid or liquid chemicals. Ideal for decontamination work, inspections and handling oil, it is CE Certificated and classified as a category III chemical protective suit type 3, 4, 5 and 6. Providing effective protection against ultra-fine dusts and powders, it can also be used in those areas where inorganic acids and alkalis can be found as well as water based salt solutions.

With an easy-to-reach zip from shoulder to shoulder, the donning and doffing procedure of this lightweight, one-piece suit could not be easier. In addition, the back zip, which is also protected by a double flap of Tychem®* F, does not interfere with the wearer's work and provides effective protection during decontamination.

Available in four sizes and in a grey version with heat-sealed Silvershield gloves, the suit can also be supplied in orange with Butyl gloves attached. The feet are protected by flexible socks with cuffs in the same Tychem®* F material.

For optimum comfort around the face, the Dräger SPC 3800 also features the Dräger face cuff, a thin, flexible cuff that can be worn either on or underneath a face mask.

*Registered trademark of E. I. du Pont de Nemours and Company

ST-6042-2004

Dräger Protec Plus and Dräger WorkStar, industrial chemical protective suits for practically every eventuality.

Effective barrier protection against sprays and splashes.

ST-4899-2005

Dräger Protec Plus TC

ST-4886-2005

Dräger Protec Plus TF

Dräger Protec Plus
Made from Tychem, a coated Tyvek®* material, Dräger Protec Plus chemical protective coveralls feature elastic drawstrings on the hood, sleeves and trouser cuffs to keep splashes out. The zip fastener, which runs down the middle of the front side, is fitted with two covers secured by a hook-and-loop fastener, and an elastic seal in the neck area ensures an effective seal with a full face mask.

With welded seams for added security, these one-piece, limited use coveralls are impermeable to liquids and are CE certified and classified as chemical protection Types 3, 4, 5 and 6. They are also tested for anti-static properties under EN 1149-1.

Dräger Protec Plus TC – Tychem C
Designed to protect against inorganic acids and alkalis as well as water based salt solutions, the Dräger Protec Plus TC is ideal for use in paint shops, with agricultural chemicals, in asbestos disposal, disinfecting and industrial cleaning applications. It is also suitable for use in resin and glass fibre processing and to protect against industrial paints, virus and blood.

Dräger Protec Plus TF – Tychem F
Used in decontamination work, inspections and when handling oil, these coveralls provide protection against many concentrated inorganic acids and alkalis. They are also suitable for use with a large number of organic chemicals.

* Registered trademark of E. I. Du Pont de Nemours and Company

Dräger WorkStar Flexothane

Dräger WorkStar PVC

Dräger WorkStar
Compatible with airline systems, the Dräger WorkStar Flexothane®* and PVC chemical protection suits offer single-piece, reusable protection.

Dräger WorkStar Flexothane®*
Approved as a spray-proof protection suit in accordance with EN 465, Type 4, the Flexothane®* model combines a hood with pull-tie, sleeves with elastic ends and arm cuffs, and press-button trouser leg ends for easy adjustment. Fitted with a double-covered zip fastener, it also benefits from reflective strips on the upper sleeves for added safety in dark or dimly lit conditions. Easy to wash and available in four sizes, it is ideal for those situations where people may come into direct contact with liquid chemicals such a crude oil, lubricating oil and petrol.

Dräger WorkStar PVC
Particularly suited to those applications where acid protection is required or where cleaning agents are applied with high pressure cleaning equipment, the Dräger WorkStar PVC is approved as a liquid-tight protection suit to EN 466, Type 3. Featuring a front zip fastening complete with triple covering, it incorporates elastic wrists and turned-back cuffs to the sleeves, and elastic ends and a special fastener underneath the chin. Along with elastic ankle adjusters, the trouser legs benefit from foot-straps and turned-back ends complete with hook-and-loop-fasteners. Reinforced at the knees and elbows, this durable suit is also easy to wash.

With an almost infinite number of variables, the Dräger airline range can be mixed and matched to suit every application, and the individual needs of every user.

Both short and long duration sets can be used as primary air sources with installed airline systems as back up, and vice versa. Each of these can be used with limited use and reusable chemical protection suits, with or without helmets, gloves and footwear. Ventilated systems can be used to keep wearers cool, and automatic switch over valves can be incorporated to ensure breathing air integrity even when the primary air source might be lost.

Flexible, versatile and durable, these systems are all designed to be comfortable to wear and easy to use.

* Registered trademark of Sioen N.V.

ST-10071-2008

Quality that gives you absolute confidence to do the job.

We know, from working with our customers over the years, that Dräger systems can be relied upon, and our customers know that too. Designed for you, by people who understand your workplace, each of our systems is built to endure the toughest conditions in the harshest of environments. Versatile, practical and comfortable, they not only help you to breathe, they help you to meet the challenges you face with the utmost confidence. Dräger's commitment to quality stands out in their design, ease of use and their performance – and that's something you can rely on.

Not all products, features, or services are for sale in all countries.
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Dräger PAS® AirPack 1
Compressed Air Breathing Apparatus

Designed using leading technology and materials, Dräger's range of heavy-duty airline apparatus is ideal for use where an extended duration of breathing air is called for. Chemical tank cleaning, toxic spillages or certain tasks when working on offshore installations are all made easier and more comfortable when using the Dräger PAS® AirPack 1.

ST-3560-2003

Dräger. Technology for Life®

Benefits

Increased freedom of movement

Uninterrupted air supply is provided by the trolley-mounted cylinder(s) to the wearer via a hose reel. As the PAS AirPack can be easily re-located and therefore positioned in a safe zone which is in close proximity to working area, the user need only wear a lightweight harness, such as Dräger's PAS Colt, during operation. This allows the wearer a greater freedom of movement, and less stress and fatigue than they would be subjected to if wearing a conventional self-contained breathing apparatus unit.

A well thought trough system

The Dräger PAS AirPack 1 is able to accommodate up to four compressed air cylinders of up to 12 litres in capacity and is constructed from an anti-static powder coated steel material.

A 50 metre length of hose is supplied with the PAS AirPack 1 as standard, this can be extended to a length of 100 metres with a range of extension hoses. The trolley hose reel connector is protected with a cover to minimise inadvertent damage being caused.

The hose reel is equipped with a winding handle to allow the hose to be easily re-wound onto the reel after use. Outgoing hose distribution is also controlled with a braking system in order to prevent unnecessary unwinding and potential entanglement.

The Dräger PAS AirPack 1 benefits from the world renowned, tried and tested, pneumatics system used on Dräger's successful PSS range of compressed air breathing apparatus. The system incorporates a safety pressure relief valve and the pressure reducer is shrouded in a protective plate for additional safety.

The PAS AirPack has been ergonomically designed to facilitate ease of operation, general handling and mobility.

The Module comprises of:

- Robust welded durable steel frame coated, for corrosion protection, with a tough black anti-static polymeric powder coating.
- Stainless steel fittings.

Pneumatics

The Dräger PAS AirPack 1 Trolley module incorporates the following pneumatic elements;

- Pressure reducer suitable for connecting breathable quality air at an input pressure of either 200 or 300 bar.
- Pressure reducer suitable for supplying breathable quality air at an outlet medium pressure of 8 bar nominal. (6 to 10 bar)
- Vent valves, to allow for the independent charging if an individual cylinder.
- High Pressure (HP) gauge, indicating cylinder pressure.

