Dräger Personal Safety System (PSS) 7000

The Dräger PSS 7000 is a self-contained, two staged, open circuit, positive pressure, compressed air breathing apparatus set which conforms to EN136, EN137 & EN144.

Self-contained
Two-stage
Open-circuit
Positive pressure

Compressed
Air
Breathing apparatus

Component parts:

- Back plate assembly.
- Harness and cylinder bracket arrangement.
- Hose lines.
- Reducer.
- Lung Demand Value.
- Facemask.
- Bodyguard 7000.
- Cylinder valve and cylinder of compressed air.

Notes

Dräger PSS 7000 SCBA Set, conforms to EN137 and to the requirements of EC Council Directive 89/686/EEC, BSEN 133.

The equipment is CE Mark Approved and is issued with an EC Type Examination Certificate: CE0359.

Dräger FPS 7000 (facemask) conforms to EN136.

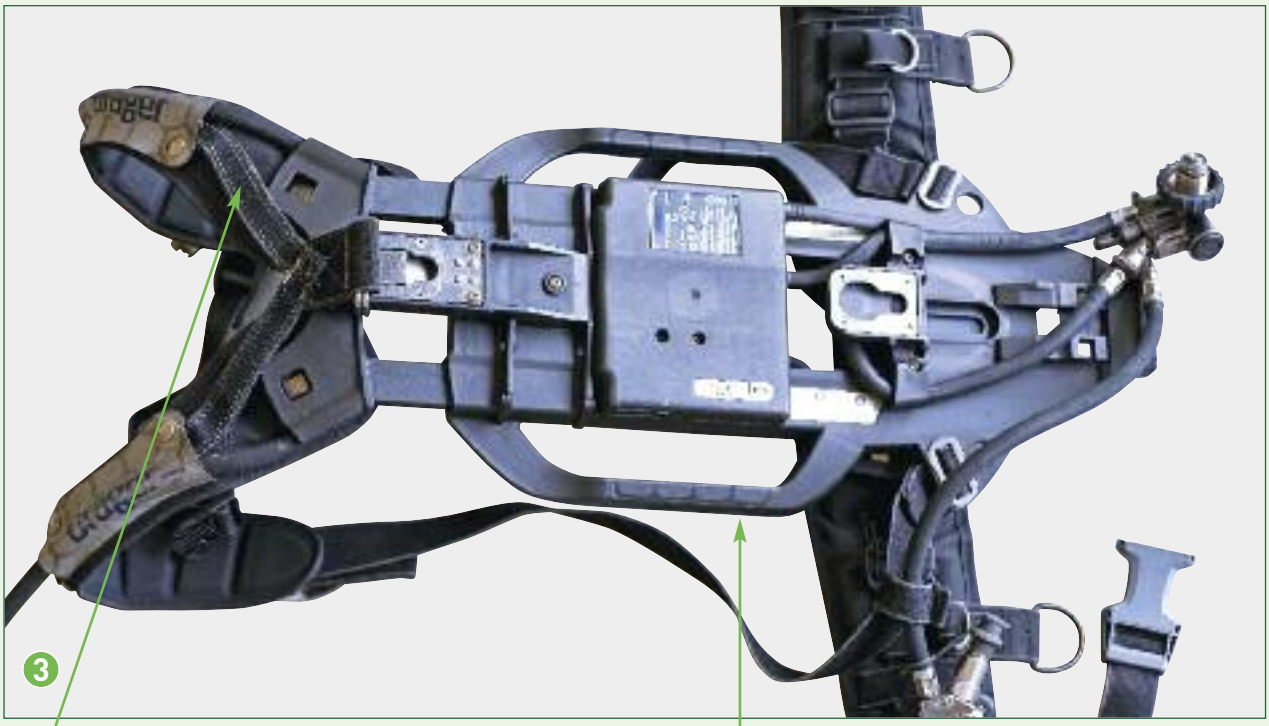
Dräger Compressed Air Cylinder Valves conform to the EN144; CE0589.

Back Plate Assembly

The back plate assembly consists of three elements:

1. The Adjustable Shoulder Yoke - ('S' - Short, 'M' - Medium, 'L' - Long).
2. The Waist Belt Pivot Slide Assembly - improves the weight distribution and manoeuvrability for the wearer.
3. The Back Plate.

- With these three elements, the back plate works on the Bergen principle of transferring 2/3 of wearers weight onto the waist belt.
- Conforms to EN 137: 2006.
- Ergonomically designed.



4. Rubber buffer at the base of the system provides additional impact protection.

- Highly resistant to chemicals.
- Flame retardant.
- The shoulder yoke, back plate and waist belt pivot slide assembly is manufactured from a moulded carbon composite material providing an anti-static, lightweight and durable system.

