SCOTT SAFETY

ELSA

Compressed-air Escape Breathing Apparatus

Service Manual

Article No. 1035072
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BREATHING APPARATUS SERVICE MANUAL

ELSA SERVICE MANUAL - CONTENTS

Article Number 1035072

SUMMARY OF CONTENTS

WARNINGS

Please Read Carefully and Fully Understand

This Service Manual is for use by personnel who have successfully completed a recognised training course in, and hold a current certificate for, the servicing of breathing apparatus supplied by Scott Safety Limited. Unqualified personnel MUST NOT service breathing apparatus.

Scott Safety Limited have taken great care to ensure that the information contained within this Service Manual is accurate, complete and clear. However, Training and Technical Support Services will be pleased to clarify any points in this Manual and answer questions of a general nature on breathing apparatus.

Failure to adhere to the above instructions may result in the cancellation of the certificate for servicing breathing apparatus supplied by Scott Safety Limited.

The following warnings are in accordance with certifying authority requirements and apply to the use of breathing apparatus in general:

In toxic atmospheres where the contamination is likely to exceed minimum levels, reference should be made to EN 529 : 2005 and the Health and Safety Executive publication HS(G)53 - Respiratory Protective Equipment, a Practical Guide for Users.

The quality and purity of air used to supply and charge compressed-air breathing apparatus must meet the requirements of EN 12021 :2014.

Observe all existing regulations regarding the use of Pressure Systems and Transportable Gas Regulations. These regulations will not only apply to compressed-air cylinders and vessels where used, but also to the supply hoses.

To ensure operational readiness, it is strongly recommended that breathing apparatus which is not in regular use should be tested in accordance with the instructions given in the Service and User Instruction Manuals; and operated at monthly intervals.

Apparatus that fails a routine check or any of the tests detailed within this Manual MUST be withdrawn from service until the fault is identified, rectified and all tests and routine checks have been passed successfully.

Fully de-pressurise the pneumatic system and disconnect from air supply prior to servicing pneumatic components.

Wear suitable eye protection when working with compressed-air equipment.

Registered Office: Scott Safety Limited, Pimbo Road, West Pimbo, Skelmersdale, Lancashire, WN8 9RA, England.

1. TERMS FOR USE OF THIS MANUAL

Failure to comply with these instructions or misuse of the apparatus may result in death, injury or material damage; and invalidate any warranty or insurance claims.

Scott Safety Limited retains the right to modify the apparatus or the information contained in this Manual without prior notification. **Scott Safety Limited** will endeavour to keep all registered users fully informed of all changes.

This Manual must not be copied in part or whole, or used for purposes other than its intended purpose without the written permission of **Scott Safety Limited**.

This document remains the sole property of **Scott Safety Limited** and must be surrendered upon request.

For further advice and information regarding the servicing of breathing apparatus supplied by **Scott Safety Limited**, please contact:

Training and Technical Support Services
Scott Safety Limited
Pimbo Road,
West Pimbo,
Skelmersdale,
Lancashire,
WN8 9RA,
England.
Tel: +44 (0) 1695 711711
Fax: +44 (0) 1695 711775

2. GENERAL PRECAUTIONS

- Servicing of the apparatus MUST ONLY be performed by trained personnel in possession of a current servicing certificate issued by **Scott Safety Limited** and in strict accordance with the correct instructions.
- Use only genuine replacement parts supplied by **Scott Safety Limited**. The use of other parts may degrade the performance of the apparatus and render it unsafe.
- Use only the tools specified in service procedures. The use of other tools may damage components and render the apparatus unsafe.
- Keep the work area clean to minimise the risk of dirt or debris contaminating or entering pneumatic assemblies.
- The apparatus MUST be cleaned in accordance with the appropriate instructions prior to dismantling or servicing.
- Use only the specified cleaning substances and lubricants. Failure to do so may cause damage or degradation to components and materials.
- When using lubricants, take care to prevent oral or skin contamination. Wear protective gloves and wash hands IMMEDIATELY following use. DO NOT smoke in the proximity of lubricants.

