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Section 1  Instructions for Use
Section 2  Introduction and Safety Warnings
Introduction


PSS 500 Series is CE Mark Approved and issued with EC Type Examination Certificate.

Base versions in this series are as follows:

PSS 500
PSS 500 E
PSS 500 ET

The following versions of the Bodyguard electronic monitoring unit are approved to the above European Standard, and available for use with the Dräger PSS 500 Series of Self Contained Compressed Air Breathing Equipment (C.A.B.E.).

- Bodyguard E - ‘Button’ activated.
- Bodyguard ET - ‘Tally’ activated.

The units are Intrinsically Safe, conforming to EMC (radio interference requirements) and to JCDD 38.

The PSS 500 Series Personal Safety System provides the wearer with respiratory protection when working in a contaminated or oxygen deficient life threatening environment.

The advanced design gives greater performance, comfort and ease of use. The revolutionary articulated carrying system improves weight distribution, and the patented slide and pivot mechanism permits freedom of movement and increased manoeuvrability.

Variants of the PSS 500 Series use the same adjustable articulated carrying system and high performance first stage pressure reducer but differ in pneumatic configuration. All variants are however fully compatible with the Dräger range of lung demand valves and facepieces.
For Firefights professionals.

- Adjustable and articulated carrying system - Colour: Black - Anti-Static.
- Professional high temperature carrying system harness with comfort padding.
- Carbon composite - triple ‘Near Spherical’ air containment unit with integral valve.
- Mechanically activated pressure gauge and whistle warning unit.
- Medium pressure hose, from first stage pressure reducer, fitted with female quick release coupling.
- Demand valve fitted with male adaptor for connection to female quick release coupling of medium pressure hose of first stage pressure reducer.
For Firefighting professionals.

- Adjustable and articulated carrying system - Colour: Black - Anti-Static.
- Professional high temperature carrying system harness with comfort padding.
- Carbon composite - triple ‘Near Spherical’ air containment unit with integral valve.
- Medium pressure hose, from first stage pressure reducer, fitted with female quick release coupling.
- Demand valve fitted with male adaptor for connection to female quick release coupling of medium pressure hose of first stage pressure reducer.

Fig. 2
For Firefighting professionals.

- Adjustable and articulated carrying system - Colour: Black - Anti-Static.
- Professional high temperature carrying system harness with comfort padding.
- Carbon composite - triple ‘Near Spherical’ air containment unit with integral valve.
- Multi-function Electronic Monitoring Unit, (Bodyguard). Tally’ Activated.
- Medium pressure hose, from first stage pressure reducer, fitted with female quick release coupling.
- Demand valve fitted with male adaptor for connection to female quick release coupling of medium pressure hose of first stage pressure reducer.
Safety Warnings

- **Explain** Instructions for Use, supplied with this equipment, must be adhered to.

- **Maintain** respiratory protection equipment as outlined in Dräger Limited service schedules and maintenance instructions.
  
  Contact Dräger Limited, Blyth for details of Service Contracts and Service Training Courses.

- **Train** potential wearers in how to wear, and use equipment and to understand its limitations.
  
  Contact Dräger Limited, Blyth for details of Wearer Training Courses.
Section 3  Product Description
Product Description

The PSS 500 Series of compressed air respiratory protection equipment contains three variants, (PSS 500, PSS 500 E and PSS 500 ET).

Each variant incorporates an adjustable and articulated carrying system for supporting the compressed air containment unit and the high performance first stage pressure reducer.

The pressure reducer connects to the right hand high pressure outlet port of the central manifold located in the carrying case.

The air containment unit consists of three carbon composite ‘Near Spherical’ pressure vessels mounted around a central manifold incorporating an On/Off valve.

**PSS 500**

Attached to the high performance first stage pressure reducer of the PSS 500 is the hose assembly of the mechanically activated pressure gauge and whistle warning unit.

In this configuration a blanking plug seals off the left hand high pressure outlet port of the central manifold.

**PSS 500 E and PSS 500 ET**

Attached to the left hand high pressure outlet port of the central manifold of the PSS 500 E and PSS 500 ET is the pressure switch and hose assembly of the Bodyguard multifunction Electronic Monitoring Unit.

In this configuration a blanking plug seals off the dual pressure outlet port of the reducer.

The Bodyguard is a robust and compact instrument, designed to replace traditional mechanical pressure gauge, whistle warning unit and Distress Signal Unit (DSU).

Operated by ‘Button’ - E, or ‘Tally’ - ET, and system pressure of respiratory protection equipment, this unique multifunction instrument incorporates pre-programmed features for continuous monitoring of:

- Air pressure of air containment system.
- Time remaining to whistle alarm setting (TTW).
- Movement Sensor - Distress Signal Unit (DSU).
- Temperature.
- Battery Life.

Available for Bodyguard is a ‘snap on’ I.R. Link and Windows based Software Package for programming of additional monitoring Options, such as user I.D. and datalogging with downloading of datalogged parameters.
PSS 500 Series Carrying System
The carrying system consists of three elements:

- Adjustable Shoulder Yoke.
- Carrying Case for Air Containment Unit.
- Articulated Waistbelt Assembly.

Manufactured from moulded carbon composite material, the three elements are anti-static, lightweight and durable.

The ergonomic design of the adjustable and articulated carrying system provides the wearer with unrestricted freedom of movement. The low centre of gravity of the equipment, and resulting balanced weight distribution onto the wearer’s hips, gives stability, a high degree of comfort, and reduced wearer fatigue.

A slide and lock arrangement between the air containment unit carrying case, and the shoulder harness yoke allows adjustment of the overall length of the carrying system to suit torso length of wearer. Three preset length settings available are - short, medium, and long.

A universal flexible joint located in the centre of the waistbelt assembly, connects to a vertical slide arrangement at the base of the carrying case.

Positioned at the base of the wearer’s spine, (lumbar region), the flexible joint and slide arrangement combine to provide a natural pivot point about which the carrying case and shoulder yoke move in response to upper body movements of the wearer.

The carrying case, with hinged lid, contains a central high pressure manifold used to secure the compressed air containment unit.

When equipment is not being worn, it may be carried using handles (optional extra), mounted each side of the carrying case moulding.

Harness
Harness arrangement consists of:

- Shoulder padding with slide lock buckles mounted to shoulder yoke.
- Pair of adjustable (pull-down) shoulder straps.
- Waist padding with slide lock buckles mounted either side of the articulated waistbelt assembly
- Adjustable (pull forward) waistbelt straps with push-in quick release buckle set.

Padding and adjustable straps remove easily for maintenance and cleaning.

Pneumatic Arrangement
The pneumatic arrangement incorporates a pressure reducer that connects to the right hand high pressure port of the central manifold, located in the carrying case. Two pins, projecting from the manifold, align with holes in the valve manifold of the air containment unit to ensure correct location. A locking plate, on the valve manifold, locks onto the pins of the central manifold securing the complete assembly.
Fitted to the medium pressure outlet port of the reducer is a medium pressure hose, with quick release female coupling, for attaching a lung demand valve.

The medium pressure outlet port incorporates the pressure relief valve, (fitted to nozzle of medium pressure hose), and is also used for connecting accessories, such as a decontamination hose, secondary breathing attachment or airline belt manifold.

Fitted to dual pressure outlet port of reducer is either:

**PSS 500**
A unique dual function hose assembly incorporating an in-line whistle warning unit, (high pressure activated - medium pressure operated), and high pressure contents gauge for monitoring air pressure in air containment unit.

**PSS 500 E and PSS 500 ET**
A blanking piece seals off the dual pressure outlet port of reducer.

Connected to the second high pressure outlet port, of the central location manifold, is the pressure sensor of the hose to the **Bodyguard**.

The medium pressure hose, for the lung demand valve, and either the dual function hose assembly (PSS 500), or, Electronic Monitoring Unit (Bodyguard) hose (PSS 500E or PSS 500ET), are each directed through rubber grommets at the top of the carrying case, then located over the shoulders of the wearer. Loops in the shoulder harness secure the hoses in position.

The reducer-pneumatic arrangement, harness padding and adjusting straps easily remove from the equipment for maintenance and cleaning.

**PSS 500 D**
PSS 500 with **ChargAir™** (PSS 500 D). Assembled to a port in the central manifold is the **ChargAir™** supply hose with quick release male coupling. Connection of a special secondary supply hose to **ChargAir™** allows refilling of air containment unit from an independent high pressure (maximum 300bar) secondary breathing air supply source, while wearer is breathing from equipment.

**Lung Demand Valves**
Approved lung demand valves, for use with this equipment, incorporate a medium pressure hose fitted with a quick release male coupling.

Functional variants are:

- **Type A** Positive Pressure with Push-In connector to facepiece.
- **Type AE** Positive Pressure with M45 Screw-In connector to facepiece.
- **Type N** Normal Demand with M40 Screw-In connector to facepiece.

Refer to the appropriate Training Manual for details of the selected lung demand valve.
Section 4  Operating Principle
Operating Principle

Pressure Reducer
The high performance first stage pressure reducer is factory set and sealed and must not be tampered with as this invalidates conditions of warranty of Dräger Limited.

Service life of the reducer is six years. Dräger recommends that at the end of this period the reducer be returned to Dräger Service, Blyth, for overhaul under the Repair Exchange Scheme (REX).

Details of REX Scheme available on request.

Functioning at inlet pressures of 200bar and 300bar, the reducer provides a controlled outlet medium pressure to the lung demand valve.

Incorporated in the medium pressure outlet port is a safety pressure relief valve.

PSS 500
Pneumatic Arrangement
Fitted to the right hand high pressure outlet port of the central manifold is the reducer. The left hand high pressure outlet port is sealed off with a blanking piece.

Operation - refer to Figure 1, Figure 2, Figure 3 and Figure 4
On opening the valve of the air containment unit the high pressure air flows into the central manifold, through a sintered bronze filter then into the reducer. High pressure air entering the reducer closes the whistle activation mechanism, pressurises the capillary tube in dual pressure hose activating the pressure gauge, passes into piston bore, past piston seat and pre-set plunger, into medium pressure chamber.

As pressure increases in medium pressure chamber it forces the piston to move axially against compression spring until piston seat contacts end face of plunger - sealing off high pressure.

On inhalation, from lung demand valve, air flows from medium pressure chamber, and, as pressure reduces, the compression spring retracts the piston, moving piston seat from end face of plunger. (Fig. 2).

The high pressure air then begins to enter medium pressure chamber repeating the cycle.