5. A retractable personal line with a 90kg breaking strain is fitted to the right-hand side of the set.

- It is 6m in length (1.25m then a small knot the 4.75m).
- Side handles, incorporated into the back-plate moulding channels for hose lines enables easy carrying even with a cylinder fitted.
- An anti-entanglement strap is fitted between the cylinder and back plate to eliminate the risk of entanglement by closing the gap between the cylinder and backplate.

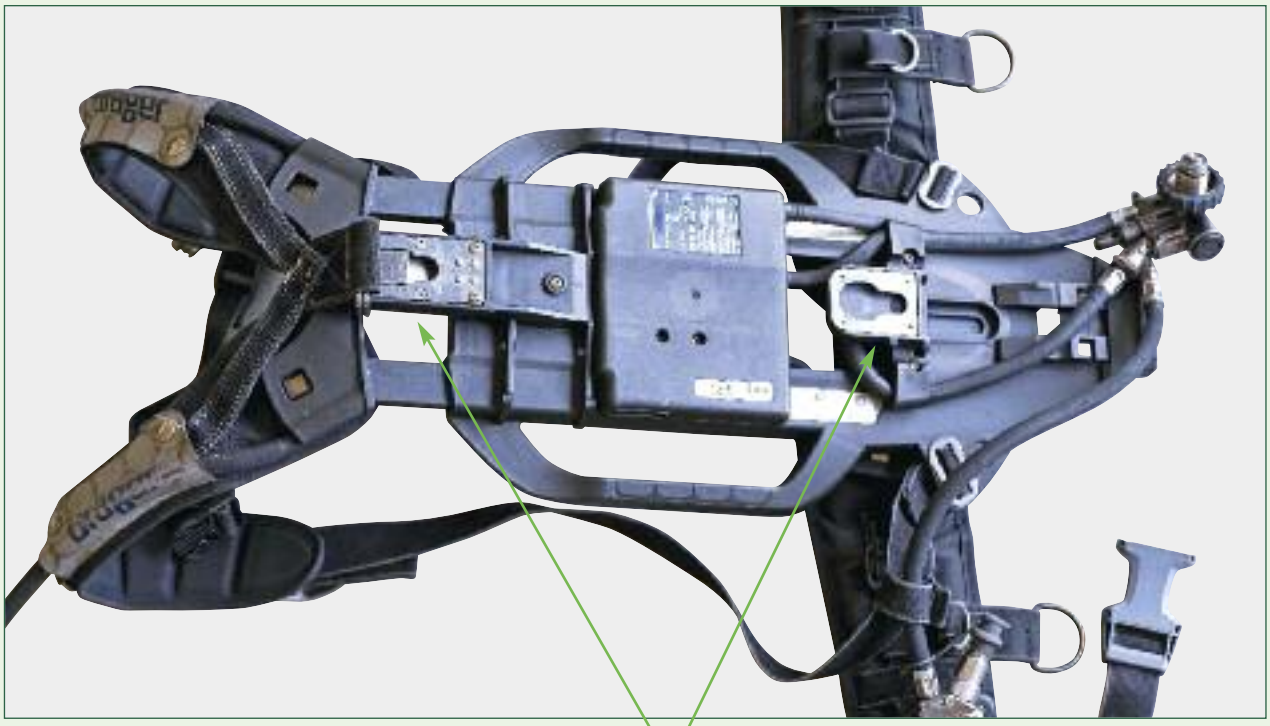
Dual Pressure Sensor

Harness & Cylinder Attachment

6. A pair of adjustable (pull-down) shoulder straps locates into the associated slot in the base of the back plate and is secured using a retention peg.
7. An adjustable chest strap is fitted with a trident buckle.
- Pivoted and sliding waist harness with a pair of adjustable (pull forward) waist belt straps.
- 'S' shaped stainless steel, anti-static, anti-slip buckles.
8. Push-in quick release trident buckle which is moulded with Dräger name facing outwards.

Quick Release Trident Buckle

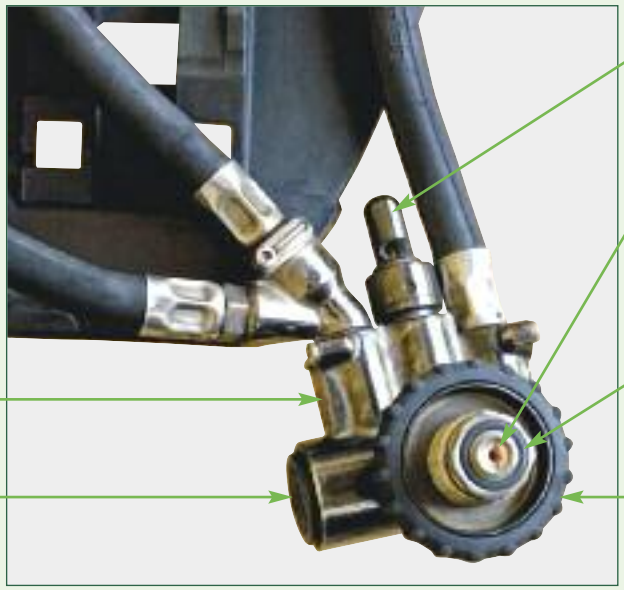
- Inner padding is flame retardant closed cell, fully vulcanised foam. The inner liner is then covered with outer layers of woven polyester covered with neoprene.
- All straps, including adjusting straps, are manufactured from a black material containing 50% Kevlar webbing that meets the flame engulfment test requirements of EN137 and other material: nylon and panotex.
- Hose retaining flaps are made from double-coated neoprene polyester, plus a reflective outer printed with a photo-luminescent pattern and blue 'Dräger' logo.