- Wear eye protection when using a compressed-air airline to clean or dry parts.
- Examine all components carefully for signs of wear or damage and renew where necessary in accordance with the servicing instructions.

3. BREATHABLE AIR

Air for respiratory protective equipment may be natural or synthetic. The quality of air used to supply and charge breathing apparatus must conform to EN 12021: 2014

Note:

- Contaminants must be kept to a minimum and must not exceed permissible exposure levels.
- Air supplied to breathing apparatus must be free from the odour of oil. The odour threshold is in the region of 0.3 mg/m^3.
- For self-contained, open-circuit, compressed-air breathing apparatus, the water content shall not exceed 30 mg/m^3 for 300 bar apparatus or 50 mg/m^3 for 200 bar apparatus.
- Air for compressed-air breathing apparatus must have a dew-point sufficiently low to prevent internal freezing when apparatus is used below 4°C.
- National regulations for compressed-air airline breathing apparatus must be observed.

4. HOW TO USE THIS MANUAL

4.1 CONTENTS OF THIS MANUAL

This Manual is comprised of the following information:

i) **Introductory Notes -** (this section);

ii) **Product Module -** (providing specific information for the complete apparatus);

iii) **Component Modules -** (detailing specific information for sub-assemblies of the complete apparatus);

iv) **Tests and Toolkit Section -** (explaining relevant test procedures and giving details of any toolkit that may be required in order to service and maintain the apparatus).

The Product Module contains the following information:

- **Introduction -** (general notes for guidance);
- **Apparatus Description -** (a technical description of the composition and function of the apparatus);
- **Recommended Service Schedule -** (detailing the minimum scheduled maintenance required to ensure that the apparatus is maintained in a fully-operational state);
- **Service Instruction Index -** (listing the Component Modules used in the apparatus along with the specific identity of each Module);
- **Fault-finding Chart -** (providing possible causes of faults and detailing remedial action);
- **General Assembly Instructions -** (giving details of how to remove component sub-assemblies from and re-assemble component sub-assemblies to the complete apparatus);
- **Assembly Diagram and Parts List -** (showing line-drawings of component sub-assemblies in their relative position with each other and providing Article Numbers for each sub-assembly where applicable).

Each Component Module contains the following information:

- **Technical Description -** (a technical description of the composition and function of the particular component or sub-assembly);
- **Tools -** (a list of the tools required to service the component or sub-assembly);
- **Recommended Service Schedule -** (detailing the minimum scheduled maintenance required to ensure that the component or sub-assembly is maintained in a fully-operational state);
- **Servicing Instructions -** (giving details of how to dismantle and re-assemble the component or sub-assembly);
- **Assembly Diagram and Parts List -** (showing line-drawings of component parts in their relative position with each other and providing Article Numbers for replacement parts where applicable).

The Tests and Toolkit Section contains the following information:

- **Tests -** (explaining the procedure for carrying out specific tests on the apparatus and detailing the criteria and course of action for successful and unsuccessful test results);
- **Toolkit -** (providing Article Numbers and descriptions of the toolkit and its contents).

4.2 ASSEMBLY DIAGRAMS AND PARTS LISTS

An Assembly Diagram and Parts List are provided at the end of each Product and Component Module. In some cases, more than one Assembly Diagram and Parts List may be present.

The objectives of each Assembly Diagram and Parts List are to:

- Assist with component identification by providing a line-drawing of each component relevant to the particular Module. Each component is shown in its relative position;
- Clearly show the relationship of individual components to higher levels of assembly;
- Identify which components will be included if an assembly is ordered;
- Provide Article Numbers for those components which may be ordered as replacement parts;
- Identify those components which may not be ordered individually as replacement parts;
- Provide a meaningful description of each component;
- Inform the reader of any further information that may be relevant to a particular component, for example: component dimensions, specific application, or the quantity of components supplied in the pack against a given Article Number.