Benefits

– Medium Pressure (MP) gauge, indicating cascade system or ring main pressure.

Safety features

– Pressure relief valve, to relieve medium pressure from air hoses.
– Whistle Warning Unit – High pressure (HPWWU), indicating cylinder pressure to a volume of approximately 55 bar
– Whistle Warning Unit – Medium pressure (MPWWU) for use with independent air line source. Indicating cascade system or ring main pressure at approximately 4.5 bar.
– Suitable for use in explosive atmospheres (ATEX zone 1)

Performance

The high performance pressure reducer assembly of the Dräger PAS AirPack 1 is incorporated in the main pneumatic manifold assembly located behind the control panel. Functioning at inlet pressures of 200 or 300 bar the reducer provides a controlled outlet operating medium bar-pressure supply of 8 bar nominal. (6 to 10 bar). A pressure relief valve, incorporated into the manifold, ensures that any ‘over pressure’ (possible failure of the reducer) will not enter the mediumpressure airline system.

System components

D-39880-2011

Dräger PAS® Lite

For use in industrial applications where a simple, robust and easy to use breathing apparatus is required, the Dräger PAS® Lite Self-Contained Breathing Apparatus (SCBA) combines reliability with comfort and performance.

System components

D-6561-2010_S

Dräger Quaestor 7000

All static and dynamic tests of the Dräger Quaestor 7000 are carried out fully automatically. Controlled by the newly developed software each test is carried out intuitively. For the user this guarantees high efficiency through comfort and speed.

D-6563-2010_S

Dräger Quaestor 5000

All static and dynamic tests of the Dräger Quaestor 5000 take place semi-automatically as a sophisticated combination of personal handling and automated control during the test sequence. The newly developed software supports the user with intuitive user guidance.

ST-3935-2005

Quad Pack

An extension to allow the accommodation of up to 4 cylinders.

ST-3936-2005

Carry Frame

2 Cylinder carrying with pneumatics.

System components

ST-3937-2005

Stand Alone Hose Reel

Can be used in conjunction with carry frame. Contains 50 m of airline hose.

Accessories

ST-2602-2004

different accessories

- 'Y' Piece for 2 users
- Pressure reducer for connection to HP source
- Filter Unit to ensure correct air quality from ring main
- PAS Airline Harness

Technical Data

Dräger PAS AirPack	Dräger PAS AirPack 1 Trolley, Reducer Hose Reel & Hose	Dräger PAS AirPack 1 Carry Frame and Reducer	Dräger PAS AirPack 1 Trolley Excluding Hose Reel	Dräger PAS AirPack 1 Stand Alone Hose Reel
Size excluding cylinder (H x W x D) - Min (mm)	1019 x 465 x 60	888 x 465 x 375	1019 x 465 x 604	520 x 340 x 560
Weight (kg)	40.5	11.5	18	25.5
Input pressure cylinder (bar)	200 or 300	200 or 300	200 or 300	200 or 300
Input pressure Airline (bar)	6 - 10	6 - 10	6 - 10	6 - 10
Nominal 1st stage output pressure (bar)	8	8	8	8
1st stage output flow (l/min)	>600	>600	>600	>600
High pressure whistle activation pressure (bar)	55 - 60	55 - 60	55 - 60	55 - 60
Airline whistle activation pressure (bar)	4 - 5	4 - 5	4 - 5	4 - 5
Whistle sound level (dBA)	>90	>90	>90	>90
Whistle frequency range (Hz)	2000 - 4000	2000 - 4000	2000 - 4000	2000 - 4000
Operating temperature range (°C)	-32 to +70	-32 to +70	-32 to +70	-32 to +70

Ordering Information

Dräger PAS AirPack 1	
Airline trolley, reducer hose reel and 50 metres of hose	33 52 228
Stand alone hose reel	33 52 239
Carry frame and reducer	33 52 241
Trolley excluding hose reel	33 53 008
Quad pack unit to allow the accommodation of 4 cylinders	33 53 471

Dräger PAS Colt Airline Harness Unit Approved to EN14593:2005	
Complete with Whistle Warning Unit and push-in Lung Demand Valve	33 52 942
Complete with Whistle Warning Unit and Quick Release Coupling*	33 52 948
Complete with Quick Release Coupling but without Whistle Warning Unit*	33 52 947
Complete with push-in Lung Demand Valve but without Whistle Warning Unit	33 52 941

Ordering Information

Dräger PAS Airpack Harness	
Complete with Whistle Warning Unit and push-in Lung Demand Valve	33 54 483
Complete with Whistle Warning Unit and Quick Release Coupling*	33 54 481
Complete with Quick Release Coupling but without Whistle Warning Unit*	33 54 480
Complete with push-in Lung Demand Valve but without Whistle Warning Unit	33 54 482

Accessories Standard	
Dräger FPS 7000 P EPDM	R 56 200
Dräger FPS 7000 PE (M45 x 3) EPDM	R 56 426
Dräger FPS 7000 RA (M40) EPDM	R 56 310
Dräger FPS 7000 RA Silicone	R 56 332
3 Metre extension hose complete with CEJN	33 52 463
5 Metre extension hose complete with CEJN	33 52 464
10 Metre extension hose complete with CEJN	33 52 465
20 Metre extension hose complete with CEJN	33 52 466
30 Metre extension hose complete with CEJN	33 52 467
50 Metre extension hose complete with CEJN	33 52 468
Y Piece	R 27 9 45
Pressure reducer	33 57 357
Dräger PAS F3000	33 59 915
Dräger PAS F3000P	33 59 916
Dräger PAS F5000	33 59 923
Dräger PAS F5000P	33 59 924

*Units equipped with the Quick Release Coupling. Lung Demand Valve to be ordered separately.

Notes

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PAS® AirPack 1
Airline breathing air supply system

Instructions for Use

Dräger

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 recommends 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.

2 Description

2.1 Product overview

The Dräger PAS AirPack 1 is a compact air supply system that uses breathing air inputs to provide a medium-pressure output (independent air supply) for one or two breathing apparatus wearers.

There are three PAS AirPack 1 versions available:
- A two-wheeled trolley version with an integral hose reel (Fig 1).
- A two-wheeled trolley version without a hose reel.
- A carrying-frame version without a hose reel (Fig 2).

Breathing air inputs are from high and/or medium-pressure sources. The high-pressure input is from one or two breathing air cylinders – the equipment has storage capacity for two 4.7 to 12 litre cylinders. The medium-pressure input is a regulated external supply from a factory airline or compressor.

Referring to Fig 1, the features and components of the PAS AirPack 1 pneumatic system are:
- The high-pressure input connectors (7) are standard cylinder-type threaded connectors.
- The medium-pressure input connector (9) is a male quick connector which has an internal non-return valve.
- There is a medium-pressure output connector on the hose reel (11) if fitted, and on the body of the pneumatic assembly (4). Each is a female quick connector, which has a valve that self-seals when disconnected.
- A high-pressure gauge (1) indicates cylinder pressure.
- A medium-pressure gauge (2) indicates output pressure.
- A high-pressure whistle (10) sounds to indicate low cylinder pressure.
- A medium-pressure whistle (3) sounds to indicate low output pressure. If the PAS AirPack 1 is using an external medium-pressure supply, the whistle indicates that the external supply pressure is low.
- An internal pressure reducer converts the high-pressure input to a medium-pressure output.
- A relief valve (5) in the medium-pressure system and bleed valves (8) on the high-pressure connectors release air from the system when operated.
- If fitted, the hose reel has 50 m of hose on a rotating drum. The drum has an inertia brake that prevents overrun of the drum as the hose is pulled out.