Consumption of air from the air containment unit reduces the pressure and at a preset pressure the compression spring in the whistle activation mechanism retracts the high pressure plunger from its sealing seat releasing medium pressure air from medium pressure chamber into whistle activation chamber. (Fig. 3). From the activation chamber a controlled air flow enters the bore of outer rubber hose of the dual pressure hose assembly operating whistle warning unit.
Pressure Reducer

- High Pressure
- Medium Pressure
- H.P. to Gauge

Fig. 1
Medium Pressure Flow to Demand Valve

M.P. to Demand Valve

High Pressure

Medium Pressure

H.P. to Gauge

Medium Pressure

High Pressure
Whistle Activated

M.P. to Demand Valve

High Pressure

Medium Pressure

M.P. to Whistle

H.P. to Gauge

High Pressure

Fig. 3
Pressure Relief Valve ‘Open’

Air venting from relief valve

High Pressure

Medium Pressure

High Pressure

Fig. 4
Dual Function High and Medium Pressure Hose Assembly  
- refer to Figure 5
The dual pressure hose assembly supplies medium pressure air from the reducer to the in line whistle warning unit and high pressure air to the contents gauge.

The hose construction although appearing similar to medium pressure hoses, differs in its internal construction. Inside the outer 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 bore of capillary tube to the pressure gauge and not through the rubber hose.

At a preset pressure the whistle activation mechanism releases medium pressure through the secondary end fitting, into bore of outer rubber hose assembly, then into the whistle tube operating the whistle warning unit located at base of gauge.

Whistle Warning Unit - refer to Figure 5
Constructed as part of the dual pressure hose assembly, and located at base of pressure gauge, the in-line whistle warning unit provides an audible alarm signal. The alarm begins sounding when the available air remaining in air containment unit has reduced to a preset pressure.

The wearer should regularly monitor the gauge pressure to determine the remaining air available and leave contaminated area BEFORE activation of whistle, however on hearing the alarm the wearer MUST leave the contaminated area for a safe environment.

The pre-set pressure setting of the Whistle Warning Unit can be adjusted by user to meet special requirements.

Operation
See descriptions of Pressure Reducer and Whistle Warning Unit, and Dual Pressure Assembly

High Pressure Contents Gauge - refer to Figure 5
The content gauge is a Bourdon Tube type constructed from a stainless steel pressed case and having a 3mm thick lens window. The gauge conforms to technical and accuracy requirements of European Standard EN137.

The gauge dial is luminescent yellow having radial black graduation marks at 10bar intervals from 0 to 350bar. At each 50bar marking graduation marks are red. A red radial arc highlights the segment from 0 to 50bar.
Dual Function Hose - Gauge and Whistle

- Gauge
- Gauge Cover
- Whistle
- H.P. Capillary
- Phosphor Bronze Wire

Fig. 5
PSS 500E and PSS 500ET

Pneumatic Arrangement

Fitted to the right hand outlet port of the central manifold is the reducer. Connected to the left hand high pressure outlet port of the central manifold is the pressure switch and hose assembly of the **Bodyguard** multi-function Electronic Monitoring Unit.

The dual pressure outlet port of the reducer, used to fit hose of mechanical gauge and whistle of the **PSS 500**, is sealed off with a blanking piece.

**See Figure 6.**

A preset and sealed mechanism, between the two outlet ports of the reducer, controls activation of the whistle warning unit, when equipment fitted with mechanical gauge and whistle, (**PSS 500**).

The **Bodyguard** has basic monitoring and alarm options programmed into the instrument before despatch from Dräger.

Refer to Instructions for Use supplied with the **Bodyguard**.

**Operation**

On opening the valve of the air containment unit the high pressure air flows into the central manifold through a sintered bronze filter. Increasing air pressure in the central manifold makes the pressure switch of the **Bodyguard** active - turning ‘On’ the unit.

Air passes also from the manifold into the piston bore of the reducer, past the piston seat and pre-set plunger, into medium pressure chamber of the reducer.

As pressure increases in the medium pressure chamber, it forces the piston to move axially against the compression spring until the piston seat contacts the end face of plunger - sealing off high pressure.

On inhalation from lung demand valve, air flows from medium pressure chamber and as pressure reduces, the compression spring retracts the piston moving the piston seat from the end face of plunger. High pressure air begins to enter the medium pressure chamber repeating the cycle. Consumption of air from the air containment unit reduces pressure.

The pre-programmed features of the **Bodyguard** continually monitor performance of the equipment.

Refer to Instructions for Use supplied with **PSS 500E** and **PSS 500ET**.
Pressure Reducer - PSS 500 E and PSS 500 ET
Bodyguard - Hose Assembly - refer to Figure 7 and Figure 8

The hose assembly of the Bodyguard, although appearing similar to the medium pressure hoses, provides a flexible protective sleeve encasing the electronic wiring from the pressure sensor to the Electronic Monitoring Unit.

PSS 500 PSS 500 E and PSS 500 ET

Common features of the above equipment variants are:

Hose Assemblies

Medium Pressure Hoses - refer to Figure 9

Flexible and anti-kinking rubber hose lengths combine to provide medium pressure hose assemblies for the reducer-pneumatic arrangement and associated lung demand valves.

Pressure relief valve spring, O ring retainer and O ring locate onto the nozzle end fitting of the medium pressure hose, which connects to medium pressure outlet port of reducer.

The O ring of the relief valve also functions as a seal for the hose to reducer connection.

ChargAir™ Hose (Optional) - refer to Figure 10

Assembled only to an outlet port of the central manifold, the ChargAir™ hose allows for the refilling of the equipment air containment unit from an independent high pressure, (300bar maximum), secondary breathing air supply source, while wearer is breathing from the equipment.

The ChargAir™ hose assembly is constructed from three main elements:

- Adaptor assembly incorporating a high pressure non-return valve.
- Connection hose - a tightly interwoven stainless steel wire braiding forms the external construction of this hose. Inside the stainless steel braiding is a P.T.F.E. (Polytetrafluoroethylene) tube through which high pressure air flows. Swivel end fittings connect the hose to the banjo and quick release coupling.
- Secondary supply connection - high pressure male quick release coupling.

Lung Demand Valves

Functional variants of the lung demand valves are:

- Type A  Positive Pressure with Push-In connector to facepiece.
- Type AE Positive Pressure with M45 Screw-In connector to facepiece.
- Type N  Normal Demand with M40 Screw-In connector to facepiece.

Refer to the appropriate Training Manual for details of the selected lung demand valve.
PSS 500 ET

- PSS 500 ET 'Tally' Operated
- 'Tally' fitted

Fig. 7
PSS 500 E PSS 500 ET

- PSS 500 E: 'Button' Operated
- PSS 500 ET: 'Tally' removed
Medium Pressure Hose
With quick release female coupling

Connected to Demand Valve
Fig. 10

- High Pressure - from reducer
- Non-return valve 'closed'

Cylinder refill
high pressure 'in'

- Non-return valve 'open'
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## 5.2 Service and Test Intervals

Carry out regular Inspection, Testing and Servicing of Equipment according to this table. Record all data in the equipment Log Book. These instructions also apply to non-used (in storage) equipment.

<table>
<thead>
<tr>
<th>Description</th>
<th>After Use</th>
<th>Every Month</th>
<th>Every Year</th>
<th>Every 3 Years</th>
<th>Every 6 Years</th>
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<tr>
<td><strong>Complete Equipment</strong></td>
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<tr>
<td>Clean and Disinfect</td>
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<tr>
<td>Visual Inspection</td>
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<tr>
<td>Functional and Leak Testing as defined in Instructions for Use</td>
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<tr>
<td>Flow and Static Tests per Manufacturer's instructions</td>
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<td><strong>Bodyguard</strong></td>
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<td>Clean</td>
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<td><strong>Demand Valve</strong></td>
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<tr>
<td>Clean and disinfect as necessary</td>
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<tr>
<td><strong>Pressure Reducer</strong></td>
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<td>Medium Pressure Check</td>
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<tr>
<td>Basic Overhaul (Repair Exchange Scheme)</td>
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<td><strong>Central Manifold</strong></td>
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<tr>
<td><strong>Air Containment Unit</strong></td>
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<tr>
<td>Charge to correct pressure</td>
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<tr>
<td>Charged Pressure Check, Check Test Date on label of 'Near Spheres'</td>
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<tr>
<td>Re-Certification - Pressure Test of individual 'Near Spheres' (or according to National Standards)</td>
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<td><strong>Valve of Air Containment Unit</strong></td>
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<tr>
<td>Overhaul as necessary, or at time of Re-Certification of 'Near Spheres'</td>
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</table>

- Dräger Recommendation - UK.
- COSHH
- Grease Demand Valve connector O-ring as required. (Use Molykote 111)
5.3 Cleaning, Disinfecting and Drying

5.3.1 General
Dräger recommend that contaminated dirty components or assemblies are carefully cleaned and disinfected then thoroughly dried after use, or as and when considered necessary by the user.

To ensure correct operational condition of the equipment use only the cleaning and disinfecting solutions recommended by Dräger. The use of any other product will invalidate the Dräger warranty and guarantee.

Important Note:
If the equipment is fitted with an integral lung demand it is important to refer also to the cleaning, disinfecting and drying section of the relevant training manual.

When using baths to contain cleaning and disinfecting solutions the immersed components and assemblies must only be agitated manually.

It is important to note that Dräger Do Not recommend the use of any form of mechanical, electrical or ultrasonic agitation of this product. If the user decides however to use ultrasonic cleaning baths then it is important that the instructions supplied by the manufacturer of the bath are strictly followed.

Refer to the Training Manuals for any ancillary units, e.g. Lung Demand Valve.

Safety Note: Refer to manufacturers’ usage instructions when using cleaning and disinfecting agents. It is important that attention be paid to concentration and reaction times. Do Not use organic solvents such as Acetone, Alcohol, White Spirit, Trichloroethylene or similar.

Dräger recommends:

1. Cleaning:
Dräger Safety Wash
1 Litre Safety Wash and Dispenser 3380164
1 Litre Safety Wash Refill 3380165
5 Litre Safety Wash and Dispenser 3380166
5 Litre Safety Wash Refill 3380167

Sekusept
4 Bottles @ 2 Litres 7904071

Do Not exceed a temperature of 30 degrees Celsius.

Note: Rinse off cleaning solution in clean water before disinfecting.
2. Disinfecting:

Incidur.
1 can 6 Litres 7904072
1 can 30 Litres 7904073
Dräger Wipex Cloths (Pack of 50) 3380375

**Do Not** exceed a temperature of 30 degrees Celsius.

**Note:** Rinse off disinfecting solution in clean water before drying.

3. Rinsing and Drying

Remove cleaning and disinfecting solutions by rinsing in clean running water, followed by drying. For pneumatic assembly see Section 5.3.3.