The following example shows a typical Parts List and provides guidance on how to interpret the information contained:

Item	Article No	Description	Remarks
1	1234567	Cradle Assembly	
2	1234568	**.** Latch Kit	
3	**-**	**..** Latch	
4	1234569	Nut	Pack of 6

[A] **[B]** **[C]** **[D]**

Key:

[A] Item Number

The numbers displayed in this column correspond with those on the Assembly Diagram.

[B] Article Number

This column displays the Article Number of the replacement component or kit, which can be ordered from **Scott Safety Limited**. In cases where a component is not available as a separate item, this is indicated by a dash (**-**) in place of the Article Number. An example of this can be found against item 3 above.

[C] Description

This column provides a meaningful description of each component or kit. Additionally, the relationship of individual components to higher levels of assembly is given.

Components contained within a higher level of assembly are indicated by one or more dots (referred to as indents) in front of the component description. One indent indicates that the particular component is part of one higher level of assembly, two indents indicates that the particular component is part of two higher levels of assembly; and so on. If no indents are present, the component is not available as part of a higher level of assembly within the context of the Module in which it appears.

Similarly, indents indicate those components which will be supplied as part of an assembly.

For example:

- Item 1 has no indents in front of the description and so is not part of a higher level of assembly within the context of the Module.
  If item 1 is ordered, items 2 and 3 will also be included.
- Item 2 shows one indent in front of the description so is contained within one higher level of assembly. In this case, as part of item 1.
  If item 2 is ordered, item 3 will also be included.
- Item 3 shows two indents in front of the description so is contained within two higher levels of assembly. In this case, as part of item 2 and item 1.

[D] Remarks

Additional information is provided where applicable. For example: component dimensions, specific application, or the quantity of components supplied in the pack against a given Article Number. If no pack quantities are stated, the pack will contain a quantity of one of the given Article Number.

5. ORDERING REPLACEMENT PARTS

1. Refer to the relevant Assembly Diagram and Parts List and note the Article Number(s) you require.

2. Contact our **Customer Services** department, quoting the Article Numbers and quantities required.

Customer Services:

Scott Safety Limited
Pimbo Road,
West Pimbo,
Skelmersdale,
Lancashire,
WN8 9RA,
England.

Tel: +44 (0) 1695 711711
Fax: +44 (0) 1695 711775

1. INTRODUCTION

To ensure that you are fully familiar with the safety aspects, operation and configuration of the apparatus, please read the Introductory Notes section of this Manual and the User Instruction Manual prior to using these Service Instructions.

2. APPARATUS DESCRIPTION

ELSA is a self-contained, open-circuit, constant-flow, compressed-air, escape breathing apparatus. Respiratory protection is provided during escape from a hazardous environment for either 10 or 15 minutes duration, depending upon the size of cylinder fitted to the apparatus. The apparatus provides a constant flow of air at 38 litres per minute for the duration of the cylinder supply. **ELSA** may be worn by personnel entering potentially hazardous areas or stored, ready-for-use, within the area.

Pictogram user instructions and the duration of the air supply are printed clearly on the front panel of the bag. The cylinder contents gauge is visible through a transparent panel on the reverse of the bag, enabling the level of cylinder charge to be checked without opening the bag.

The apparatus comprises a compressed-air cylinder, a reducer/cylinder valve and a hood, all of which are contained within a high-visibility orange or black anti-static bag. A quick-fire strap connects the access flap on the bag or hood to the actuating pin on the reducer/cylinder valve. The action of opening the bag flap pulls the actuating pin from the reducer/cylinder valve and starts the flow of air to the hood.

To use **ELSA**, the wearer places the carrying strap around the neck, pulls the flap of the bag open and dons the hood, where air is immediately available to the wearer. If the reducer/cylinder valve does not open when the wearer opens the bag flap, the quick-fire strap can be used to pull the actuating pin manually.

The quick-fire strap is not connected when the apparatus is first delivered, allowing the contents of the bag to be inspected and the anti-tamper tags fitted prior to deployment. Tamperproof tags are provided with the apparatus and MUST be fitted prior to deployment.