Cylinder Attachment

First Stage Reducer and Cylinder Connector

The reducer is factory set and sealed and must not be tampered with



- Reducer is made from nickel plated marine brass and has a ten - year service life.
- Designed to reduce the compressed air in the cylinder (200-300bar) down to 6-9 bar and can deliver 1000 l/min.
- At 20 bar it can deliver 550 l/min.
- At 10 bar it can deliver 300 l/min.
- Two outlet ports, one providing dual high and medium pressure air to Bodyguard® 7000, and the other outlet providing medium pressure to LDV.
- Medium pressure port incorporates a pressure relief valve that operates between 11-16 bar and dumps 400 l/min.
- The dual pressure port (medium and high pressure) feeds the warning whistle unit (WWU) which activates at 55 (+/- 5 bar) and sounds at 90dBA.
- At the outlet end of the hose is a female quick release coupling (QRC) that is used to attach the male coupling of the lung demand valve (LDV).
- Dual High Pressure Port - Fitted to this port is the unique dual function hose assembly that incorporates the in-line whistle warning unit, (high pressure activated - medium pressure operated), and a high pressure (HP) contents gauge for the monitoring of the air pressure in the compressed air cylinder.

Cylinder Connector

- Chrome plated marine quality brass.
- Contains a nitrile O-ring.
- Pivots to ease attachment to cylinder.

Flow of Air

Cylinder pressure of 300 bar flows through the anti-debris tube containing a sintered bronze filter and through the cylinder valve at a 90º angle into the pressure reducer which reduces velocity.

- The HP side of the system is protected by a choke screw that restricts the airflow to a maximum of 25 l/min if damage to supply hose occurs.
- HP air enters the reducer, closes and seals the piston of the whistle activation mechanism against the seat. This pressurises the capillary tube in the dual pressure hose and activates the pressure sensor of the Bodyguard®- turning 'On' the unit - passes into the piston bore - past the piston seat and pre-set plunger and into the MP chamber.
- As air is deflected across the plunger it is reduced to 6-9 Bar (passes from a small area to a larger area).
- As the pressure increases in the MP chamber, it forces the piston to move axially against the compression spring until the piston seat contacts the end face of the plunger - sealing off the high pressure air.
- On inhalation, from the LDV, the air is drawn from the medium pressure chamber and as the pressure reduces in the chamber, the compression spring retracts the piston - moving the piston seat from the end face of the plunger. The HP air then again begins to enter the medium pressure chamber - repeating the cycle.
- Consumption of air from the cylinder(s) reduces the available pressure, and at a pre-set pressure the compression spring in the whistle activation mechanism retracts the HP plunger from its sealing seat – releasing air from the medium pressure chamber and into the whistle activation chamber.
- A pressure relief arrangement is incorporated in the pneumatics system at the MP outlet from the reducer. In the unlikely event of an HP leak into the MP side of the system, causing an 'over pressure', the relief valve will open between 11bar - 16bar to vent pressure This safety feature ensures that MP air is maintained to the LDV and subsequently to the wearer.
- When the wearer begins to inhale a negative pressure is created inside the facepiece and lung demand valve. -1 to -25 bar. Due to the negative pressure the ambient air pressure acts against the diaphragm. As the diaphragm deflects it then presses against the main hinged lever of the balanced piston unit resulting in the release of the positive pressure 'Off' mechanism.

- Increasing deflection of the diaphragm, during inhalation, pivots the cam of the main lever against the secondary lever. The secondary lever then pivots and presses against the end cap of the piston - moving the piston axially against the conical spring - lifting the piston cone from its seating and releasing air from the lung demand valve into wearer's face piece.
- A compression spring attached to the front cover of the lung demand valve acts on the diaphragm, then the pivot levers and the conical compression spring, lifting the sealing cone and maintaining a positive pressure (above ambient) inside the face piece.
- When the wearer stops inhaling then begins to exhale, the diaphragm, pivot levers and sealing cone retract.
- This cycle repeats as the wearer begins to inhale.