The PAS AirPack 1 pneumatic system allows the user to remove depleted cylinders and replace them with fully charged cylinders when required. Repeatedly replacing alternate depleted cylinders can provide an uninterrupted air supply to the attached breathing apparatus wearers. Internal non-return valves (Fig 1, Item 6) ensure that air from the other cylinder can not escape when a depleted cylinder is removed.

2.2 Intended use

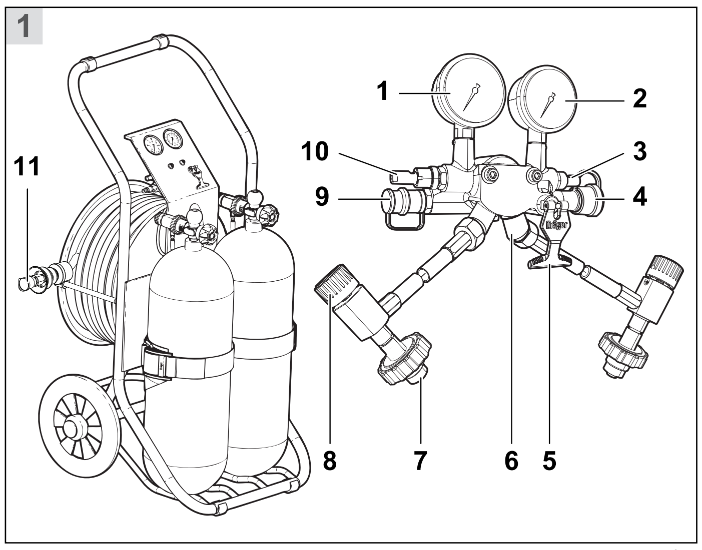
The PAS AirPack 1 is used with breathing air cylinders and an external breathing air supply (factory airline or compressor) to provide a medium-pressure output. When used with approved airline equipment, it supplies breathing air to one or two breathing apparatus wearers.

It is intended to be used with only the air cylinders connected (self-contained use), or with the air cylinders and an external medium-pressure supply connected (external-supply use). When it is used with an external supply the cylinders provide a backup air supply.

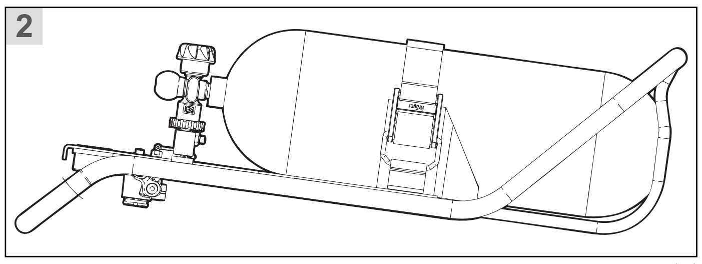
The breathing apparatus, cylinders and other accessories used with this product must be assembled in an approved configuration. See Section 10 for the compatible airline equipment and configurations. Contact Dräger for further information.

2.3 Approvals

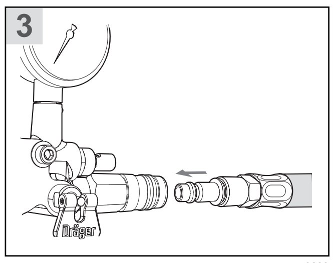
The European standards, guidelines, and directives according to which this product is approved are specified in the declaration of conformity (see declaration of conformity or www.draeger.com/product-certificates).



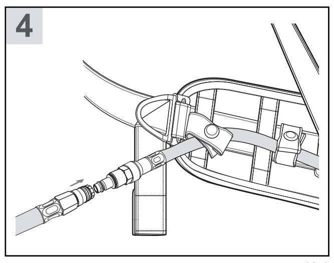
3754



3753



3228



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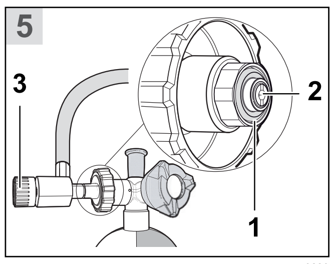
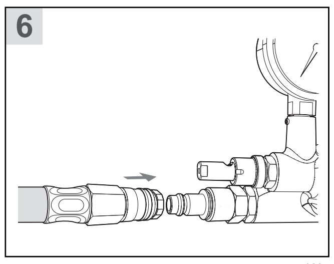


3226



3227

2.4 Use in potentially explosive atmospheres

- The PAS AirPack Series is type tested as suitable for use in potentially explosive atmospheres. The combinations are suitable for use in hazardous areas of Zone 1 and 2 for explosion group IIA and IIB and for Zone 21 and 22.

2.4.1 Special conditions for safe use

The Airline Systems shall not be used in the vicinity of processes where high charges are generated if explosive atmospheres are present (for example, where rapid filling processes are carried out – big bag filling – or many actions of fast limit surface separation are done). In such cases, hazardously high charges of the Airline Systems may occur due to electrostatic induction.

The breathing apparatus and the compressed air cylinders which are used in combination with the Airline Systems each have to meet the applicable requirements of the equipment categories and explosion groups relevant to the respective Airline System.

The Airline Systems have to be moved manually inside explosive atmospheres by the user (pushing or pulling). It is mandatory to use floors in Zone 1 and Zone 21 that are able to discharge electricity where dusts of minimum ignition energies < 10 mJ are present.

If air supply hoses are used with a total length > 50 m, then the couplings which are connected to the hoses in a conductive manner have to be provided with an additional earth contact (after a hose length of 50 m) and integrated into the operating eqipotential bonding.

- Do not charge the cylinder in a potentially explosive atmosphere.

2.5 Explanation of marking and symbols

Refer to the relevant authority for explanation of approval body symbols and markings. Examples of other marking on the product:

BRBA-1359	–	Dräger serial number
08/09	–	Month and year of manufacture
3353261	–	Dräger part number
HP	–	High pressure
MP	–	Medium pressure
	–	Medium-pressure input
	–	Medium-pressure output
	–	Relief valve

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 cylinder and 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 air supply meets the air quality requirements, and complies with the airline pressure, flow and hose requirements (see Section 8 and Section 10), and has been issued with a permit for use if necessary.

Position the PAS AirPack 1 in a safe and uncontaminated area where it cannot be damaged.

Dräger recommend that the user carries out a risk assessment to establish local procedures to be followed in the event of failure of the air supply.

Do not attempt to lift or carry the PAS AirPack 1 carrying frame version on your own. Observe the relevant manual handling and safety procedures when moving the carrying frame. The weight without cylinders is approximately 11.5 kg.

CAUTION

Impact damage to the pneumatic assembly may prevent valve connection or cause an air leak. Handle the equipment with care.