Providing the apparatus is serviced regularly in accordance with these instructions, there is no shelf-life limit.

The hood is fabricated in high-visibility, flame-retardant PVC or PVC-coated materials with a rubber neck seal. An inner mask, that covers the wearer's nose and mouth, minimises visor misting and carbon dioxide dead-space. The spring-loaded exhale valve helps maintain hood integrity. The breathing hose elbow is attached to the front fitting of the hood by a U-Clip, which is held in position by the exhale valve fitting.

The reducer/cylinder valve (RCV) is a spring and piston device with a fixed orifice outlet that provides a constant flow of air at 38 litres per minute to the hood. A charging adaptor that conforms to EN 144-2: 1999 is provided.

Versions of the reducer/cylinder valve are available fitted with a 250 bar burst disc, which protects the system from over-charging.

3. SERVICE SCHEDULE

ELSA must be inspected / serviced annually by trained and qualified personnel, who may also be required to inspect, clean and maintain the apparatus on a monthly basis. Alternatively, monthly checks may also be performed by trained wearers. The method of maintenance adopted is the responsibility of the employer, who must ensure that all participants are fully aware of their duties and responsibilities and are suitably trained.

There is a recommended service schedule for each Module contained in the following table. Service details for each Module are contained within other sections of this Manual. In the following table, item numbers, e.g. (Item 8) refer to the components shown in the appropriate Assembly Diagram and Parts List.

3.1 HOSES

Hose assemblies must be leak-tested and the apparatus examined thoroughly to ensure that components are undamaged.

All medium and high-pressure hoses have a maximum service life of 12 years, after which they must be renewed. Hoses must be inspected annually and those which display any of the following defects must be renewed:

- Splits, abrasion, exposed braiding and severe crazing of the outer surface of the hose (minor crazing is acceptable).
- Damaged couplings, ferrules, excessive wear and corrosion.

Hoses contaminated by corrosive substances must be assessed for damage by a qualified expert and discarded if damage is suspected.

Note:

- Apparatus that is used frequently in close proximity to corrosive substances, high levels of ultraviolet light or high temperatures should be tested and serviced more frequently.
- Apparatus that is likely to suffer impact or abrasion damage should be tested and serviced more frequently.
- Life-expired and damaged hoses must be destroyed or rendered unusable to prevent accidental re-use.
- Items not in the following Main Service Schedule should be replaced only when damaged or worn.

3.2 MAIN SERVICE SCHEDULE

ARTICLE	DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5 OR 10
HOOD (HD-3)						
1032984	HOOD ASSEMBLY (ITEM 1)	INSPECT	INSPECT	INSPECT	INSPECT	INSPECT
1032112	EXHALE VALVE & O-RING (ITEM 9)	INSPECT	INSPECT	INSPECT	INSPECT	RENEW
1025990	LABEL (ITEM 11)	-	-	-	-	RENEW
REDUCER/CYLINDER VALVE (RCV-2)						
1025109	HOSE ASSEMBLY (ITEM 1 - PARTS LIST 5.3)	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1
1027891	O-RING (ITEM 2 - PARTS LIST 5.3)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
2015406	O-RING (ITEM 5 - PARTS LIST 5.3)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
1029995	RELIEF VALVE & O-RING (ITEM 11)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
1027797	O-RING - ACTUATOR (ITEM 15)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
2009622	O-RING - ACTUATOR (ITEM 16)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
1028016	O-RING - PISTON (ITEM 23)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	RENEW
2014896	O-RING - PISTON STEM (ITEM 24)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	RENEW
1029421	PISTON SEAT (ITEM 25)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST
1031241	CHARGING ADAPTOR ASSEMBLY (ITEM 29)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
1027987	O-RING - CONTENTS GAUGE (ITEM 36)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
1028161	O-RING - REDUCER BODY (ITEM 40)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW

Note:
We recommend that cylinders be tested in accordance with current regulations and the cylinder valve be serviced when the cylinder shell is tested. Please contact **Scott Safety Limited** for more information.