Hose Lines

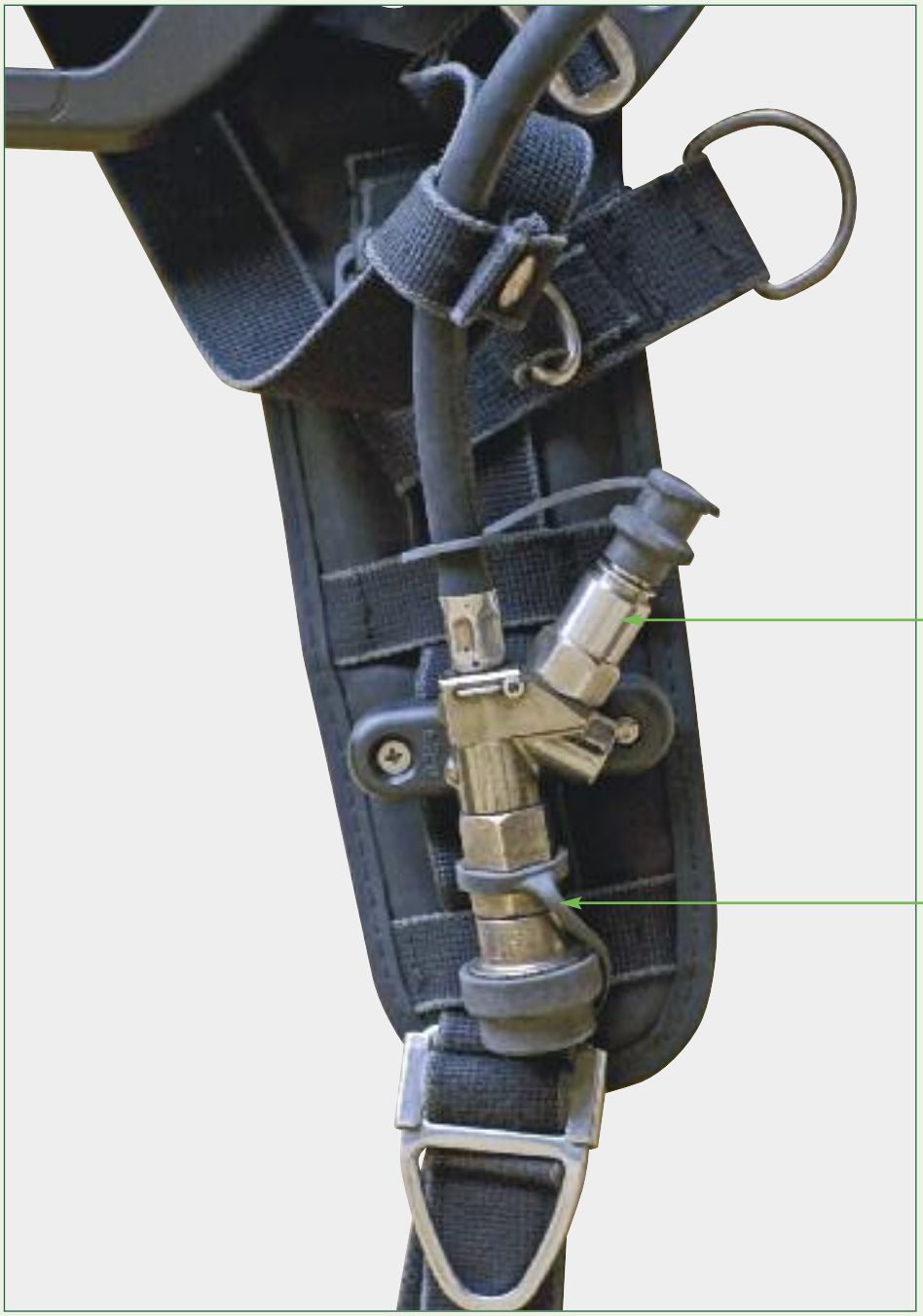
- Non – kinking, manufactured from EPDM (Ethylene-Polpylene-Diene-Monomer) rubber and re-enforced stitching.
- Medium pressure hose supplies 6-9 bar to the LDV and supplementary air attachment. They are flexible, have free head movement, will not collapse and will not restrict or close the air supply when trapped.

- Dual hose 200-300 bar from the reducer to the Bodyguard.
- Inside the outer EPDM rubber hose assembly; that attaches to the Bodyguard®; is a fine bore copper capillary tube that is coil-wound around a multi-strand length of phosphor bronze wire.
- The capillary tube and wire are then brazed to each of the end fittings of the capillary tube assembly.
- High pressure air flows through the bore of the capillary tube to the pressure gauge (or Bodyguard® 7000) via a transducer and not through the rubber hose.
- The LPWW will activate at 55 bar +/- 5 bar and is louder than 90 dBa. This uses 3.8 lpm of air.

Supplementary Air Supply

The PSS7000 is fitted with a secondary hose attachment to allow for further extension of the wearers air.