Rinsing - **Do Not** exceed a temperature of 30 degrees Celsius.
Drying - **Do Not** exceed a temperature of 60 degrees Celsius.

5.3.2 Cleaning and Disinfecting Pneumatic Assembly

**Important Note:** If the equipment is fitted with an integral lung demand valve it is important to refer also to the cleaning, disinfecting and drying section of the relevant training manual.

Follow these instructions to remove the pressure reducer and hose assembly from the backplate for cleaning and disinfecting.

**Note:** **Do Not** immerse pressure reducer or pressure sensor of Bodyguard in cleaning or disinfecting solutions. Use clean cloth, moistened in cleaning fluid, to remove dirt/contaminants.

**Tool Required**

2mm AF Hexagon Socket Key 3337900

**Safety Warning:** Valve of air containment unit should be closed (clockwise) and system vented.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

**Note:** **Do Not** attempt to remove from hinge unless cover is at 180°.

Refer to Figure 1.

2. Turn locking plate (1) anti-clockwise to release the air containment unit. Grip the handle and lift the unit from the central manifold.

![Fig. 1](image)
Refer to Figure 2.

3 Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove two screws (1), retaining cap (2), and staple pin (3) from central manifold. See Fig. 6. Grip and pull reducer to remove from outlet port of central manifold.

**Note:** If the equipment is fitted with Bodyguard, repeat instruction 3 to remove pressure sensor from the second port of the central manifold. See Fig. 3.

Refer to Figure 4.

4 Unfasten the hose loops on the right and left shoulder straps to release hoses. Slide the pair of grommets (1) from the carrying system case. Reducer pneumatic assembly now disconnected from the carrying system.

5 Using a clean cloth moistened in cleaning fluid, remove dirt/contaminants from pneumatic assembly.

**Note:** Do Not immerse pressure reducer(or carrying case) in cleaning or disinfecting solution.

6 When clean, remove cleaning agent residue with a clean cloth moistened with clean water.

7 After cleaning and disinfect components by wiping with Dräger Wipex Cloths, (Refer to Wipex Cloth Instructions), or clean cloth moistened with disinfecting solution. (Refer to Disinfecting Fluid Instructions).

**Note:** When drying components Do Not exceed a temperature of 60 degrees Celsius.
8 Check sealing washers and O rings, on end fittings of the hose and reducer, for damage, replace if necessary. Re-assemble the pressure reducer and hose assemblies to the carrying system. Reverse above procedure.

5.4 Replacing High Pressure Filter

Tools Required:
- 8mm AF Hexagon Socket Key 3310536
- Extractor and Assembly Tool 3310537

Safety Warning: Valve of air containment unit should be closed (clockwise) and system vented.

1 Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

Note:  Do Not attempt to remove from hinge unless cover is at 180 °.

2 Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

Refer to Figure 5.

3 Lift the equipment to the upright position to access the blanking plug (1). Using the 8mm hexagon socket key, unscrew and remove the blanking plug.

4 Using pin of tool 3310357 - from inside the case, push the end of the tool through the bore of the central manifold to remove washers (2 and 3), O rings (4) and filter (5). Scrap washers, O rings and filter.
Refer to Figure 6.

5 First load new washer (2), O ring (4), filter (5), second O ring (4) then washer (3) to end of the tool 3310537 as shown in Fig. 6. Insert the tool assembly into the bore of the manifold. While holding the sleeve extract the pin, then extract the outer sleeve of the tool. Ensure correct positioning of washer (2) as shown.

6 Screw the blanking plug into the manifold and using 8mm hexagon socket key, tighten blanking plug (1). (10Nm).

7 Connect air containment unit to equipment and carry out Leak Test.

5.5 Medium Pressure Hose

If the equipment is fitted with an integral lung demand it is important to refer also to the relevant training manual for the lung demand valve regarding instructions for the removal and fitting of the medium pressure hose.

5.5.1 Removing MP Hose from Reducer

Tools Required:
2mm AF Hexagon Socket Key 3337900

Safety Warning: Before proceeding with replacement of hose the valve of the air containment unit should be closed (clockwise) and the system vented of pressure.

1 Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

Note: Do Not attempt to remove from hinge unless cover is at 180 °.

2 Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

3 Unfasten the hose loops on the right shoulder strap to release the medium pressure hose. Slide the hose grommet from carrying system case.
Refer to Figure 7.

4 Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove two screws (1), retaining cap (2), and staple pin (3) from medium pressure port of reducer. Grip and pull hose to remove from outlet port of reducer. Medium pressure hose assembly now disconnected from carrying system.

Note: Component parts of Relief Valve, i.e. spring (5), O ring retainer (6) and O ring (7), will be attached to nozzle of medium pressure hose medium pressure hose.

5 Remove the O ring retainer (6) and O ring (7), spring (5) and the grommet ring. Scrap the hose if defective.

5.5.2 Fitting MP Hose to Reducer

Tools Required:
2mm AF Hexagon Socket Key 3337900

Refer to Figure 8.

1 Fit spring (1), O ring retainer (2), new O ring (3), ensuring O ring locates into O ring retainer (2).

2 Check reducer outlet bore is clean and not damaged, fit the grommet to the hose then insert the hose end fitting into the outlet port. Hold against the compression spring then insert the retention staple through holes in reducer body ensuring correct location into the groove in hose end fitting. Check the hose is securely retained by pulling hose away from reducer body.

3 Locate groove of the retaining cap over the protruding portion of the retention staple pin - align screw holes - insert screws and using 2mm AF hexagon socket key, tighten the screws.

4 Slide the hose grommet into the slot of carrying system case. Fasten the hose loop on the right shoulder strap to retain the hose.

5 Connect air containment unit and perform Leak Test.
5.6 Removing and Fitting Pressure Gauge

**Tools required:**
- 1.5mm AF Hexagon Key 3331237
- Hexagon Adaptor - 2mm 3310600
- Torque Key 3310593
- Loctite 542 3333622
- O-Ring Assembly Tool 3337901

**Safety Note:** Vent air pressure from pneumatic system before proceeding with disassembly. Close valve of air containment unit and vent system.

1. Disconnect dual pressure hose from hose loops of shoulder strap. Refer to Figure 9.

2. Using the 2.0mm hexagon adaptor and torque key, remove screw (1). Unfold the rubber cover (2) from around the gauge then slide cover along the hose. To prevent rotation of the whistle tube during removal of the gauge immediately re-insert the screw (1) into the threaded radial hole of the whistle tube.

**Important Note:** Do Not attempt to remove the set screw (3) with the screw (1) removed.

3. Using 1.5 AF hexagon socket key unscrew and remove socket set screw (3). Grip body of gauge and unscrew gauge (anti-clockwise) from end of hose. Fit new O-Ring (4) using O-Ring assembly tool. See Fig. 10.

**Note:** If fitting new gauge check O-Ring (4) is fitted and not damaged.

4. Check bore of whistle tube is clean and not damaged. Grip the gauge then carefully screw (clockwise) into the end of hose until rotation stops - **Do Not** tighten.
5 Carefully unscrew gauge (approximately 45 degrees anti-clockwise) until the face of the gauge is 90 degrees to flute in whistle tube and axial slot in the shaft of the gauge is in line with threaded radial hole in whistle tube. Locate new socket set screw onto 1.5 AF hexagon socket key and screw set screw into whistle tube - ‘nip’ tight.

**Note:** End of set screw should not protrude past the outer diameter of the whistle tube.

6 Remove screw (1). Slide the rubber cover along hose and fold around gauge body. See Fig. 11.

**Note:** Flute in whistle tube should be visible and aligned with the hole in the side of the rubber cover.

7 Hold screw (1) to the 2.0mm adaptor, apply one drop of Loctite 542 to the thread of the screw then re-insert the screw through the cross hole in the rubber cover and into the threaded radial hole of the whistle tube and tighten the screw to a torque of 0.7Nm.

8 Before the adhesive sets connect cylinder, and if necessary the lung demand valve, to the pressure reducer and apply pressure to the equipment. Close the cylinder valve and carry out Leak Test. Following satisfactory leak test immediately begin to slowly vent pressure until the whistle activates.

### 5.7 Removing and Fitting Dual Pressure Hose

**Tools Required:**

2mm AF Hexagon Socket Key 3337900

**Safety Note:** Vent air pressure from pneumatic system before proceeding with disassembly. Close valve of air containment unit and vent system.

1 Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

**Note:** Do Not attempt to remove from hinge unless cover is at 180 °.

2 Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.
5:12

Refer to Figure 12.

3 Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2), and retention staple pin from the dual pressure port of reducer. Grip and pull hose (4) to remove from outlet port of reducer.

4 Unfasten the hose loop on the left shoulder strap to release hose. Slide the hose grommet from carrying system case. Dual pressure hose assembly is now disconnected from carrying system. Scrap the hose if defective.

Refer to Figure 13.

5 Inspect O rings (5) and (6), sealing ring (7) and replace if necessary. To replace the three filter elements (8) refer to Section 5.8. If fitting a new hose, remove the grommet from old hose and refit to the new hose.

Note: If fitting new hose check O rings (5) and (6) and sealing ring (7) are fitted and not damaged.

6 Check reducer outlet bore is clean and not damaged then insert the hose end fitting into the outlet port - insert retention staple through holes in reducer body ensuring correct location into groove of hose end fitting. Locate groove of retaining cap over protruding portion of the retention staple - align screw holes - insert screws and using 2mm AF hexagon socket key, tighten screws.

Note: Check hose securely retained by pulling hose away from reducer body.

7 Slide the hose grommet into the slot of the carrying system case. Fasten the hose loop, on the left shoulder strap around hose to retain hose.

8 Connect air containment unit to equipment and carry out Leak Test.
5.8 Replacing Dual Pressure Hose Inlet Filter Elements

Tools Required:
2mm AF Hexagon Socket Key 3337900
Screwdriver 3336222

Safety Note: Before proceeding with replacement of filter, turn ‘Off’ the valve of the air containment unit and vent pressure from the system.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

Note: Do Not attempt to remove from hinge unless cover is at 180°.

2. Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

3. Using 2mm AF hexagon socket key unscrew (anti-clockwise) and remove the two cap retention screws. Remove the retaining cap then the retention staple. Grip and pull the hose to remove from outlet port of reducer.

Refer to Figure 14.

4. Using screwdriver 3336222 remove circlip (1) and washer (2). Remove and scrap the three filter elements (3). Inspect O-Ring (4) and replace if necessary.

5. Assemble three new filter elements, refit the washer then insert the circlip into groove in nozzle to secure O-Ring, filter, washer and capillary tube.