4. SERVICE INSTRUCTION INDEX

COMPONENT	MODULE	SECTION
Hood	HD-3	Headgear
Reducer/Cylinder Valve	RCV-2	Pneumatics
Toolkit Flow-setting and Test Leak-test	TK-17 FS-2 LKT-7	Tests and Toolkit

Note:
Based on product usage and storage conditions, the reducer can be serviced every 5 or 10 years.

5. FAULT-FINDING CHART

COMPONENT	SYMPTOM	POSSIBLE FAULT	REMEDIAL ACTION
HOOD	HOOD INFLATES EXCESSIVELY	EXHALE VALVE STICKING	CLEAN/RENEW EXHALE VALVE
	LEAKING HOOD	HOOD INCORRECTLY FITTED	ADJUST HOOD AND RE-TEST
		HOOD DAMAGED	RENEW HOOD
		EXHALVE VALVE O-RING DRY OR DAMAGED	CLEAN, LUBRICATE OR RENEW EXHALE VALVE O-RING
		EXHALE VALVE NOT CLOSING	RENEW EXHALE VALVE
REDUCER/CYLINDER VALVE	LEAKAGE FROM HOSE PORT	DAMAGED O-RING	RENEW O-RING
	LEAKAGE FROM REDUCER HEAD	DAMAGED PISTON O-RINGS	RENEW PISTON O-RINGS
	LEAKAGE FROM CONTENTS GAUGE	DAMAGED O-RING	RENEW O-RING
		DAMAGED GAUGE	RENEW GAUGE
	LEAKAGE FROM CHARGING ADAPTOR	DAMAGED SLUG OR O-RING	RENEW SLUG AND O-RING
		DAMAGED BONDED SEAL	RENEW BONDED SEAL
	LEAKAGE FROM CYLINDER NECK	DAMAGED CYLINDER OR O-RING	RETURN TO AUTHORISED CYLINDER SERVICE CENTRE
	LEAKAGE FROM ACTUATOR PIN	DAMAGED O-RINGS	RENEW O-RINGS
	PRESSURE RELIEF VALVE VENTING	PISTON SEAT DAMAGED	RENEW PISTON SEAT
		REDUCER BODY DAMAGED	RENEW REDUCER BODY
	LEAKAGE FROM WHISTLE	DAMAGED PISTON O-RINGS	RENEW PISTON O-RINGS
		DAMAGED GAUGE O-RING	RENEW GAUGE O-RING
	FAILS FLOW-TEST	REDUCED-PRESSURE LOW: WEAK REDUCER SPRING	RENEW REDUCER SPRING
		REDUCED-PRESSURE HIGH: DAMAGED PISTON SEAT	RENEW PISTON SEAT
	REDUCER NOISY OR VIBRATING	DAMAGED OR DRY PISTON O-RINGS	RENEW OR LUBRICATE PISTON O-RINGS

6. GENERAL ASSEMBLY INSTRUCTIONS

Refer to the relevant component Service Module for removal and servicing instructions of sub-assemblies. A list of all component Service Modules is given in Section 4 of this Module.

WARNING:

- **Fully de-pressurise the pneumatic system prior to servicing pneumatic components of ELSA.**
- **Wear suitable eye protection when working with compressed-air equipment.**

6.1 TOOLS

The following tool is required to remove and replace component sub-assemblies:

Item	Article No.	Description	Remarks
(A)	1025884	Krytox Grease	

Note:
For full toolkit details, please refer to the Toolkit Module within the Tests and Toolkit section.

6.2 REMOVE CYLINDER FROM BAG

1. Break tamperproof tag (11) and open bag flap carefully.
2. Disconnect quick-fire strap (8) from D-Ring located inside bag flap.
3. Open bag (9) fully and confirm that firing pin on quick-fire strap (8) is located securely through actuating pin on reducer/cylinder valve (6).
4. Ease contents gauge through slot at transparent window in bag (9) and remove cylinder assembly (5), breathing hose (7) and hood assembly (1) from bag.