When remote wearers are connected to the PAS AirPack 1, a controller must be appointed to monitor the gauges and whistles of the product throughout the operation. The controller must maintain the air supply to the wearers and must ensure that any precautionary or emergency signals are conveyed to the remote wearers in line with local procedures and these Instructions for Use.

3.1 Preparation for use

1. Carry out a visual inspection (see Section 3.4.1).
2. Fit the air cylinder or cylinders (see Section 3.4.2).
3. Carry out a full functional test (see Section 3.4.5).

WARNING

Incorrect airline equipment configurations may result in insufficient air flow to breathing apparatus wearers or increase the possibility of air supply failure. See Section 10 for the compatible airline equipment and configurations.

Prepare the breathing apparatus for use (see the Instructions for Use supplied with the breathing apparatus). Observe the safety information and carry out all preparation and functional testing tasks before use.

Do not use the PAS AirPack 1 to supply air to more than two breathing apparatus wearers at any time. If a controller is appointed, and is required to wear breathing apparatus and to connect to the equipment then only one other user is permitted.

4. Connect the airline equipment (extension hoses, Y-piece, etc.) as follows:
   - On hose reel versions, pull out the hose as required and connect the airline equipment to the output connector on the hose reel (Fig 1, Item 11). Use the output connector on the pneumatic assembly (Fig 1, Item 4) for connecting the controller if required.
   - On versions without a hose reel, connect the airline equipment to the output connector on the pneumatic assembly (Fig 3).
5. Depending on the required use, do one of the following:
   - Self-contained use – Fully open **one** cylinder valve.
   - External-supply use – Connect the external supply (see Section 3.4.4). Ensure that both cylinder valves are fully closed.
6. Put on the breathing apparatus and connect to the airline equipment (Fig 4 shows a typical breathing apparatus connector).

3.2 During use

WARNING

An appointed controller or the breathing apparatus wearers must monitor the PAS AirPack 1 gauges and whistles during use. Procedures to warn and evacuate remote users must be in place.

The effective working duration of the equipment is dependent on the initial air supply available and the breathing rate of the wearers. Do not commence any operation using a cylinder that is less than 80 per cent full.

At very high work rates the pressure in the face mask of a breathing apparatus wearer may become negative at peak inhalation flow.

- Breathe normally and proceed to the work area taking care with any airline equipment.
- On receipt of an evacuation signal, withdraw immediately to a safe area (see local instructions for full evacuation procedures).
- When the task is complete, withdraw to a safe area before removing the breathing apparatus.
- The high-pressure and medium-pressure whistles indicate that there is low pressure in the associated system. If a warning whistle sounds, carry out the necessary actions depending on the configuration of the PAS AirPack 1 (see Section 3.2.1 to 3.2.3).

3.2.1 Medium-pressure whistle sounds during external-supply use

Fully open **one** cylinder valve, and disconnect the external supply from the PAS AirPack 1. Continue the task as a self-contained use task.

3.2.2 Medium-pressure whistle sounds during self-contained use

Breathing apparatus wearers must proceed in line with breathing apparatus Instructions for Use and local procedures.

3.2.3 High-pressure whistle sounds during self-contained use

- If there is a second/offline fully-charged cylinder connected to the PAS AirPack 1, proceed as follows:
  a. Fully open the valve of the second/offline cylinder.

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b. Close the valve of the empty cylinder and then open its bleed valve.
c. If a replacement cylinder is available, immediately remove the empty cylinder (see Section 3.4.3) and fit a replacement (fully charged) cylinder (see Section 3.4.2).

- If the second/offline cylinder is empty, or there is no second/offline cylinder connected: breathing apparatus wearers must proceed in line with breathing apparatus Instructions for Use and local procedures.

3.3 After use

WARNING

Do not remove the breathing apparatus until in a safe breathing environment.

1. Once in a safe area, remove all breathing equipment.
2. Disconnect the external supply from the PAS AirPack 1 and fully close all cylinder valves.
3. Pull the handle of the relief valve (Fig 1, Item 5) to vent all air from the system.
4. Disconnect any airline equipment from the PAS AirPack 1 and fit all protection caps.
5. Carefully rewind the hose reel if necessary. Clean the hose (see Section 5.3) during rewinding.
6. Disconnect and remove the air cylinders if necessary (see Section 3.4.3).
7. Carry out the after use maintenance tasks in the maintenance table (see Section 5.1).

3.4 Common user tasks

3.4.1 Visual inspection

Check that the PAS AirPack 1 is clean and undamaged, paying particular attention to pneumatic components, hoses and connectors. Typical signs of damage that may affect the operation of the PAS AirPack 1 include impact damage, abrasion, cutting, corrosion and discolouration. Report damage to service personnel or Dräger and do not use the PAS AirPack 1 until faults are rectified.

3.4.2 Fitting air cylinders

Only fit fully charged cylinders that are approved for use, fully serviceable and in date. Use 4.7 to 12 litre, 200 bar or 300 bar, steel or composite, breathing air cylinders with compatible connectors (see Section 8). Cylinders must be matched for pressure – do not mix 200 bar and 300 bar cylinders.

1. Position the PAS AirPack 1 as follows:
   - Place trolley versions in the upright position (Fig 1).
   - Place the carrying frame version in the horizontal position (Fig 2).
2. Check the outlet port of the air cylinder and ensure that the O-ring (Fig 5, Item 1) and the sintered filter (Fig 5, Item 2) are clean and undamaged.
3. Insert the cylinder through the cylinder strap, and locate the rounded end of the cylinder on to the bars on the base of the frame.
4. Align the input connector with the cylinder valve ensuring a smooth curve of the high-pressure hose. Tighten the hand wheel hand tight. Do not use tools or over tighten.
5. Take up the slack in the cylinder strap. Pull the strap over the cylinder to operate the cam lock and secure using the hook-and-loop fastening.
6. Close the cylinder bleed valve (Fig 5, Item 3) (turn it fully clockwise).

3.4.3 Removing air cylinders

WARNING

High-pressure air release may cause injury to the user or other personnel near the breathing apparatus. Close the cylinder valve and fully vent the system before attempting to disconnect an air cylinder.

1. Position the PAS AirPack 1 as follows.
   - Place trolley versions in the upright position (Fig 1).
   - Place the carrying frame version in the horizontal position (Fig 2).
2. Close the cylinder valve and then open the bleed valve.
3. Disconnect the high-pressure input connector from the cylinder valve.
4. Pull the cylinder strap to release the cam lock and then remove the cylinder.

3.4.4 Connecting to an external supply

CAUTION

The cylinder valves must remain fully closed during external-supply use. If cylinder valves are open, air from the cylinders will be used.

A compatible external air supply is a regulated medium-pressure input of breathing air (see Section 8 and Section 10).

1. Select a suitable air supply and adaptor hose.
2. Check that the supply outlet, adaptor hose, and input connector are clean and undamaged.
3. Connect the external supply to the medium-pressure input connector of the PAS AirPack 1 (Fig 6).
4. Check that the pressure indicated on the medium-pressure gauge (Fig 1, Item 2) is 6 bar to 10 bar. If necessary, adjust the pressure-regulating device of the external supply (the nominal setting is 8 bar). (If the pressure is below 8 bar, a low whistle or hiss may be heard from the high-pressure whistle during use. This is normal operation for the unit, and does not affect the functionality of the product.)

3.4.5 Functional testing

WARNING

If the breathing equipment 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 equipment until the fault condition is rectified.