6. Check reducer outlet bore is clean and undamaged then insert hose end fitting into outlet port. Insert retention staple through holes in reducer body ensuring correct location into the groove in hose end fitting. Locate groove of retaining cap over the protruding portion of retention staple - align screw holes - insert the two screws and using 2mm AF hexagon socket key tighten screws.

Note: Check hose securely retained by pulling hose away from reducer body.

7. Connect air containment unit to the equipment then carry out High Pressure Leak Test.
5.9 Replacing Dual Pressure Hose Whistle Jet Filter

Refer to Section 5.11, i.e. Dual Pressure Hose Components.

5.10 Dual Pressure Hose Components

5.10.1 Dis-assembly Hose Components

Tools Required:
- 2mm AF Hexagon Socket Key 3337900
- 1.5 AF Hexagon Socket Key 3331237
- O ring Assembly Tool 3337901
- Screwdriver 3336222

Safety Note: Vent air pressure from pneumatic system before proceeding with disassembly. Close valve of air containment unit and vent system.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

Note: Do Not attempt to remove from hinge unless cover is at 180 °.

2. Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

Refer to Figure 15.

3. Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2), and retention staple (3) from the dual pressure port of the reducer. Grip and pull the hose to remove from outlet port of reducer.

4. Unfasten the hose loop on the left shoulder strap to release hose. Slide the hose grommet from the carrying system case. Dual pressure hose assembly is now disconnected from carrying system.
Refer to Figure 16

5 Using the 2.0mm hexagon key remove screw (1). Unfold the rubber cover (2) from around gauge body and slide cover along the hose. To prevent rotation of the whistle tube during removal of the gauge re-insert the screw (1) into the threaded radial hole of the whistle tube.

**Important Note:** Do Not attempt to remove the set screw (3) with the screw (1) removed.

6 Using 1.5 AF hexagon socket key unscrew and remove socket set screw (3). Grip the gauge and unscrew (anti-clockwise) from the end of the hose. Inspect O-Ring (4) and if necessary fit new O-Ring using O-Ring assembly tool. See Fig. 17

**Note:** If fitting new gauge check O-Ring (4) is fitted and not damaged.

Refer to Figure 18

7 Using screwdriver (3336222) remove circlip (1). Remove washer (2), the three filter elements (3) and O-ring (4). Scrap the filter elements.

8 Push end (5) of the capillary tube assembly into the hose in direction of arrow (A). Remove O-Ring (6). Opposite end of capillary tube will protrude from whistle tube. Grip end (5a) of capillary tube assembly and fully withdraw capillary tube in direction of arrow (B).
Refer to Figure 19.

9. Using 2.0 AF hexagon socket key unscrew and remove socket set screw (1). Carefully screw the gauge (clockwise) two revolutions into end of whistle flute. Grip the gauge then pull and withdraw the whistle jet assembly (3) from whistle flute (2). Remove the face filter (4) from whistle jet (3). Scrap the filter and replace with new. Remove the gauge from the whistle jet assembly.

Note: This completes dis-assembly of dual pressure hose. Inspect all components for damage and replace with new components where necessary.

5.10.2 Assembly of Hose Components

Tools Required:
- 2mm AF Hexagon Socket Key 3337900
- 1.5 AF Hexagon Socket Key 3331237
- Hexagon Adaptor (2mm) 3310600
- Torque Key 3310593
- Loctite 542 3333622
- O-Ring Assembly Tool 3337901

Important Note: Check all components are clean and undamaged. Replace with new components where necessary.

Refer to Figure 20.

1. Assemble filter (4) and, if necessary a new O-Ring (5) to the whistle jet (3). Insert the whistle jet (3) into whistle flute (2) aligning the plain radial hole in whistle jet with threaded hole (X). Locate screw (1) onto 2.0 AF hexagon key and screw fully into whistle tube and plain radial hole in whistle jet. Do Not apply Loctite to the screw, or tighten the screw.
Refer to Figure 21.

2 If necessary, assemble new O-Ring (1) and back-up ring (2) into the groove in end (A) of the capillary tube assembly. Insert end (B) of the capillary tube into the bore of the whistle tube and keeping the hose straight, to ensure smooth assembly of capillary, push the capillary tube through the bore of hose until end (B) protrudes from opposite end fitting of the hose.

3 If necessary fit new O-Ring to the gauge using O-Ring assembly tool. Carefully screw the gauge (clockwise) into end of hose until rotation stops - Do Not tighten.

Refer to Figure 22

**Note:** End of the set screw should not protrude past the outside diameter of whistle tube.

6 Assemble and slide the rubber cover along hose.

7 Check reducer outlet bore is clean and undamaged then insert hose end fitting into outlet port. Insert the retention staple through holes in reducer body ensuring correct location into groove in hose end fitting. Locate groove of retaining cap over the protruding portion of retention staple - align screw holes - insert the two screws and using 2mm AF hexagon socket key tighten screws.

**Note:** Check hose securely retained by pulling hose away from reducer.
Refer to Figure 23.

8 Using the 2.0mm hexagon key remove screw (1). Slide the rubber cover along hose and fold around gauge body.

**Note:** The flute in the whistle tube should be visible and aligned with the hole in side of rubber cover.

9 Hold screw (1) to the 2.0mm adaptor, apply one drop of Loctite 542 to the thread of the screw then re-insert the screw through the cross hole in the rubber cover and into the threaded radial hole of the whistle tube and then using the 2mm adaptor and torque driver, tighten the screw to a torque of 0.7Nm.

10 Before the adhesive sets, connect air containment unit, and if necessary, the lung demand valve, to the pressure reducer and apply pressure to the equipment. Close the valve and carry out Leak Test. Following satisfactory leak test immediately begin to slowly vent pressure until the whistle activates.

5.11 Whistle Warning Unit - Resetting Alarm Activation Point

**Tools Required**
3mm AF Hexagon Socket Key 3335737

1 If necessary attach the lung demand valve to the equipment. Activate the positive pressure mechanism (lever or button) to switch ‘Off’ positive pressure.

2 Turn the valve of the air containment unit fully ‘anticlockwise’ (90 degrees) to ‘open’ the valve pressurise the pneumatic system. Check reading of pressure gauge.

3 Turn the valve of the air containment unit fully ‘clockwise’ (90 degrees) to ‘close’ the valve. Vent equipment slowly as follows and note pressure at which whistle activates:

**Positive Pressure Lung Demand Valves** - Cover outlet port of demand valve with palm of hand. Press the centre of the rubber cover of the demand valve and slowly vent equipment by carefully lifting palm of hand to maintain slow steady decrease in pressure.
Normal Demand Lung Demand Valves - Slowly vent equipment by carefully pressing the centre of the rubber cover of the demand valve maintaining slow steady decrease in pressure.

**Note:** If whistle does not sound at required pressure reset as follows:

4 Place the equipment on a flat surface. Turn the locking plate (1 Fig. 24) anti-clockwise to release air containment unit. Grip handle of the air containment unit and lift unit from the carrying system manifold.

5 Pivot the reducer body to reveal the adjuster (1) Fig. 25 situated between the dual pressure hose and medium pressure hose connections. Remove the anti-tamper plug from the adjuster.

**Important Note: Do Not turn adjuster unless the pressure is vented from the system.**

Using a 3mm hexagon key in the socket of the adjusting cap:

- turn the adjusting cap clockwise to increase the pressure at which whistle activates.
- turn the adjusting cap anti-clockwise to decrease pressure at which whistle activates.

**Note:** As a guide - one quarter turn of the adjusting cap is equivalent to a pressure change of approximately 2 bar to 3 bar. **Do Not** turn adjusting cap with the pressure ‘On’.

4 Repeat instructions 2 to 3.

5 If necessary repeat instructions until the required whistle activation setting is achieved.
5.12 Removing and Fitting Bodyguard (E and ET)

5.12.1 Removing Bodyguard

**Tools Required:**
2mm AF Hexagon Socket Key 3337900

**Safety Warning:** Before proceeding with the removal of the Bodyguard hose from the reducer, turn the valve of the air containment unit fully clockwise to the ‘closed’ position then vent the system.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

**Note:** Do Not attempt to remove from hinge unless cover is at 180 °.

2. Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold. Refer to Figure 26.

3. **Fig. 26**

   Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1) retaining cap (2), and retention staple (3) from port of central manifold. Grip and pull the hose to remove pressure switch (4) from outlet port of central manifold.

4. Unfasten the hose loop on the left shoulder strap to release hose. Slide the hose grommet from carrying system case. **Bodyguard** and hose assembly is now disconnected from the carrying system.

5. Inspect O rings and sealing ring of pressure switch end fitting and replace if necessary.

5.12.2 Fitting Bodyguard

**Tools Required:**
2mm AF Hexagon Socket Key 3337900

**Note:** Check that the O ring and sealing ring are fitted to pressure switch end fitting and are undamaged.
1 Check central manifold outlet port is clean and not damaged then insert the pressure switch into the port - insert the retention staple through the corresponding holes in manifold ensuring correct location into groove of end fitting of pressure switch.

**Note:** Check hose securely retained by pulling hose away from central manifold.

3 Locate groove of retaining cap over the protruding portion of the retention staple - align screw holes then insert screws and using 2mm AF hexagon socket key tighten the screws.

4 Slide the hose grommet into the slot of the carrying system case. Fasten hose loop on the left shoulder strap around hose to retain the hose.

5 Connect air containment unit to equipment and carry out Leak Test.

### 5.13 Removing and Fitting Central Location Manifold

**Tools Required:**
- 2mm AF Hexagon Socket Key 3337900
- 2.5mm AF Hexagon Socket Key 3310563
- Plate Spanner R26817

**Safety Warning:** Valve of air containment unit should be closed (clockwise) and system vented.

1 Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

**Note:** Do Not attempt to remove from hinge unless cover is at 180 °.

2 Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

Refer to Figure 27.

3 Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2) and retention staple (3) from the pressure reducer port of the central manifold. Grip and pull the reducer to remove.
Note: If equipment is fitted with Bodyguard, repeat instruction 3 to remove pressure switch from second port of the central manifold.

4 Using 2.5mm AF hexagon socket key unscrew (anti-clockwise) and remove the two screws, (4) Fig. 27, to detach the pedestal from the flange of the central manifold. Grip the spindle (5) and extract the valve knob from the bore in base of carrying case to remove the pedestal spindle assembly.

Refer to Figure 28.

5 Lift the carrying case then insert the pins of the plate spanner R26817 into the radial holes in the securing ring (1) - unscrew and remove the securing ring. Remove the washer (2), O ring (3) and then extract the central manifold from the carrying case.