6.3 FIT CYLINDER INTO BAG

1. Insert cylinder assembly (5) into bag (9) and locate contents gauge into slot at transparent window, so that gauge can be seen clearly when bag is closed.
2. Feed approximately half of the breathing hose (7) into bag (9).
3. Fold hood (1) into bag (9) and arrange breathing hose (7) under rear of hood so that it will not foul when hood is pulled from bag.
4. Fit quick-fire strap (8) to D-Ring on bag flap.

WARNING:

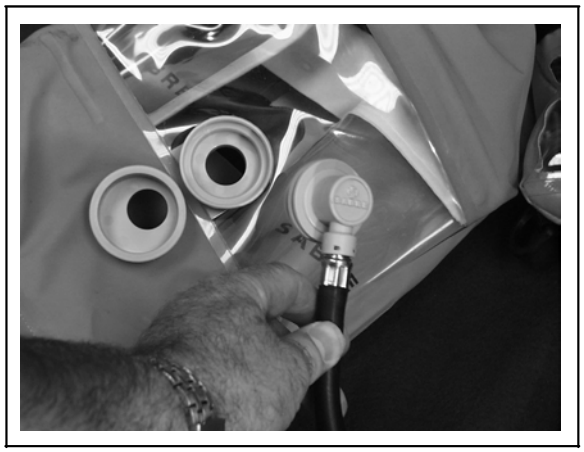
When fitting the quick-fire strap, ensure that it will not foul the breathing hose or wrap around the reducer/cylinder valve when pulled.

5. Close bag flap and fit tamperproof tag (11).

6.4 REMOVE BREATHING HOSE CONNECTOR FROM HOOD

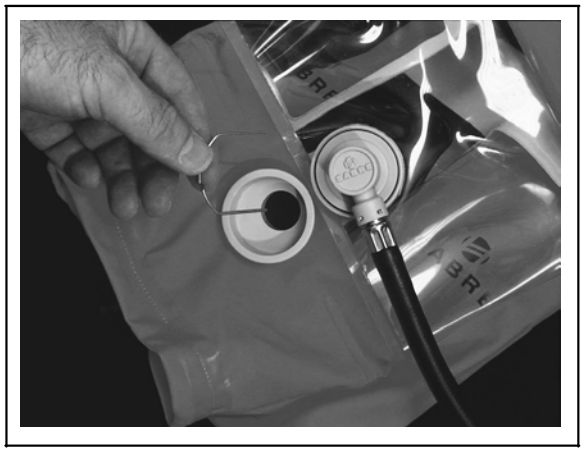
1. Remove breathing hose (7) and hood assembly (1) from bag (9) as described in Section 6.2 of this Module.

2. Pull exhale valve cover (3) to remove from exhale valve fitting on hood (1).
3. Pull exhale valve assembly (2) to withdraw from exhale valve fitting on hood (1).



4. Withdraw U-Clip (4) and remove hood connector from inlet fitting on hood (1).

6.5 FIT BREATHING HOSE CONNECTOR TO HOOD



1. Check to confirm that hood connector is in good condition, clean and free from grease.

2. Locate hood connector into inlet fitting on hood (1) and secure in position using U-Clip (4).

3. Ensure that exhale valve O-Ring has been lightly lubricated with Krytox Grease (A) and push exhale valve assembly (2) into exhale valve fitting on hood (1).

4. Fit exhale valve cover (3), ensuring that it 'clicks' into position.

5. Insert breathing hose (7) and hood assembly (1) into bag (9) as described in Section 6.3 of this Module.

6.6 TEST APPARATUS

1. When servicing any of the pneumatic components or when cylinder has been disconnected, the apparatus must be subjected to a flow-test (see FS Module) and a leak-test (see LKT Module).