1. Ensure that the cylinder valves and bleed valves are fully closed.
2. Fully open only **one** of the cylinder valves.
3. Check the pressures indicated on the pressure gauges:
   - The high-pressure gauge must indicate at least 80% of the cylinder maximum pressure.
   - The medium-pressure gauge must indicate 6 bar to 10 bar.
4. Fully open the bleed valve of the second/offline cylinder. Ensure that there is no audible leak and then re-close the bleed valve.
5. Fully close the online cylinder valve.
6. Wait one minute and then observe the high-pressure gauge and reopen the cylinder valve. The gauge must 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.
7. Fully close the online cylinder valve again.
8. Pull the handle of the relief valve (Fig 1, Item 5) to vent the air slowly and observe the high-pressure gauge. The high-pressure whistle should begin to sound within the range 60 bar to 50 bar.
9. Release the handle of the relief valve immediately when the whistle commences. Allow the whistle to fully vent the high-pressure side of the reducer.
10. Again pull the handle of the relief valve to vent the air slowly and observe the medium-pressure gauge. The medium-pressure whistle should begin to sound within the range 5 bar to 4 bar.
11. Repeat Steps 2 to 7 for the opposite cylinder.
12. Pull the handle of the relief valve to fully vent the system.

4 Troubleshooting

Disconnect or replace any associated equipment and retest before referring to the troubleshooting table.

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
High-pressure or medium-pressure air leak	Loose/damaged connector or faulty seal	Reconnect or tighten connectors and retest.
	Pressure reducer or hose leak	Service task
High or low medium-pressure	Pressure reducer out of specification	Service task
Poor sounding whistle	Dirt	Clean and retest
Whistle not functioning correctly	Defective activation mechanism	Service task

5 Maintenance

5.1 Maintenance table

Service and test the PAS AirPack 1, including out-of-use equipment, in accordance with this table. Record all servicing and testing details in the equipment log book. See also the maintenance information for any associated breathing equipment.

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

Component/ System	Task	After use	Every month	Every year	Every six years
Complete equipment	Visual inspection (see Note 1 and Section 3.4.1)	❍	❍		
	Functional test (see Section 3.4.5)	❍	❍		
High-pressure input connectors	Renew the O-ring and sintered filter (see Note 2)			❍	
Pressure reducer	Overhaul. Contact Dräger for the Repair Exchange (REX) service				❍
Cylinder	Charge to correct pressure (see Section 5.2)	❍			
	Check the initial test date stamped on the cylinder		❍		
	Cylinder pressure test and recertification	Carry out in line with national regulations			
Cylinder valve	Basic overhaul	During cylinder pressure test or on condition			

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.

5.2 Air cylinder charging

WARNING

Air quality for compressed-air cylinders must conform to requirements of EN 12021.

- Refer also to the instructions supplied with the cylinder and the charging unit for recharging the cylinder.
- Only charge compressed-air cylinders which:
  - Conform to national standards.
  - Feature the original manufacturer's test date and test mark.
  - Have not exceeded the test date indicated on the cylinder by the last testing station.
  - Are not damaged.
- To prevent ingress of moisture into the cylinder, ensure that the cylinder valve remains closed until connected to the charging unit.
- Recharge to the rated working pressure of the cylinder. Dräger recommend a charge rate of 27 bar/minute (rapid charging will increase the temperature resulting in an incomplete charge).
- To prevent overcharging of the cylinder, Dräger recommend using a pressure-limiting device on the charging compressor.

5.3 Cleaning and disinfecting

CAUTION

Cleaning agents and disinfectants listed below are not manufactured by Dräger and have been reviewed only for compatibility when used to clean or disinfect the subject Dräger product(s). Read and comply with all safety precautions provided by the manufacturers of such agents and disinfectants.

Do not immerse the PAS AirPack 1 in water or cleaning solutions and do not place the PAS AirPack 1 in a heated drying facility.

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

Refer also 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 PAS Airpack 1 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, or in air.
5. Contact service personnel or Dräger if disassembly of pneumatic or electronic components is required.

6 Storage

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. Store trolley versions in the upright position (Fig 1); store carrying frame versions in the horizontal position (Fig 2).

7 Disposal

When required, dispose of the PAS AirPack 1 in accordance with national or local regulations for waste disposal.

8 Technical data

Operating conditions
- Temperature: -30 to +60 °C.
- Usage area: suitable for indoor and outdoor use.

High pressure
- Input connector: 200 bar or 300 bar, standard G5/8" connector as per EN 144-2.
- Input: 4.7 to 12 litre, 200 bar or 300 bar, breathing air cylinder.

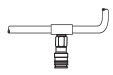
Medium pressure
- Input and output connectors: Dräger quick connectors (compatible with CEJN 344 and Rectus 95KS series).
- Input and output: 6 bar to 10 bar (8 bar nominal) breathing air at a flow rate of >600 litres/min. **Important note:** do not exceed 10 bar.

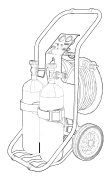
Whistle operation
- High-pressure whistle commences in the range: 60 bar to 50 bar.
- Medium-pressure whistle commences in the range: 5 bar to 4 bar.
- Whistles cease in the range: 1.75 bar to 0 bar.
- Whistle volume: >90 dBA.

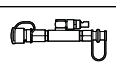
9 Order list

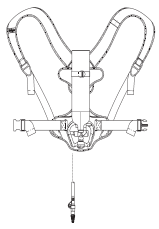
Description	Quantity	Order code
Dräger Quad Pack kit (for use with four cylinders)	1	3353471

10 Compatible airline equipment and configurations

Breathing air supply equipment	
	External medium-pressure supply (see Section 8 for specification and connector type)
	High-pressure supply (see Section 8 for specification and connector type)

Dräger supply, control and monitoring equipment	
	Dräger PAS AirPack 1 trolley
	Dräger PAS AirPack 1 trolley without hose reel
	Dräger PAS AirPack 1 carrying frame without hose reel

Airline equipment (approved to the relevant EN standard)	
	Extension hose (lengths ranging from 3 m to 50 m available from Dräger)
	Y-piece
	Hose reel (Dräger hose reel has 50 m of hose)
	Airline filter unit
	In-line medium-pressure whistle

Breathing apparatus	
	Airline set (EN 14593-1)
	Escape/airline set with automatic switch-over valve (ASV) and airline connector (EN 402/EN 14593-1)
	Working set with automatic switch-over valve (ASV) and airline connector (EN 137/EN 14593-1)

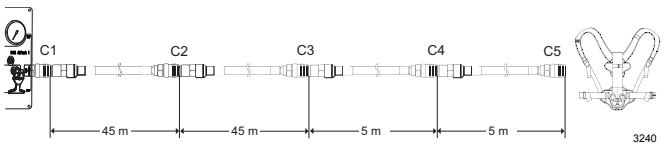
10.1 Airline equipment configurations

WARNING

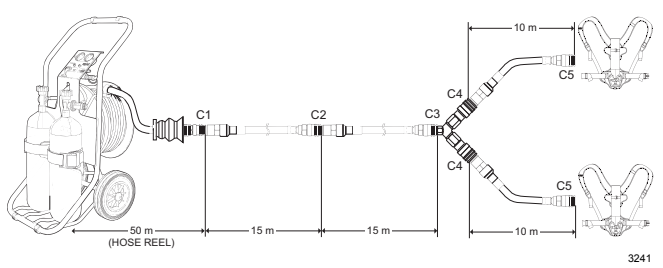
Airline equipment must allow the input pressure and flow specified in the breathing apparatus instructions to be met. Incorrect configurations may result in insufficient air flow to breathing apparatus wearers or increase the possibility of air supply failure.