6 Reverse the above instructions to refit the central manifold.
5.14 Removal of Harness from Carrying System

Note: Close valve of the air containment unit and vent air from the system. Open hose loops of shoulder straps to release hoses.
5.14.1 Removal of Shoulder Adjusting Strap

1. Place the equipment on flat surface. Press the hook of each locking clamp then lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit. If necessary remove the cover.

**Note:** Do Not attempt to remove pivot cover from hinge unless cover is at 180 degrees.

2. Turn locking plate of the air containment unit anti-clockwise to release the air containment unit. Grip the handle and carefully lift the unit away from the manifold.

3. Push the end of each of the shoulder adjusting straps through anchor peg location and remove anchor peg. See Fig. 30.

4. Thread the upper end of each of the shoulder adjusting straps through the buckle. See Fig. 31.

5. Clean and replace as necessary.
5.14.2 Removal of Shoulder Pads

1. Open the hose loops of the shoulder pads to release the hoses.

2. Thread end of each shoulder pad strap through buckle (1) and slots in the arm of the shoulder yoke. See Fig. 32.

3. Clean or replace as necessary.

5.14.3 Removal of Waistbelt and Waistbelt Pad

1. Rotate the waistbelt assembly and pivot plate through 90 degrees.

2. Push the waistbelt padding (1) away from the centre of the pivot plate (2) to reveal the anchor peg location. Push the waistbelt strap (3) towards the anchor peg and remove the anchor peg (4). Pull the waistbelt out of the anchor peg location. See Fig. 33.

3. Pull the waistbelt (1) through the loops of the waistbelt pad (2) and remove the waistbelt adjusting strap (3) from the buckle (4). See Fig. 34.

4. Repeat the procedure for both sides of the waistbelt.

5. Clean or replace as necessary.
5.15 **Assembly of Harness to Carrying System**

5.15.1 **Assembly of Waistbelt and Waistbelt Pad**

**Note:** *RH Male Buckle/LH Female Buckle*

1. Thread the front half of the waistbelt (1) through the metal buckle (2) then slide the assembled waistbelt (3) through the loops of the waistbelt padding (4). See Fig. 35.

2. With the pad (1) pulled back from the pivot plate (2) - place the end of the waistbelt (3) through the anchor peg location and insert the anchor peg (4). See Fig. 36.

3. Slide the waistbelt pad back over the pivot plate.

4. Repeat for both sides of the waistbelt.

5. Bring the waistbelt strap and buckle together - checking orientation is correct for male/female buckle.

5.15.2 **Assembly of Shoulder Pads**

1. LH + RH shoulder pads. Thread the end of the shoulder strap carefully through the slots in the arm of the yoke assembly and the buckle (1). See Fig. 37. Repeat for both sides of the harness.

2. Reassemble hoses to shoulder pads and close loops to secure.
5.15.3 Assembly of Shoulder Adjusting Straps

1. Thread the shoulder adjusting strap (1) through the metal buckle (2). See Fig. 38.

2. Push the free end of the shoulder adjusting strap (1) through the anchor peg location in the rear cover of the carrying system and push the anchor peg (2) into position - ensure that the strap is not twisted. Pull on the shoulder adjusting strap to seat the anchor peg into position. See Fig. 39. Repeat for both sides of the harness.
5.16 Removal of Yoke from Carrying System

1. Remove shoulder pads. Remove the rubber shock buffer from the opening ‘A’ of the yoke. Turn yoke adjuster (1) through 90 degrees and slide yoke to opening ‘A’ and align adjuster with opening - remove yoke. See Fig. 40.

5.16.1 Assembly of Yoke to Carrying System

1. Place the yoke into the top position of the slot in carrying system - aligning and locating the yoke adjuster with diamond shaped hole in yoke. Rotate the adjuster until the yoke can slide down the slot in the carrying system and when the preferred working position is selected - turn the yoke adjuster through 90 degrees to lock the yoke into place. Reassemble shoulder pads.

5.17 Removal of Waistbelt Pivot Plate from Carrying System

Tools required:
2.5mm AF Hexagon Socket Key

1. If necessary - remove waistbelt and waistbelt pad.

Refer to Figure 41.

3. Using 2.5mm hexagon socket key unscrew screws from the pivot plate retaining block. While holding the pivot plate assembly in position carefully remove screws (1), retaining block (2) and spring plate (3) from slot in the back cover. Retain components for reassembly. Replace any worn or damaged components. Pivot plate assembly can now be removed from backplate.
5.17.1 Assembly of Waistbelt Pivot Plate to Backplate

1. Place the pivot plate assembly into slot the in the back cover. Hold in position and place the spring plate and retaining block over the boss of the pivot plate. Insert screws and tighten using a 2.5mm hexagon socket key.

2. Slide the pivot plate along the slot checking the security of the assembly and for unrestricted freedom of movement.

4. Orient correctly and if necessary reassemble the waistbelt and the waistbelt pad.

5.18 Removal of Pivot Plate and Components

Tools required:
2.5mm AF Hexagon Socket Key

1. Remove pivot plate assembly. See Section 5.18.

Refer to Figure 42.

2. Squeeze sides of the pivot bumper (1) to reveal the pivot pin (2), then using a screwdriver or similar object, push the pivot pin out of the assembly releasing the component parts.

Refer to Figure 43.

3. Remove nuts (1) from the upper pivot (2).

4. Inspect and replace any worn or damaged components.

5. Scrap the nuts (1), do not re-use.
5.18.1 Assembling Pivot Plate Components

1. Insert new nuts (1) into position on rear of upper pivot (2) Fig. 43.

Note: Assemble as shown in Fig. 44.

Refer to Figure 44.

2. Carefully position the pivot bumper (1) over the boss of the upper pivot (2).

Refer to Figure 45.

3. While holding the lower pivot (1) in position on the pivot plate (2) - place the upper pivot assembly (3) over the boss of lower pivot.

4. While holding assembly together - pull back pivot bumper (1) to reveal pivot pin location and insert pivot pin (2) into position. Release pivot bumper. See Fig. 46.

5. Check the pivot assembly for security and unrestricted freedom of movement.

6. Reassemble waistbelt pivot plate to backplate.
5.19 Removal of Yoke Adjuster from Carrying System

Tools required:
Tool - Yoke Nut 3310649
Tool - Yoke Screw 3310650

1 If fitted, remove the air containment unit from the carrying system.

2 Remove the rubber shock buffer from the opening at the base of the yoke. Turn the yoke adjuster through 90 degrees and slide the yoke to opening and align the adjuster with the opening - remove the yoke.

Refer to Figure 47.

4 Using the yoke screw tool and the yoke nut tool unscrew and remove components. Inspect components and replace as necessary.

5.19.1 Assembly of Yoke Adjuster to Carrying System

Tools required:
Tool - Yoke Nut 3310649
Tool - Yoke Screw 3310650
Loctite 221 Adhesive 3335371

Refer to Figure 47.

1 Locate the yoke screw (5) into the hole in the back cover plate with head of screw located into recess. Assemble washer (4) to the yoke screw.

2 Assemble the two disc springs (2) to the yoke nut (1) ensuring that the disc springs are orientated correctly as shown in Fig. 48.
Assemble the yoke adjuster (3) to the yoke nut. Apply one drop of Loctite 221 to the first thread of yoke screw (5). While holding the yoke screw in position, and using the yoke screw tool, screw the yoke nut assembly to the yoke screw. Using yoke screw tool and the yoke nut tool finally tighten assembly.

Refer to Figure 49.

Place the yoke into top position of the slot in the back cover aligning and locating the yoke adjuster with diamond shaped hole in the yoke. Rotate the adjuster until the yoke can slide down the slot and when the preferred working position is selected - turn the yoke adjuster through 90 degrees to lock the yoke into place. Assemble the rubber shock buffer into the opening ‘A’ of the yoke.
Section 6  Test Procedures
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6.1 Test Procedures

Standard test procedures for the PSS 500 Series of Self Contained Breathing Equipment (S.C.B.A.) are as follows:

- Pressure Check - Air Containment Unit
- High Pressure Leak Test - Mechanical Gauge
- Whistle Warning Unit Test
- High Pressure Leak Test - Bodyguard E and ET
- Whistle Warning Unit Test - Bodyguard E and ET
- Full Flow Test
- Medium Pressure Test - Pressure Reducer

For detailed instructions of the following additional Functional Tests, refer to the appropriate Test Equipment Manual, (i.e. Test Box, A900 Test Unit, Quaestor).

**Lung Demand Valves**

**Type A and AE**
- Balanced Piston Leak Test
- Positive Pressure Balance Test
- Static Pressure Test
- Positive Pressure Switch Over

**Type N**
- Balanced Piston Leak Test
- Demand Valve Opening Pressure

6.2 Pressure Check - Air Containment Unit

**Tools Required**
- High Pressure Test Gauge 3331209
- Charging Adaptor 3338375

**Safety Warning:** If air containment unit is assembled to the carrying system, ‘close’ the valve (90 degrees clockwise) and vent pressure from the pneumatic system.

**Note:** Check Test Date, shown on the air containment unit by the last Testing Station. If past the Test Date Do Not use the air containment unit. Arrange for retest and certification.

1 Place the equipment on flat surface. Lift and pivot the locking clamps releasing the hinged cover. Lift and open the cover to access the air containment unit. Then turn the locking plate anti-clockwise to release air containment unit. Grip the handle of the unit and lift the unit from the carrying system manifold.
2 Carefully locate the manifold pins of the charging adaptor (3338375) to the valve manifold of the air containment unit. Gently push to complete the assembly and turn the locking plate clockwise to secure. Close the relief valve of the charging adaptor.

3 Screw the handwheel of the high pressure gauge into the outlet port of the charging adaptor then ‘close’ the relief valve of the test gauge. Using the extension shaft, located onto the male drive of the valve manifold, turn the male drive fully anti-clockwise (90 degrees) to ‘open’ the valve. Check reading on test gauge.

**Test Parameters**
The content pressure of the air containment unit must be at least 80% of maximum working pressure (indicated on sphere label - 300bar) before attempting to perform functional tests of equipment. If pressure is low then recharge.

4 Using the extension shaft, turn the male drive fully clockwise (90 degrees) to ‘close’ the valve then open the relief valve of the high pressure test gauge, venting pressure.

5 Turn the locking plate anti-clockwise and remove the charging adaptor and high pressure test gauge assembly from valve manifold of air containment unit.

6 Assemble air containment unit to the equipment.

6.3 **Equipment Tests**

Before performing operational tests on the equipment ensure that the air containment unit has been pressure tested as detailed in Section 6.2. If the air containment pressure is low then recharge to the required working pressure.

6.3.1 **High Pressure Leak Test - Mechanical Gauge**

**Note:** If the equipment has a quick release coupling on the medium pressure hose then attach the lung demand valve to the female coupling.