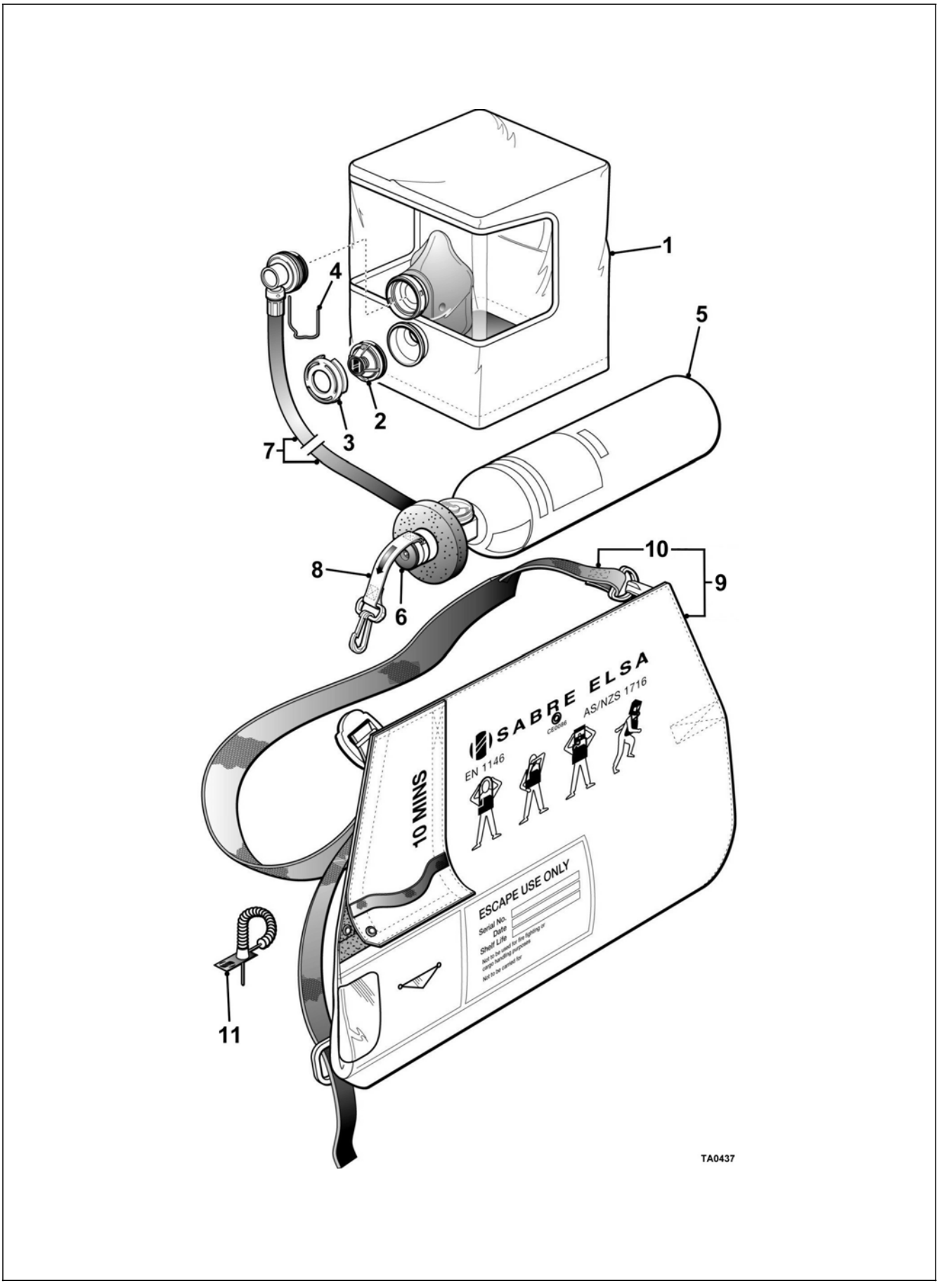
2. Complete the ‘Routine Checks’ instructions detailed in the **ELSA** User Instruction Manual prior to returning the apparatus to service.