- Comprising of male and female connectors covered by protective caps.



Lung Demand Valve

- LDV manufactured from glass-filled nylon which provides a high degree of strength and durability.
- Rubber shroud covers the mechanism.
- Mechanism consists of a balanced piston assembly, banjo spindle spring lever and a silicon diaphragm (red button) or rubber (CBRN - green).
- Operates on first breath principle.
- Operating pressures:
  First breath = -1 to -25 m/bar
  Reduced into mask = 1 to 3.9 m/bar
  Activate exhalation valve = 4.2 to 5.7 m/bar
- Has a type A push-in connector to the face piece ('P' connection).
- Able to deliver 500 LPM.
- Red/ Green button = reset (close circuit).
- Black button = (depress for supplementary air supply).

Once connected to the front port of the facemask the LDV can rotate, accommodating changing orientations of the wearer. In addition, the medium pressure connection to the LDV by means of a swivelling banjo allows another degree of freedom. The end result is that the LDV and hose will remain streamlined with the body.
The balanced piston assembly and banjo spindle spring lever work in conjunction to allow the flow of air dependant on the wearer inhaling or exhaling.

FPS 7000 Face Mask

Double facemask seal:
Inner sealing line combined with an external sealing surface for highest safety

Harness:
Ergonomically shaped and easy to lock in place

Inner mask:
Available in different sizes

Visor:
Made of very durable polycarbonate with anti-scratch coating

Connector:
Different connector variations with backward compatibility to existing systems

Mask body:
Ergonomically shaped and available in three sizes (S, M, L)

- The Facial Protection System (FPS) 7000 conforms to EN136 and gives 70% vision.
- Rubber on the facemask is hypoallergenic.
- Made from neoprene with a double reflex seal to help prevent air leaks.
- Speech diaphragm.
- Large, distortion free, anti-scratch polycarbonate visor which is heat and impact resistant for distortion - free vision and distributes air evenly to avoid fogging.
- Grade 1 heat and impact resistant.
- Available in three sizes, small, medium/large and large.

Inner Mask

- Oral-nasal inner mask made of neoprene.
- Consists of two mushroom valves to allow intake of cylinder air and reduces on dead air space which prevent the build-up of carbon dioxide and condensation forming inside the mask.
- Three sizes of oro-nasal inner mask 1,2,3.

Additional Features

- Robust push-to-connect design which allows 360° rotation of lung demand valve (LDV).
- 5-point spider head harness with stainless steel buckles to secure the mask around the wearers head. There are two sizes of spider harness: small and medium/large
- Incorporates speech diaphragm.
- Push connector for LDV.
- 9 Neck strap consists of standby button to hold facemask in a secure and safe manner whilst the facemask is not being worn.

Breathing Cycle P-connector (positive pressure)

Inhalation:

- By lung demand valve delivered air enters via inhalation valve.
- Flushing of the visor.
- Control valves open.
- Arriving of the air inside the inner mask via the control valves.

Exhalation:

- Inhalation valve closed.
- Control valves closed.
- Spring-loaded exhalation valve opens in the chin area.
- Exhaled air releases to surrounding atmosphere.

FPS 700 Face Mask

- Weighs approximately 600g

NOTE:
Silicone facemasks do not have CBRNE type approval (BS 8468-1) and must not be worn at these incidents. Silicone facemasks can however be worn when deploying in GTS to a CBRNE incident.

Bodyguard® 7000

The Dräger Bodyguard® 7000ET (Electronic Tally)) is an electronic monitoring unit which provides continuous monitoring of personal information and operational status of the Dräger PSS® 7000 self-contained breathing apparatus and conforms to EN137.

This multi-function system incorporates the following features for providing continuous monitoring of the BA set:

- Monitoring of available air pressure of the compressed air cylinder.
- Time to whistle (TTW).
- Visual - Light Emitting Diodes (LED's) Indicators.
- Hours of recorded info.
- Movement Sensor and Automatic Distress Signal Unit (ADSU) – numeric display.
- Button activated manual Distress Signal Unit (DSU).
- Operation of running man.
- A backlight feature - illuminating the display.
- Personal ID - Optional, if enabled.
- The temperature monitoring facility is not present on the Bodyguard® 7000.

The tally version of the Bodyguard® 7000 is switched 'On' by the sensing of the system cylinder pressure of the SCBA.