1 Activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure. Turn the valve handwheel fully anticlockwise to ‘open’ the valve and to pressurise the pneumatic system. Check pressure reading on pressure gauge.

**Note:** PA90LDVs: Do Not press centre of rubber cover while pressing reset lever. If an immediate leak indicated from demand valve - press centre of rubber cover to release positive pressure mechanism - press reset lever/button to lift positive pressure mechanism. Repeat action two or three times to eliminate leak.
2 ‘Close’ the valve of the air containment unit and again observe the reading on the pressure gauge.

**Test Parameter**
Gauge reading shall not decrease more than 10 bar in one minute.

3 If equipment ‘Passes’ the test proceed to Section 6.3.2.

If equipment ‘Fails’ to conform to the test parameter, vent pressure from the system, investigate source of the leak, rectify and repeat the test. Until the leak is rectified and the equipment conforms to the requirement of the test parameter, **Do Not** carry out any further test.

6.3.2 Whistle Warning Unit Test - Mechanical Gauge and Whistle

**Specification**
The whistle warning unit is set by Dräger to activate at a pre-set pressure of 55 bar +/- 5 bar (60 bar to 50 bar).

4 **Positive Pressure Lung Demand Valves** - Cover outlet port of the demand valve with palm of hand. Press the centre of the rubber cover of the demand valve to activate positive pressure. Slowly vent equipment by carefully lifting the palm of the hand to maintain a slow and steady decrease in pressure.

**Normal Demand Lung Demand Valves** - Slowly vent equipment by carefully pressing the centre of rubber cover of the demand valve maintaining a slow and steady decrease in pressure.

As pressure decreases observe the pressure gauge and note pressure at which the whistle begins to sound.

**Test Parameter**
The whistle warning unit should activate an audible signal at the pre-set pressure of 55 bar +/- 5 bar (60 bar to 50 bar).

5 a. If whistle setting incorrect, reset as detailed in Section 5.12.
b. If whistle setting satisfactory, go to Section 6.3.5.

6.3.3 High Pressure Leak Test - Bodyguard E and ET

Before performing operational tests on equipment, ensure cylinder has been pressure tested as detailed in Section 6.2. If cylinder pressure is low, recharge to required working pressure.

1 Activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure. Cylinder valve ‘Closed’.
Note: PA90LDVs: Do Not press centre of rubber cover while pressing reset lever. If an immediate leak indicated from demand valve - press centre of rubber cover to release positive pressure mechanism - press reset lever/button to lift positive pressure mechanism. Repeat action two or three times to eliminate leak.

2 Tally Operated - Remove Tally.
   Button Operated - Press LH button

   **Bodyguard** will begin self check sequence.

3 When the leak test icon (Fig. 1) is displayed - press the LH button. Bar graph segments sweep to the right and the ‘open valve’ icon will be displayed. See Fig. 2.

**General Note:** If during the self check sequence the LH button is not pressed when the leak test icon (Fig. 1) is displayed then wait till end of sequence when ‘0’ bar is displayed. Press and hold down LH button until reverse arrow icon displayed (‘a’ Fig. 6) then release button - **Bodyguard** will then restart the self check sequence. Repeat from 3.

4 When the ‘open valve’ icon is displayed ‘Open’ the valve of the air containment unit fully to pressurise the system.

5 On sensing pressure, the display changes to Fig. 3 - ‘actual pressure displayed’, alternating ‘close valve’ (a) and ‘press RH button’ (b) icons.

6 As soon as the valve is fully open then ‘Immediately’ begin to ‘close’ the valve. Bar segments will sweep to the right and when only two or one segments remain then ‘press’ the RH button to start the leak test timing sequence. Display will change to Fig. 4.

**Important Note:** During the leak test sequence the pressure reading may reduce by up to 10bar. This may be due to settling of the pressure reducer.

7 During the leak test timing sequence the bar graph segments will sweep to the right and at the end of the timing sequence either:
   ‘Passed’ icon (a) displayed (Fig. 5) - equipment ‘Passed’ test. Proceed to instruction 8.
   or
   ‘Failed’ icon (b) displayed (Fig. 5) - equipment ‘Failed’ test. See Note below.

**Note:** If ‘Failed’ icon (b) is displayed during leak test timing sequence then to determine whether the failure is due to a slow to settle reducer or an high pressure leak - **Do Not** vent system of pressure but ‘immediately’ Go to ‘Failed Test’ - Optional Procedure - Section 6.3.4.)

8 Continue to test Whistle Warning Signal - Venting Procedure.
Venting Procedure
Positive Pressure Lung Demand Valves - Cover the outlet port of the demand valve with palm of hand. Press centre of the rubber cover of the demand valve to activate positive pressure. Slowly vent equipment by carefully lifting palm of the hand to maintain a slow and steady decrease in pressure.

Normal Demand Lung Demand Valves - Slowly vent equipment by carefully pressing centre of the rubber cover of the demand valve maintaining a slow and steady decrease in pressure.

During venting observe the display. The whistle alarm signal (rapid ‘Bleep’) should become audible at the pre-set pressure level (55bar +/- 5bar - 60bar to 50bar) and continue down to 10bar. Continue slowly venting until the pressure and time displays indicate ‘0’ bar.

Note: Using a ‘snap on’ I.R. Link and Widows based Software Package Option, the pressure setting can be adjusted. Contact Dräger for details.

Tally Operated - Refit ‘Tally’. **Bodyguard** will switch ‘Off’.
Button Operated - Bodyguard will switch ‘Off’ if no further action is taken within 15 seconds. Alternatively, press and hold down LH button - display sequences icons (a) and (b) Fig. 6. When icon (b) is displayed, release button, **Bodyguard** switched ‘Off’.

Following satisfactory whistle alarm check, ensure the positive pressure mechanism of the lung demand valve is switched ‘Off’.

6.3.4 ‘Failed Test’ - Optional Procedure

Following the display of ‘Failed’ icon (b) Fig. 5, during leak test timing sequence, observe display of **Bodyguard** until the self check sequence automatically restarts and when leak test icon (Fig. 1) displayed - press LH button. Bar graph segments sweep to the right and the ‘open valve’ icon is displayed. See Fig. 3.

General Note: If during the self check sequence the LH button is not pressed, when the leak test icon is displayed, wait till end of sequence. Press and hold down LH button until reverse arrow icon displayed (‘a’ Fig. 7) then release button - **Bodyguard** will then restart the self check sequence.

Again ‘open’ the valve of the air containment unit fully to boost the pressure in the system. Display changes to Fig. 3 - actual pressure displayed, alternating ‘close valve’ (a) and ‘press RH button’ (b) icons.

As soon as the valve is fully open then ‘Immediately’ begin to ‘close’ the cylinder valve. The Bar segments will sweep to the right and when only two or one segments remain then ‘press’ the RH button to start the leak test timing sequence. Display changes to Fig. 4.
4 During the leak test timing sequence the bar graph segments will sweep to the right and at end of timing sequence either: If ‘Passed’ icon (a) Fig. 5, displayed at end of timing sequence - equipment ‘Passed’ test, continue to test Whistle Warning Signal - Venting Procedure instruction 5.
or If ‘Failed’ icon (b) Fig. 5 is again displayed during leak test timing sequence - ‘Close’ the valve, vent pressure from system and switch ‘Off’ Bodyguard. Investigate source of leak, rectify and repeat High Pressure Leak and Whistle Warning Test.

5 Venting Procedure
Positive Pressure Lung Demand Valves - Cover outlet port of the demand valve with palm of hand. Press centre of the rubber cover of the demand valve to activate positive pressure. Slowly vent equipment by carefully lifting palm of hand to maintain a slow and steady decrease in pressure.

Normal Demand Lung Demand Valves - Slowly vent equipment by carefully pressing centre of rubber cover of the demand valve maintaining a slow and steady decrease in pressure.

6 During venting observe the display - the whistle alarm signal (rapid ‘Bleep’) should become audible at the pre-set pressure level (see Test Parameters - Section 6.4) and continue down to 10bar. Continue slowly venting until pressure and time displays indicate ‘0’bar.

7 Tally Operated - Refit ‘Tally’. Bodyguard will switch ‘Off’. Button Operated - Bodyguard will switch ‘Off’ if no further action is taken within 15 seconds. Alternatively, press and hold down LH button - display sequences icons (a) and (b) Fig. 6. When icon (b) is displayed, release button, Bodyguard switched ‘Off’.

8 Following satisfactory whistle alarm check, ensure positive pressure mechanism of the lung demand valve is switched ‘Off’.

6.3.5 Full Flow Test

Safety Note: During full flow venting check Do Not direct outlet of demand valve onto face, eyes, or skin.

1 Activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure. Open the valve of the air containment unit fully to pressurise the pneumatic system.

Note: PA90LDVs: Do Not press centre of rubber cover while pressing reset lever. If an immediate leak indicated from demand valve - press centre of rubber cover to release positive pressure mechanism - press reset lever/ button to lift positive pressure mechanism. Repeat action two or three times to eliminate leak.
2 Press centre of the rubber cover of the demand valve. On positive pressure types this makes positive pressure active. See Safety Note.

**Test Parameter**
An unobstructed air flow should vent to atmosphere from the outlet of the demand valve. See Safety Note. This test should take a minimum of 3 - 5 seconds.

3 Positive Pressure Lung Demand Valves - To switch ‘off’ the air flow and positive pressure - activate the positive pressure ‘Off’ mechanism.

4 Close the cylinder valve then vent pressure from the system.

6.3.6 **Medium Pressure Test**

**Tools Required:**
Medium Pressure Test Gauge 3331771

**Note:** *Certified equipment incorporate a pre-set and sealed pressure reducer assembly. The Dräger guarantee is void should original seal caps be tampered with, removed, or broken. The guarantee of correct operational condition of the pressure reducer is only valid if Dräger service, and re-seals the reducer.*

1 Detach demand valve from the quick release coupling of the medium pressure hose. Open the valve of the air containment unit.

2 Insert the test gauge into the female quick release coupling of the medium pressure hose from the reducer. Check the pressure reading on the test gauge.

**Test Parameters**
At a system inlet pressure (cylinder pressure) of \( >100\)bar the test gauge reading should indicate a medium pressure of between 6bar to 9bar after 5 seconds. After one minute it is acceptable for the medium pressure to rise to 9.7bar.

4 Following the test ‘Close’ the valve and disconnect the test gauge from the quick release coupling.

5 Activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure and connect demand valve to the female quick release coupling. Press the centre of rubber cover of demand valve venting pressure from the system. Following venting activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure.