10.1.1 Dräger airline equipment and breathing apparatus

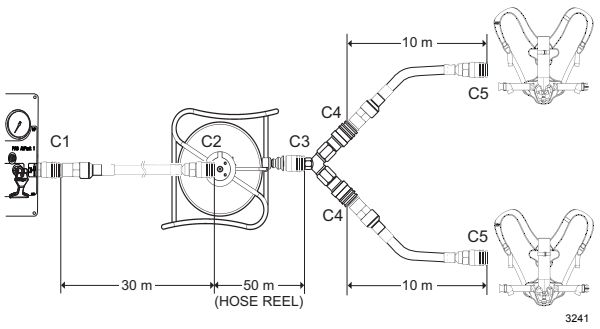
No more than five connections are permitted per line on the output side of the PAS AirPack 1 (a Y-piece is treated as two connections). Additionally, the maximum combined length of the extension hoses is 100 m. The figures below (not to scale) show some examples of the **maximum** number of connections (C1 to C5) and **maximum** hose lengths that are permissible in an output configuration using Dräger equipment.



One breathing apparatus wearer



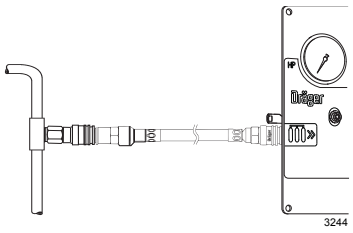
Two breathing apparatus wearers (with integral hose reel)



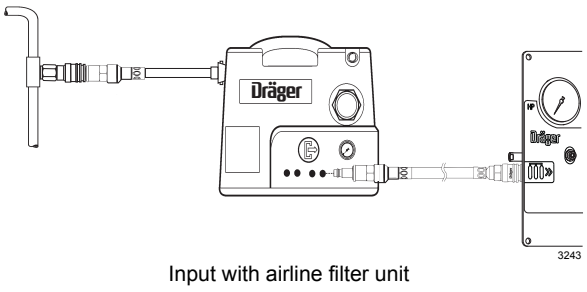
Two breathing apparatus wearers (with stand-alone hose reel)

10.1.2 Medium-pressure Input

The medium-pressure input is from a factory airline or compressor using a suitable extension hose, and filter unit if required. Any airline equipment that is used in the input line must allow the medium-pressure input requirement to be met (see Section 8).



Input with extension hose



Input with airline filter unit

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 recommends 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.

2 Description

2.1 Product overview

The Dräger PAS® AirPack Pressure Reducer is a pneumatic valve and gauge set that uses a high-pressure breathing air input to provide a medium-pressure output (independent air supply) for one or two breathing apparatus wearers. The input is from a breathing air cylinder, or from a regulated external supply such as a factory airline or compressor.

Referring to Fig 1, the features and components of the Pressure Reducer are:
- The high-pressure input connector (5) is a standard cylinder-type threaded connector.
- The output connector (3) is a female quick connector, which has a valve that self-seals when disconnected.
- A high-pressure gauge (1) indicates input pressure.
- A medium-pressure gauge (2) indicates output pressure.
- A whistle (6) sounds to indicate low input pressure from the cylinder or external supply.
- An internal pressure reducer converts the high-pressure input to a medium-pressure output.
- A relief valve (4) in the medium-pressure system releases air from the Pressure Reducer when operated.

2.2 Intended use

The Pressure Reducer is used with a high-pressure breathing air supply to provide a medium-pressure output. When used with approved airline equipment, it supplies breathing air to one or two breathing apparatus wearers.

The breathing apparatus, cylinder and other accessories used with this product must be assembled in an approved configuration. See Section 9 for the compatible airline equipment and configurations. Contact Dräger for further information.

2.3 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).

2.4 Use in potentially explosive atmospheres

- The PAS AirPack Series is type tested as suitable for use in potentially explosive atmospheres. The combinations are suitable for use in hazardous areas of Zone 1 and 2 for explosion group IIA and IIB and for Zone 21 and 22.

2.4.1 Special conditions for safe use

The Airline Systems shall not be used in the vicinity of processes where high charges are generated if explosive atmospheres are present (for example, where rapid filling processes are carried out – big bag filling – or many actions of fast limit surface separation are done). In such cases, hazardously high charges of the Airline Systems may occur due to electrostatic induction.

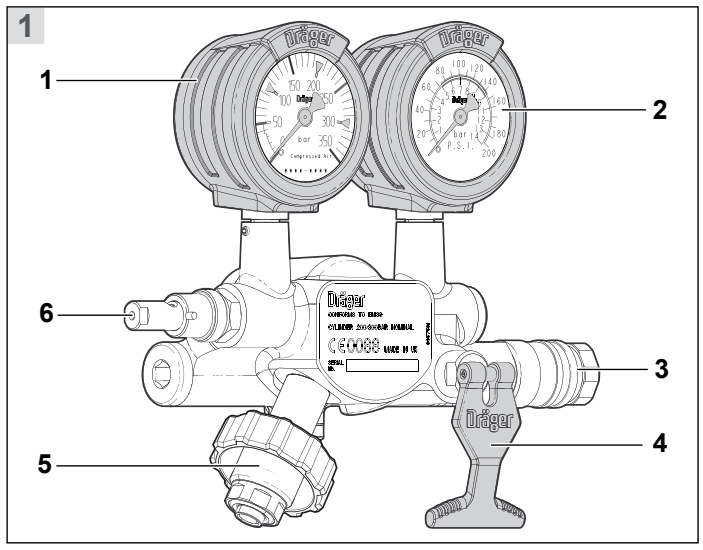
The breathing apparatus and the compressed air cylinders which are used in combination with the Airline Systems each have to meet the applicable requirements of the equipment categories and explosion groups relevant to the respective Airline System.

The Airline Systems have to be moved manually inside explosive atmospheres by the user (pushing or pulling). It is mandatory to use floors in Zone 1 and Zone 21 that are able to discharge electricity where dusts of minimum ignition energies < 10 mJ are present.

If air supply hoses are used with a total length > 50 m, then the couplings which are connected to the hoses in a conductive manner have to be provided with an additional earth contact (after a hose length of 50 m) and integrated into the operating eqipotential bonding.

- Do not charge the cylinder in a potentially explosive atmosphere.