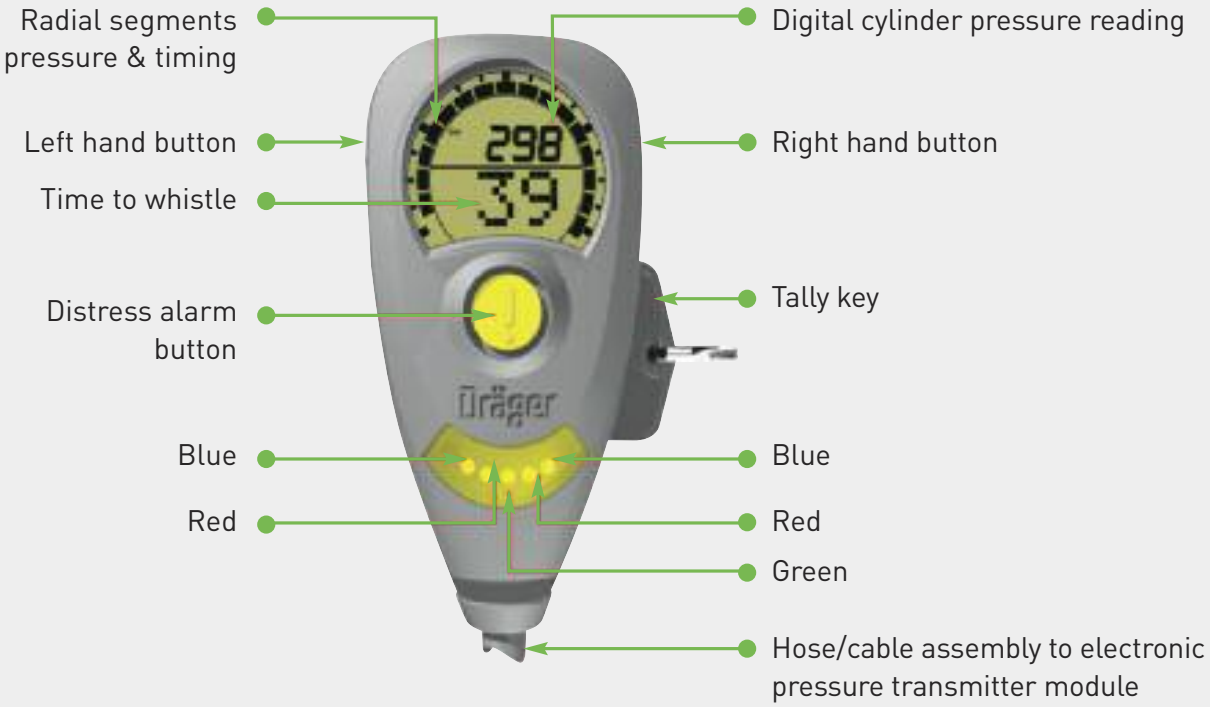
The Automatic Distress Signal Unit (ADSU) will sound if no motion detected for 21 – 25 secs. The sound increases in volume, and backlight flashes. If motion is sensed within a further 8 secs alarm is reset, if no motion is sensed, full alarm is activated and a high-pitched audible alarm emitted with two blue, and red LEDs flashing intermittently.

The Distress Signal Unit (DSU) can be manually activated when a wearer requires assistance and is operated by pressing the yellow distress alarm button on the front of the Bodyguard®.

- Incorporates electronic high pressure warning whistle.
- Power packs are available as either a pack containing 5 replaceable 1.5 Volt AA batteries, or as a single rechargeable 7.2 Volt Lithium Polymer battery pack.
- Comfort light (green) must be flashing to show that the ADSU is in operational mode.
- Blue light flashing means telemetry has been established.
- A short high pressure (HP) hose, routed from the HP sensor housing of the pressure transmitter unit, connects to the HP outlet of the pressure reducer of the SCBA.
- Yellow marking band indicates telemetry enabled.

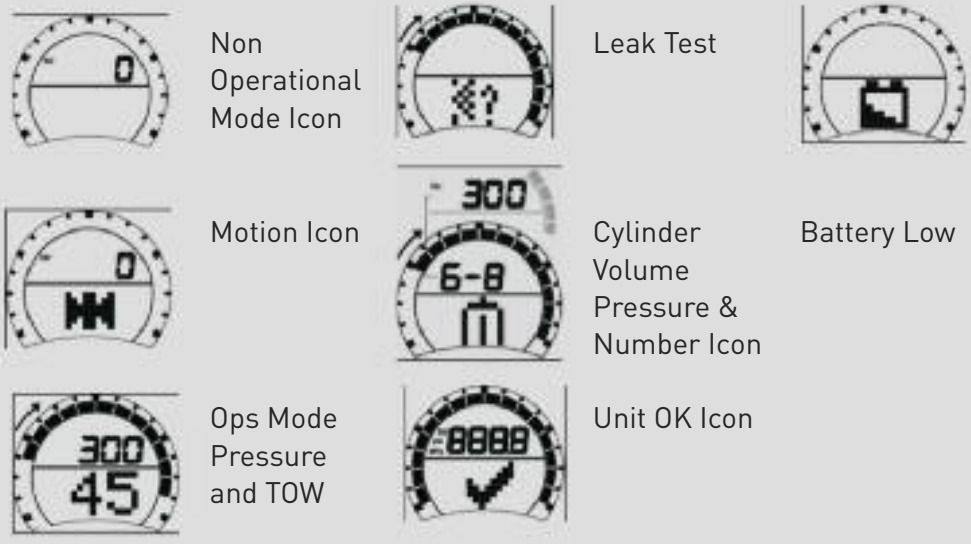
Dual High Pressure Port - Fitted to this port is the unique dual function hose assembly that incorporates the in-line whistle warning unit, (high pressure activated - medium pressure operated), and a high pressure (HP) contents gauge for the monitoring of the air pressure in the compressed air cylinder. The hose construction, although appearing similar to MP hoses, differs in its internal construction. Inside the outer EPDM rubber hose assembly is a fine bore copper capillary tube that is coil wound around a multi-strand length of phosphor bronze wire. The capillary tube and wire are then brazed to each of the end fittings of the capillary tube assembly. High pressure air flows through the bore of the capillary tube to the pressure gauge and not through the rubber hose.