**Note:** *If reducer ‘fails’ the medium pressure test then return the reducer, with hoses and any accessories removed, to Dräger Service for overhaul under the Repair Exchange Scheme (REX). Details of REX Scheme are available on request.*
6.3.7 High Pressure Leak Test - ChargAir™

**ChargAir™** Filling Hose and Pressure Reducer with **ChargAir™**

**Tools Required**
- Filling Hose Assembly with Gauge
- Second Fully Charged Valved Cylinder Assembly (300bar)

**Note:** Attach the lung demand valve demand valve to the female coupling quick release coupling of the medium pressure hose.

1. Screw the handwheel of the **ChargAir™** Filling Hose into the cylinder valve of the second (fully charged) valved cylinder assembly (300bar). Open slowly, but fully, the cylinder valve to pressurise the Filling Hose. Check pressure reading on pressure gauge.

2. Close cylinder valve of second valved cylinder assembly and observe pressure gauge.

**Test Parameter**
Gauge reading shall not decrease more than 10bar in one minute.

**Note:** If Filling Hose fails to conform to instruction 3, investigate source of leak, rectify and repeat test. Until leak is rectified, **Do Not** carry out any further test.

3. Carry out High Pressure leak test of equipment as detailed in Section 6.3.1.

4. Close valve of air containment unit then activate the reset function of positive pressure demand valves to switch ‘Off’ positive pressure.

5. Remove protective caps from male **ChargAir™** coupling of equipment and female **ChargAir™** coupling of filling hose. Push male and female couplings together until a loud ‘click’ is heard indicating a secure connection.

**Note:** A ‘dark green’ ring (1) visible behind the ‘grey’ sleeve (2) of the female coupling indicates a secure connection. See Fig. 7.

6. Open the cylinder valve of second valved cylinder assembly and observe the pressure gauge of the filling hose and pressure gauge of the equipment. Following pressure equalisation both gauges should indicate the same pressure.
7 Close the cylinder valve of second valved cylinder assembly and observe the pressure gauge of the filling hose and the pressure gauge of the equipment.

**Test Parameter**
Gauge reading shall not decrease more than 10bar in one minute.

8 If equipment fails to conform to test parameters investigate source of leak, rectify and repeat test. Until leak is rectified, **Do Not** carry out any further test.

**Note:** If reducer assembly ‘fails’ high pressure test due to fault of ChargAir™ return reducer, (hoses and any accessories removed, except ChargAir™ hose), to Dräger Service for overhaul under the Repair Exchange Scheme (REX). Reducers (300bar) with ChargAir™ must be returned with ChargAir™ hose fitted. Details of REX Scheme are available on request.

9 Check that the cylinder valve of the second valved cylinder assembly is ‘closed’. Disconnect ChargAir™ male and female coupling by pulling ‘grey’ sleeve of female coupling away from male coupling.

**Note:** As couplings separate, a ‘hiss’ or ‘pop’ may be heard as non-return valves in both couplings seal ‘off’ high pressure.

10 Assemble protective cap of filling hose to female coupling; press centre of cap to vent pressure. Unscrew filling hose handwheel from cylinder valve of second valved cylinder assembly. Press centre of the rubber cover of the demand valve, venting pressure from equipment. Reset demand valve to positive pressure ‘Off’ position.

11 Test completed.
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<td>7.5</td>
<td>Bodyguard - E and ET</td>
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</table>
7 Fault Location

7.1 Pressure Reducer

Certified equipment incorporates Dräger pre-set and sealed pressure reducer assemblies.

The Dräger guarantee is void should original seal caps be tampered with, removed, or broken. Guarantee of correct operational condition of the pressure reducer is only valid if serviced, and re-sealed by Dräger. Return faulty units (hoses and any accessories removed) to Dräger Service, Blyth.

Service life is six years. Dräger recommends that at the end of this period the reducer (hoses and any accessories detached) be returned to Dräger Service, Blyth, for overhaul under the Repair Exchange Scheme (REX). Details of REX Scheme are available on request.

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<tr>
<th>FAULT</th>
<th>CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leak from pressure relief valve of medium pressure hose</td>
<td>1: Damaged O-ring</td>
<td>Replace O-ring</td>
</tr>
<tr>
<td></td>
<td>2: Weak Spring</td>
<td>Replace spring</td>
</tr>
<tr>
<td></td>
<td>3: Damaged O-ring retainer</td>
<td>Replace retainer</td>
</tr>
<tr>
<td>Leak from pressure relief valve of medium pressure hose. Relief valve components O.K.</td>
<td>Reducer failure</td>
<td>Remove hoses from reducer and return reducer to Dräger. (REX)</td>
</tr>
<tr>
<td>High Medium Pressure</td>
<td>Reducer out of specification</td>
<td>Remove hoses from reducer and return reducer to Dräger. REX</td>
</tr>
<tr>
<td>Low Medium Pressure</td>
<td>Reducer out of specification</td>
<td>Remove hoses from reducer and return reducer to Dräger. (REX)</td>
</tr>
<tr>
<td>Medium pressure High after one minute Continuous creep</td>
<td>High Pressure Leak</td>
<td>Remove hoses from reducer and return reducer to Dräger. (REX)</td>
</tr>
</tbody>
</table>
### 7.2 Demand Valve

For detailed instructions for Inspection, Testing and Servicing, refer to the appropriate Lung Demand Valve Service/Training Manual.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inward/Outward leak when in facepiece port</td>
<td>Damaged/faulty connection O-Ring</td>
<td>Replace O-Ring</td>
</tr>
<tr>
<td></td>
<td>Damaged/faulty facepiece port</td>
<td>Replace facepiece port</td>
</tr>
<tr>
<td>Leak - positive pressure 'off'</td>
<td>1 Banjo seals leaking</td>
<td>Replace seals</td>
</tr>
<tr>
<td></td>
<td>2 Balanced piston unit leaking</td>
<td>Replace balanced piston unit</td>
</tr>
<tr>
<td>High static pressure</td>
<td>Balanced piston lever springs too strong</td>
<td>Replace springs</td>
</tr>
<tr>
<td>Low static pressure</td>
<td>Balanced piston lever springs too weak</td>
<td>Replace springs</td>
</tr>
<tr>
<td>Demand valve fails to switch automatically to positive pressure mode</td>
<td>1 Bent/damaged balanced piston lever</td>
<td>Replaced balanced piston unit</td>
</tr>
<tr>
<td></td>
<td>2 Bent/damaged retaining spring plate</td>
<td>Replaced balanced piston unit</td>
</tr>
<tr>
<td>No supplementary supply</td>
<td>Bent/damaged balanced piston lever</td>
<td>Replaced balanced piston unit</td>
</tr>
</tbody>
</table>
## 7.3 Whistle Warning Unit - Mechanical

<table>
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<tr>
<th>Fault</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whistle sounds at wrong pressure</td>
<td>Incorrect whistle setting</td>
<td>Re-set whistle (Section 5.14.)</td>
</tr>
<tr>
<td>Whistle sounds continuously</td>
<td>1 Damaged HP piston seat</td>
<td>1, 2 or 3 - Remove hoses from reducer and return to Dräger (REX)</td>
</tr>
<tr>
<td></td>
<td>2 Piston seal leaks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Plunger housing seal leak (MP)</td>
<td></td>
</tr>
<tr>
<td>Poor sounding whistle</td>
<td>1 Blocked whistle tube flute and/or jet</td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>2 Blocked filter/filters</td>
<td>Replace filter/filters</td>
</tr>
<tr>
<td></td>
<td>3 Split or perforated rubber hose of dual pressure hose (leak)</td>
<td>Replace hose</td>
</tr>
<tr>
<td>Whistle does not sound</td>
<td>1 Blocked whistle tube flute and/or jet</td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>2 Faulty activation mechanism</td>
<td>Remove hoses from reducer and return reducer to Dräger (REX)</td>
</tr>
<tr>
<td></td>
<td>3 Blocked filter/filters</td>
<td>Replace filter/filters</td>
</tr>
</tbody>
</table>
## 7.4 Facepiece

For detailed instructions for Inspection, Testing and Servicing, refer to the appropriate Facepiece Service/Training Manual.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whistle sounds at wrong pressure</td>
<td>Incorrect whistle setting</td>
<td>Re-set whistle (Section 5.14.)</td>
</tr>
<tr>
<td>Whistle sounds continuously</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Damaged HP piston seat</td>
<td>1, 2 or 3 - Remove hoses from reducer and return to Dräger (REX)</td>
</tr>
<tr>
<td>2</td>
<td>Piston seal leaks</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Plunger housing seal leak (MP)</td>
<td></td>
</tr>
<tr>
<td>Poor sounding whistle</td>
<td>1</td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>Blocked whistle tube flute and/or jet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>Replace filter/filters</td>
<td>Replace filter/filters</td>
</tr>
<tr>
<td></td>
<td>Replace hose</td>
<td>Replace hose</td>
</tr>
<tr>
<td>Whistle does not sound</td>
<td>1</td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>Blocked whistle tube flute and/or jet</td>
<td>Clean or replace whistle tube</td>
</tr>
<tr>
<td></td>
<td>Faulty activation mechanism</td>
<td>Remove hoses from reducer and return reducer to Dräger (REX)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blocked filter/filters</td>
<td>Replace filter/filters</td>
</tr>
</tbody>
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### 7.5 Bodyguard - E and ET

<table>
<thead>
<tr>
<th>FAULT or FAULT ICON</th>
<th>CAUSE</th>
<th>REMEDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Battery Icon]</td>
<td>Low Battery</td>
<td>Replace battery. Refer to Instructions for Use for correct procedure and battery specification</td>
</tr>
<tr>
<td></td>
<td>High Pressure Leak</td>
<td>Rectify cause of leak and Re-Test</td>
</tr>
<tr>
<td>![Display Icon]</td>
<td>Instrument Failure</td>
<td>Disconnect from equipment and return <strong>Bodyguard</strong> to Dräger Service</td>
</tr>
<tr>
<td>Display showing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault Codes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>suffixed with X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(See Example Fig. 1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Bodyguard</strong> will</td>
<td>Low Cylinder Pressure.</td>
<td>Recharge cylinder to maximum working pressure</td>
</tr>
<tr>
<td>not switch 'ON'</td>
<td>(Below 10bar)</td>
<td></td>
</tr>
<tr>
<td>![Battery Icon]</td>
<td>Low Battery</td>
<td>Replace battery. Refer to Instructions for Use for correct procedure and battery specification</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>Disconnect from equipment and return <strong>Bodyguard</strong> to Dräger Service</td>
</tr>
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**Other Fault Codes**

S; T; P; H; v; C; r
Section 8   Accessories
## Contents

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8.2 Decontamination Hose Accessory.