1



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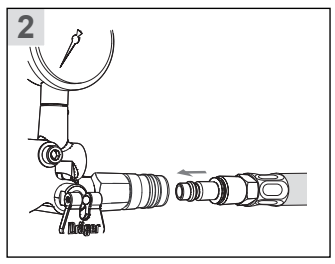

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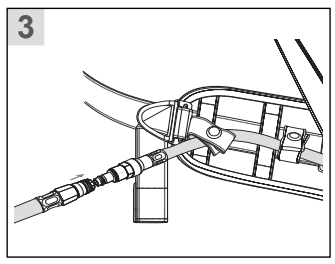

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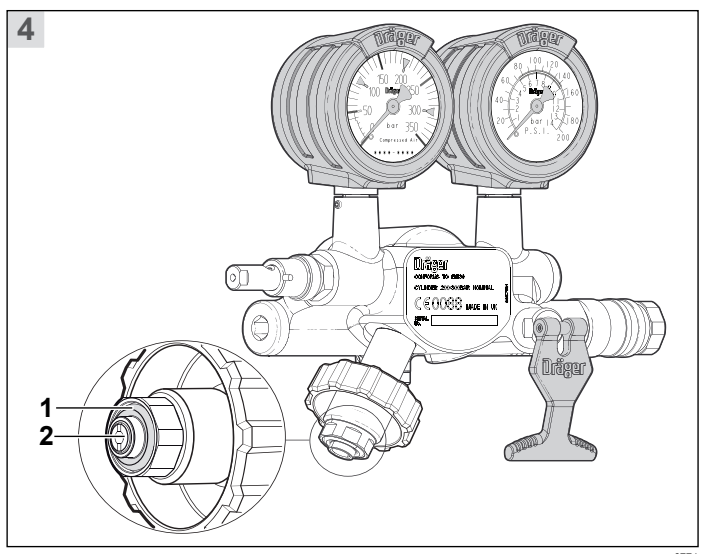

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2.5 Explanation of marking and symbols

Refer to the relevant authority for explanation of approval body symbols and markings. Examples of other marking on the product:

BRBA-1359	–	Dräger serial number
08/09	–	Month and year of manufacture
3353261	–	Dräger part number

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 cylinder or external supply 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 air supply meets the air quality requirements, and complies with the airline pressure, flow and hose requirements (see Section 8 and Section 9), and has been issued with a permit for use if necessary.

Position the Pressure Reducer in a safe and uncontaminated area, and ensure that it is securely held or placed in a position where it cannot be damaged.

Dräger recommend that the user carries out a risk assessment to establish local procedures to be followed in the event of failure of the air supply.

CAUTION

Impact damage to the Pressure Reducer may prevent cylinder valve connection or cause an air leak. Handle the equipment with care.

When remote wearers are connected to the Pressure Reducer, a controller must be appointed to monitor the gauges and whistle of the product throughout the operation. The controller must maintain the air supply to the wearers and must ensure that any precautionary or emergency signals are conveyed to the remote wearers in line with local procedures and these Instructions for Use.

3.1 Preparation for use

1. Carry out a visual inspection (see Section 3.4.1).
2. Connect an air cylinder or a regulated external supply (see Section 3.4.2).
3. Carry out a full functional test (see Section 3.4.4).

WARNING

Incorrect airline equipment configurations may result in insufficient air flow to breathing apparatus wearers or increase the possibility of air supply failure. See Section 9 for the compatible airline equipment and configurations.

Prepare the breathing apparatus for use (see the Instructions for Use supplied with the breathing apparatus). Observe the safety information and carry out all preparation and functional testing tasks before use.

Do not use the Pressure Reducer to supply air to more than two breathing apparatus wearers at any time. If a controller is appointed, and is required to wear breathing apparatus and to connect to the equipment then only one other user is permitted.

4. Connect the airline equipment (extension hoses, Y-piece, etc.) to the medium-pressure output connector (Fig 2).
5. Fully open the cylinder valve.
6. Put on the breathing apparatus and connect to the airline equipment (Fig 3 shows a typical breathing apparatus connector).

3.2 During use

WARNING

An appointed controller or the breathing apparatus wearers must monitor the Pressure Reducer gauges and whistle during use. Procedures to warn and evacuate remote users must be in place.

The effective working duration of the equipment is dependent on the initial air supply available and the breathing rate of the wearers. Do not commence any operation using a cylinder that is less than 80 per cent full.

At very high work rates the pressure in the face mask of a breathing apparatus wearer may become negative at peak inhalation flow.

- Breathe normally and proceed to the work area taking care with any airline equipment.
- On receipt of an evacuation signal, withdraw immediately to a safe area (see local instructions for full evacuation procedures).
- When the task is complete, withdraw to a safe area before removing the breathing apparatus.
- The whistle indicates that there is low pressure in the air cylinder or from the external supply. If the whistle sounds, breathing apparatus wearers must proceed in line with breathing apparatus Instructions for Use and local procedures.

3.3 After use

WARNING

Do not remove the breathing apparatus until in a safe breathing environment.

1. Once in a safe area, remove all breathing equipment.
2. Close the cylinder valve, or the shut-off valve of the external supply.
3. Pull the handle of the relief valve (Fig 1, Item 4) to vent all air from the system.
4. Disconnect any airline equipment from the Pressure Reducer and fit all protection caps.
5. Disconnect the air cylinder or external supply if necessary (see Section 3.4.3).
6. Carry out the after use maintenance tasks in the maintenance table (see Section 5.1).

3.4 Common user tasks

3.4.1 Visual inspection

Check that the Pressure Reducer is clean and undamaged, paying particular attention to pneumatic components and connectors. Typical signs of damage that may affect the operation of the Pressure Reducer include impact damage, abrasion, cutting, corrosion and discolouration. Report damage to service personnel or Dräger and do not use the Pressure Reducer until faults are rectified.

3.4.2 Connecting an air cylinder or external supply

Air cylinder: Only connect fully charged cylinders that are approved for use, fully serviceable and in date. Use 200 bar or 300 bar, steel or composite, breathing air cylinders.

External supply: Only connect a regulated 200 bar to 300 bar breathing air supply from a factory airline or compressor. If the external supply has a pressure-regulating device, set the pressure in the range 200 bar to 300 bar.

1. Ensure that air cylinder or external supply has a compatible connector (see Section 8).
2. Ensure that the equipment is securely held.
3. Check the outlet port of the air cylinder or external supply, and ensure that the O-ring (Fig 4, Item 1) and the sintered filter (Fig 4, Item 2) in the input connector are clean and undamaged.
4. Align the cylinder or external supply with the input connector of the Pressure Reducer. Tighten the hand wheel hand tight. Do not use tools or over tighten.

3.4.3 Disconnecting an air cylinder or external supply

WARNING

High-pressure air release may cause injury to the user or other personnel near the breathing apparatus. Close the cylinder valve or shut-off valve and fully vent the system before attempting to disconnect an air supply.

1. Close the cylinder valve, or the shut-off valve of the external supply.
2. Pull the handle of the relief valve (Fig 1, Item 4) to vent all air from the system.
3. Disconnect the high-pressure input connector from the air supply.

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3.4.4 Functional testing

WARNING

If the breathing equipment 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 equipment until the fault condition is rectified.

1. Fully open the cylinder valve, or the shut-off valve of the external supply.
2. Check the pressures indicated on the pressure gauges:
   - Air cylinder use: The high-pressure gauge must indicate at least 80% of the cylinder maximum pressure.
   - External supply use: The high-pressure gauge must indicate 200 bar to 300 bar.
   - The medium-pressure gauge must indicate 6 bar to 10 bar.
3. Fully close the cylinder valve, or the shut-off valve of the external supply.
4. Wait one minute and then observe the high-pressure gauge and reopen the valve. The gauge must 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.
5. Fully close the valve again.
6. Pull the handle of the relief valve (Fig 1, Item 4) to vent the air very slowly and observe the high-pressure gauge. The whistle must commence in the range 60 bar to 50 bar.
7. Continue to pull the handle of the relief valve to fully vent the system.