Constructed as part of the dual pressure hose assembly, and located at base of the pressure gauge, is the in-line whistle warning unit (WWU). The WWU provides an audible alarm signal that begins sounding when the available air remaining in the compressed air cylinder has reduced to a pre-set pressure. The released air enters the bore of the rubber hose (via the dual pressure port) and activates the in-line whistle warning unit. The pre-set pressure setting of the WWU may be adjusted by the user to meet special requirements.



The Bodyguard® 7000 can store 33 hours of data which can be downloaded and viewed if required. The Bodyguard® 7000 can be placed in to Gas Tight Suit mode by pressing the left hand button when this symbol appears

NOTE: THE BODYGUARD IS NOT TO BE SET TO GTS-MODE UNLESS AN EXTERNAL DSU IS WORN

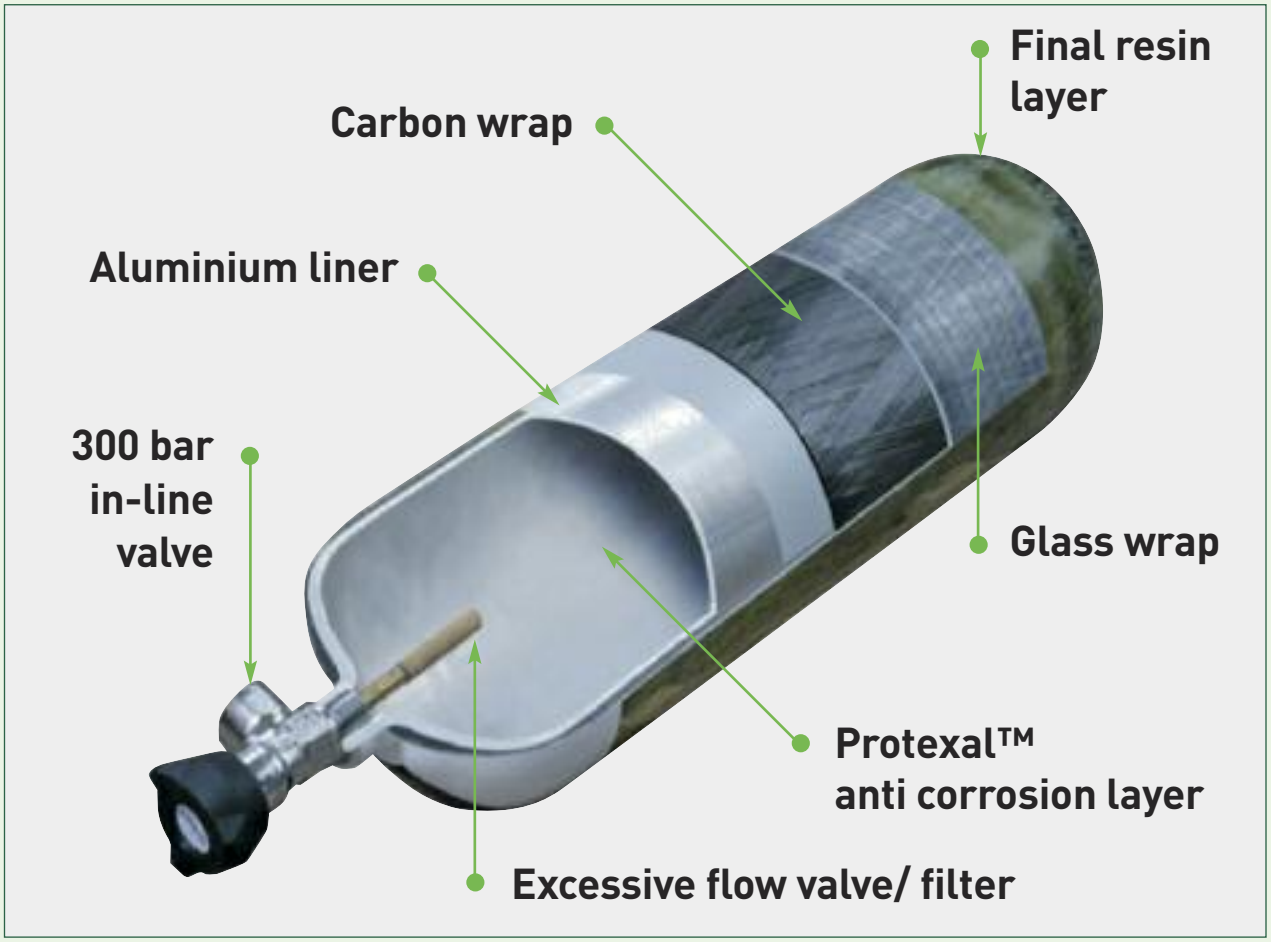


Nickel Metal Hydride Battery Module

The PSS7000 BA set comes with two battery options, the rechargeable power pack or the AAA power pack.

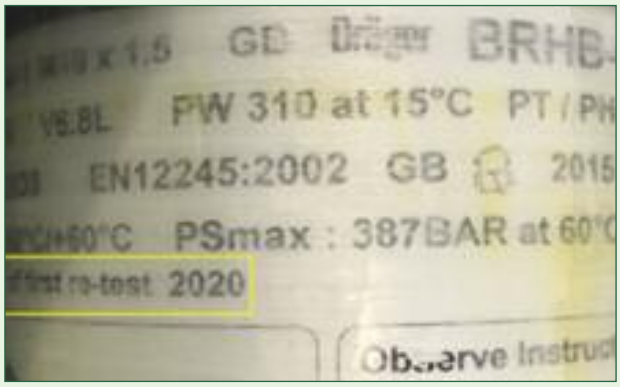
Rechargeable Power pack - a single rechargeable 7.2 Volt Lithium Polymer battery pack.

Cylinder



- The Dräger Twin Cylinder Pack Assemblies are approved for use with the twin cylinder pack variants of the DrägerMan PSS® 7000 Twin Series of compressed air respiratory protection equipment.
- 2x 300bar, 6.8 litre cylinders.
- Combined compressed air capacity of 3672 litres.
- Ultra-lightweight, carbon composite cylinders.
- Aluminum shell with Protexal anti corrosion layer.
- Over wrapped with carbon and glass fibres, epoxy resin matrix.
- External layer of glass fibre is applied to enhance the resistance of the cylinder to impact and abrasion.
- External gel coat is applied to the surface of the cylinder which provides a smooth, easily cleaned surface.
- Conforms to EN12245:2009.
- Weight of cylinder pack approx 12kg.
- 20 year life.
- Hydro-testing required every 5 years.
- Twin cylinder packs consist of two compressed air cylinders aligned and secured in tandem onto a central support strut by a pair of stainless steel straps.
- The valves can be either ratchet or non-ratchet activation and positioned either, facing the wearer (inboard) or away from the wearer (outboard).
- From the selected valve body, a high pressure stainless steel capillary tube bridges across and connects to the second cylinder. The capillary arrangement is shrouded and protected by a split moulding that forms a convenient carrying handle.