Approvals
The Decontamination Hose Accessory is an approved Dräger accessory for use only with PSS 500 Series compressed air respiratory protection equipment.

Description and Intended Use
The Decontamination Hose Accessory connects to the medium pressure outlet of the pressure reducer of approved PSS 500 Series compressed air respiratory protection equipment.

The hose provides a connection for existing lung demand valve, plus a second connection fitted with female quick release coupling, for the fitting of a secondary source of compressed air. See Safety Warning.

Safety Warning: When using Decontamination Hose Assembly with a secondary air supply hose, for Decontamination Procedure, inlet air pressure must not exceed 10bar. Do Not connect high pressure air to female coupling.

Full Technical Specification available from Dräger
8.2.1 Fitting Decontamination Hose Assembly

**Tools Required**
2mm AF Socket Key 3337900

**Safety Warning:** Valve of air containment unit should be closed (clockwise) and system vented.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

**Note:** Do Not attempt to remove from hinge unless cover is at 180°.

2. Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

3. Unfasten the hose loops on the right and left shoulder straps releasing the hoses. Slide the hose grommet pair from the carrying system case. Refer to Figure 1.

4. Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2), and retention staple (3) from the medium pressure port of the reducer. Grip and pull the hose (4) to remove from the outlet port of the reducer.

**Note:** Component parts of the Relief Valve, i.e. spring (5), O ring retainer (6) and O ring (7), will be attached to nozzle of medium pressure hose.

5. Remove the rubber ring from the grommet (2 Fig. 3) and remove the hose from the grommet. Medium pressure hose assembly is now disconnected from the carrying system.
Refer to Figure 2.

6 Fit spring (1), O ring retainer (2), new O ring (3) to the nozzle of the manifold of the decontamination hose ensuring the O ring locate into O the ring retainer (2).

17 Check that the reducer outlet bore is clean and not damaged then insert the nozzle of the manifold of the decontamination hose into the outlet port of the reducer. Hold against the compression spring and insert the retention staple through the holes in reducer body ensuring correct location into the groove of the hose end fitting.

**Note:** Check manifold of decontamination hose securely retained by pulling manifold away from reducer body.

9 Locate groove of the retaining cap over protruding portion of the retention staple pin - align screw holes - insert screws and using 2mm AF hexagon socket key, tighten screws.

10 Slide the rubber ring (4 Fig. 3), on ‘top’ hose, towards the quick release coupling. Fit grommet (2 Fig. 3) to hose. Slide and locate the grommet pair into the slot of the carrying case. Following positioning of the hose inside the case, to ensure clearance for sphere of air containment unit, locate rubber ring over the grommet (2). Fasten hose loops on the right and left shoulder straps to retain the hoses.

11 Position the hose in the carrying case (1) as shown in Fig. 3. Secure the hose to hose clip (3) and pass the quick release coupling (4), of ‘bottom’ hose, through the hole in the case and position hose as shown in Fig. 3.

12 Assemble the air containment unit and perform Leak Test.

**Order List**
Decontamination Hose 3338280
8.3  Belt Manifold Accessory

Approvals
The Belt Manifold Assembly, described in this section, is an approved accessory for use with only PSS 500 Series compressed air respiratory protection equipment.

Description and Intended Use
The Belt Manifold Assembly connects to the medium pressure outlet of approved PSS 500 Series compressed air respiratory protection equipment reducers.

This configuration provides a connection for equipment existing lung demand valve plus two additional connections:

2. Female quick release coupling for fitting of airline extension hose to second breathing equipment wearer.

With valve of PSS 500 Series equipment air containment unit turned ‘Off’, and male coupling of belt manifold connected to an independent air source, (e.g. Dräger Airpak system or works airline), equipment functions as an airline working set.

On failure, interruption, or turning ‘off’ of independent air supply, the wearer opens the equipment cylinder valve, disconnects independent air supply from belt manifold and either:

a. continues working using available air from equipment cylinder, or
b. goes on to a safe area.

Safety Warning: When using independent air source, inlet pressure must not exceed 10bar. Duration of PSS 500 Series equipment commences from time of opening valve of air containment unit and disconnecting airline supply. Time remaining from equipment is dependant on the volume of air remaining in air containment unit.

Details of equipment variants, accessories, and approved independent air supply source configurations (e.g. Dräger Airpak) are available from Dräger on request.

Technical Data

Airline Operating Pressures and Air Quality
When using PSS 500 Series of compressed air respiratory protection equipment, fitted with Belt Manifold Accessory, independent air source should conform to the following parameters.

CONNECTED TO MALE COUPLING - ONE USER: 6BAR TO 10BAR WITH A CONTINUOUS AIR FLOW OF AT LEAST 550 LITRES/MINUTE.
Connected to male coupling and second person connected to female coupling - Two Users - **7bar to 10bar** with a continuous air flow of at least 550 Litres/minute.

Air quality should conform to requirements of the latest edition of EN12021.

**Safety Note:** Check independent air supply complies with air quality, pressure, and flow requirements (see Technical Data).

**Belt Manifold Assembly**
8.3.1 Fitting Belt Manifold Assembly

**Tools Required**
- 2mm AF Socket Key 3337900
- Posi-Driv Screwdriver (No.2) 3331245

**Safety Warning:** Valve of air containment unit should be closed (clockwise) and system vented.

1. Place the equipment on flat surface. Press the hook of each locking clamp and lift and pivot the locking clamps to release the hinged cover. Lift and pivot the cover to access the air containment unit.

   **Note:** Do Not attempt to remove from hinge unless cover is at 180 °.

2. Turn locking plate anti-clockwise to release air containment unit. Grip the handle and lift the unit from the carrying system manifold.

3. Unfasten the hose loops on the right and left shoulder straps to release the hoses. Slide the hose grommet pair from the carrying case.

   Refer to Figure 1.

4. Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2), and retention staple (3) from the medium pressure port of the reducer. Grip and pull the hose (4) to remove from the outlet port of the reducer.

   **Note:** Component parts of the Relief Valve, i.e. spring (5), O ring retainer (6) and O ring (7), will be attached to nozzle of medium pressure hose.

5. Remove the rubber ring from the grommet and remove hose from the grommet. Medium pressure hose assembly now disconnected from the carrying system.

6. Check reducer outlet bore is clean and not damaged.
Refer to Figure 2

7 Using 2mm AF hexagon socket key, unscrew (anti-clockwise) and remove the two screws (1), retaining cap (2), and retention staple (3) from the manifold (4). Grip and pull the hose to remove it from the outlet port of the manifold.

Note: Component parts of the Relief Valve, i.e. spring (5). O ring retainer (6) and O ring (7), will be attached to the nozzle of the medium pressure hose.

Refer to Fig. 3.

8 Insert the non return valve (1) into bore of manifold.

9 Check the reducer outlet bore is clean and not damaged. Ensuring O ring (2) is fitted, insert the manifold connector into the outlet port of the reducer. Insert the retention staple into holes in the reducer body. Fully insert the retention staple ensuring correct location into the groove of the manifold connector.

Note: Check manifold securely retained by pulling the manifold away from the reducer body.

10 Locate the groove of the retaining cap over the protruding portion of the retention staple - align screw holes - insert screws and using 2mm key, tighten screws.

11 Slide the rubber ring of the ‘top’ hose, towards the quick release coupling. Fit the grommet to the hose and slide and locate the grommet pair into the slot of the carrying system case. Following positioning of the hose inside the case, to ensure clearance for sphere of air containment unit, locate the rubber ring over the grommet. Fasten the hose loops on the right and left shoulder straps to retain the hoses.
12 Pass ‘bottom’ hose nozzle (fitted with relief valve components) through the hole in the case. Refer to Figure 2. Insert the nozzle into the port in the manifold (4) and hold against the spring - insert retention staple (3) through the holes in the manifold. Fully insert the retention staple ensuring correct location into the groove in the hose end fitting.

**Note:** Check the hose is securely retained by pulling hose away from the manifold.

13 Locate the groove of the retaining cap (2) over the protruding portion of the retention staple - align holes - insert screws (1) and using 2mm key, tighten screws.

Refer to Figure 4.

14 Using posi-driv screwdriver, remove the two screws (1), then nuts (2) separating the retaining block half (3) from the belt manifold.

Refer to Figure 5.

15 Position the hose in the carrying case as shown and using the retaining block half, screws, and nuts, position and secure the manifold to the waistbelt as shown in Fig. 4. Secure the hose to the hose clip (1) Fig. 5.

16 Assemble the air containment unit and perform Leak Test.

17 Following satisfactory Leak Test, carry out the following Flow Test.

**Medium Pressure Flow Test**

18 Check valve of air containment unit ‘closed’. Switch ‘Off’ the positive pressure of the lung demand valve.

19 Press reset mechanism of lung demand valves to switch ‘Off’ positive pressure.
20 Connect the female quick release coupling of the hose from independent air supply to the male coupling on the belt manifold. Turn ‘On’ the independent air supply.

**Note:** If required connect second man equipment to the female coupling of the belt manifold.

21 Press centre of rubber cover on demand valve/s. See Safety Warning.

**Note:** Keep centre of rubber cover on N type demand valves (normal demand) depressed. Positive pressure types will activate to positive pressure. An unobstructed air flow should vent from demand valve/s outlet. This test should take a minimum of 3 to 5 seconds.

**Safety Warning:** Do Not direct air flow from outlet of demand valve onto face, eyes or skin.

22 Switch ‘Off’ positive pressure of lung demand valve.

23 Turn ‘Off’ the independent air supply and disconnect the supply hose from male coupling of the belt manifold.

**Note:** If second man equipment attached, remove from female coupling of belt manifold.

**Order Code**
Belt Manifold Assembly 3338671
Section 9  Spare Parts and Lists Tool List
# PSS 500 Series - Training Manual

## Spare Parts List

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<tr>
<td>1282.5</td>
<td>Medium Pressure Test Gauge</td>
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<tr>
<td>1286</td>
<td>PSS 500 Series - PSS 500 E and PSS 500 ET</td>
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<td>Harness Assembly</td>
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<td>1286.2</td>
<td>Case and Pneumatics Assembly</td>
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<td>STM 1286.3</td>
<td>Central Manifold and Pneumatics</td>
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<td>STM 1286.4</td>
<td>Central Manifold with ChargAirTM and Pneumatics</td>
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<td>Pneumatic Arrangement</td>
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<td>Charging Adaptors</td>
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<td>Decontamination Hose</td>
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<td>1286.10</td>
<td>Whistle Tube and Gauge Hose Assembly</td>
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<td>1286.11</td>
<td>Belt Manifold Assembly</td>
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<td>1289</td>
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<td>Manifold Valve Assembly</td>
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