4 Troubleshooting

Disconnect or replace any associated equipment and retest before referring to the troubleshooting table.

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
High-pressure or medium-pressure air leak	Loose/damaged connector or faulty seal	Reconnect or tighten connectors and retest.
	Pressure reducer leak	Service task
High or low medium-pressure	Pressure reducer out of specification	Service task
Poor sounding whistle	Dirt	Clean and retest
Whistle not functioning correctly	Defective activation mechanism	Service task

5 Maintenance

5.1 Maintenance table

Service and test the Pressure Reducer, including out-of-use equipment, in accordance with the table below. Record all maintenance in the equipment log book. See also the maintenance information for any associated breathing equipment.

Additional inspection and testing may be required in the country of use to ensure compliance with national regulations governing the use, maintenance, examination and testing of the compressed-air equipment as described in this document.

Component/ System	Task	After use	Every month	Every year	Every six years
Complete equipment	Visual inspection (see Note 1 and Section 3.4.1)	❍	❍		
	Functional test (see Section 3.4.4)	❍	❍		
High-pressure input connector	Renew the O-ring and sintered filter (see Note 2)			❍	
Pressure reducer	Overhaul – Contact Dräger for the Repair & Exchange (REX) service				❍
Cylinder	Charge to correct pressure (see Section 5.2)	❍			
	Check the initial test date stamped on the cylinder		❍		
	Cylinder pressure test and recertification	Carry out in line with national regulations			
Cylinder valve	Basic overhaul	During cylinder pressure test or on condition			

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.

5.2 Air cylinder charging

WARNING

Air quality for compressed-air cylinders must conform to requirements of EN 12021.

- Refer also to the instructions supplied with the cylinder and the charging unit for recharging the cylinder.
- Only charge compressed-air cylinders which:
  - Conform to national standards.
  - Feature the original manufacturer's test date and test mark.
  - Have not exceeded the test date indicated on the cylinder by the last testing station.
  - Are not damaged.
- To prevent ingress of moisture into the cylinder, ensure that the cylinder valve remains closed until connected to the charging unit.
- Recharge to the rated working pressure of the cylinder. Dräger recommend a charge rate of 27 bar/minute (rapid charging will increase the temperature resulting in an incomplete charge).
- To prevent overcharging of the cylinder, Dräger recommend using a pressure-limiting device on the charging compressor.

5.3 Cleaning and disinfecting

CAUTION

Do not immerse the PAS AirPack Pressure Reducer in water or cleaning solutions and do not place the PAS AirPack Pressure Reducer in a heated drying facility.

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

Refer also to the cleaning and disinfecting requirements for any associated breathing equipment.

- Use only clean lint-free cloths

1. Clean the PAS AirPack Pressure Reducer 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, or in air.
5. Contact service personnel or Dräger if disassembly of pneumatic or electronic components is required.

6 Storage

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.

7 Disposal

When required, dispose of the Pressure Reducer in line with local or national regulations for waste disposal.

8 Technical data

Operating conditions
- Temperature: -30 to +60 °C.
- Usage area: suitable for indoor and outdoor use.

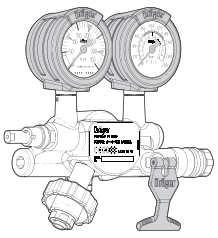
High-pressure input
- Input connector: 200 bar or 300 bar, standard G5/8" connector as per EN 144-2.
- Input: 200 bar or 300 bar breathing air cylinder, or 200 bar to 300 bar regulated external supply.

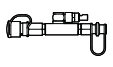
Medium-pressure output
- Output connector: Dräger female quick connector (compatible with CEJN 344 and Rectus 95KS series).
- Output: 6 bar to 10 bar (8 bar nominal) breathing air at a flow rate of >600 litres/min.

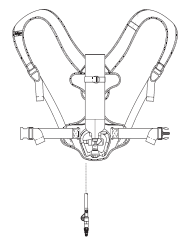
Whistle operation
- Whistle commences in the range: 60 bar to 50 bar.
- Whistles cease in the range: 1.75 bar to 0 bar.
- Whistle volume: >90 dBA.

9 Compatible airline equipment and configurations

Breathing air supply equipment	
	High-pressure supply (see Section 8 for specification and connector type)

Dräger supply, control and monitoring equipment	
	Dräger PAS AirPack Pressure Reducer

Airline equipment (approved to the relevant EN standard)	
	Extension hose (lengths ranging from 3 m to 50 m available from Dräger)
	Y-piece
	Hose reel (Dräger hose reel has 50 m of hose)
	Airline filter unit
	In-line medium-pressure whistle

Breathing apparatus	
	Airline set (EN 14593-1)
	Escape/airline set with automatic switch-over valve (ASV) and airline connector (EN 402/EN 14593-1)
	Working set with automatic switch-over valve (ASV) and airline connector (EN 137/EN 14593-1)

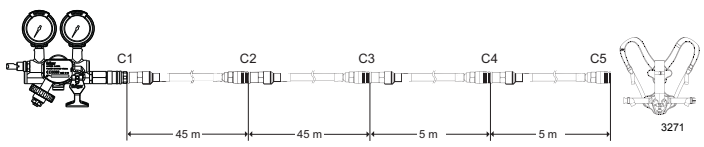
9.1 Airline equipment configurations

WARNING

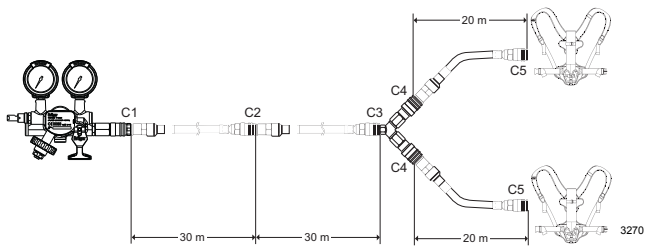
Airline equipment must allow the input pressure and flow specified in the breathing apparatus instructions to be met. Incorrect configurations may result in insufficient air flow to breathing apparatus wearers or increase the possibility of air supply failure.

9.1.1 Dräger airline equipment and breathing apparatus

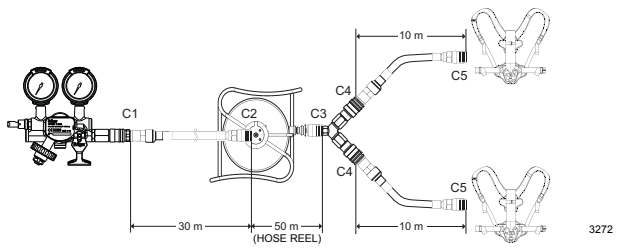
No more than five connections are permitted per line on the output side of the Pressure Reducer (a Y-piece is treated as two connections). Additionally, the maximum combined length of the extension hoses is 100 m. The figures below (not to scale) show some examples of the **maximum** number of connections (C1 to C5) and **maximum** hose lengths that are permissible in an output configuration using Dräger equipment.



One breathing apparatus wearer



Two breathing apparatus wearers



Two breathing apparatus wearers (with stand-alone hose reel)