- Two connector nuts (top and bottom) attached to the central strut are used to locate the twin cylinder pack assembly to the mounting arrangement on the backplate of the compressed air respiratory protection equipment.

Cylinder Label



Cylinder Label (including date of first re-test)

Example re-test label

Cylinder Valve

- The Dräger Valves conform to EN144.
- In-line and right angled cylinder valve.
- Constructed of chrome plated marine brass.
- Glass filled nylon hand wheel.
- Turn anti-clockwise to open.
- Pull out and turn clockwise to close.
- Spring loaded ratchet system preventing accidental shut down.
- Anti-debris tube containing 80 micron sintered bronze filter.

What is an EN number?

The European Committee for Standardisation (CEN) develop and publish European Standards (EN). Standards are documents that set out specifications and other technical information with regard to various kinds of products, materials, services and processes.

These standards provide a basis for mutual understanding among individuals, businesses, public authorities and other kinds of organisations. They facilitate communication, commerce, measurement and manufacturing.

European Standards can be used to enhance safety and performance, improve energy efficiency, and protect consumers, workers and the environment. They complement European and national policies, and make it easier for businesses and other actors to respect relevant legislation.

One European Standard replaces 34 national standards

The Members of CEN are the National Standardisation Bodies of 34 European countries – including all the member states of the European Union (EU) and other countries that are part of the European Single Market.

European standards are developed by teams of experts who have particular knowledge of the specific sector or topic that is being addressed. Each National Standardisation Body that is part of the CEN system is obliged to adopt each European Standard as a national standard and make it available to customers in their country. They also have to withdraw any existing national standard that conflicts with the new European Standard. Therefore, one European Standard (EN) becomes the national standard in all 34 countries covered by CEN Members.