INTENTIONALLY LEFT BLANK

7. ASSEMBLY DIAGRAM AND PARTS LIST

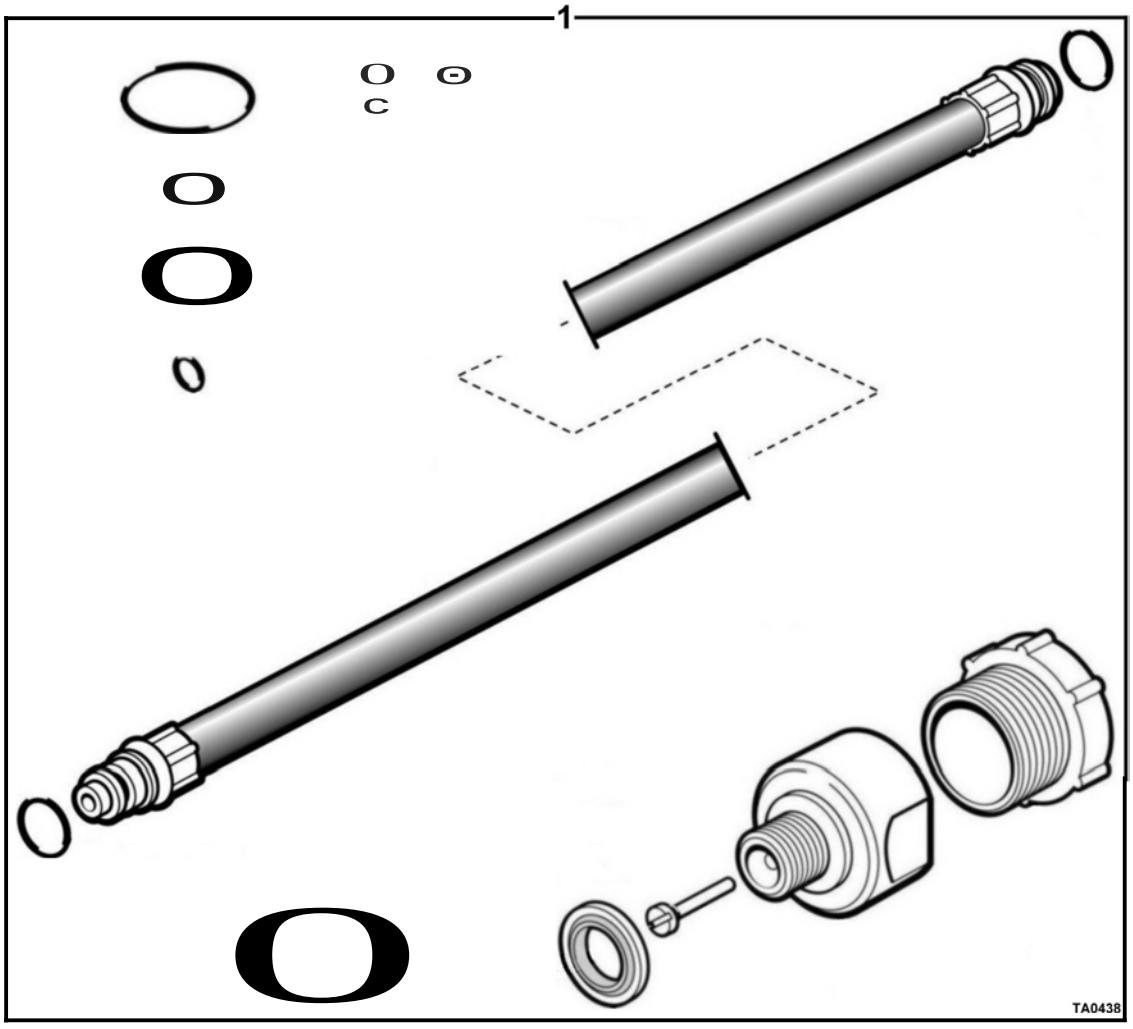
7.1 GENERAL ASSEMBLY

Item	Article No.	Description	Remarks
1	-	Hood Assembly	See HD Module
2	-	Exhale Valve & O-Ring	See HD Module
3	-	Exhale Valve Cover	See HD Module
4	-	U-Clip	See HD Module
5	-	Cylinder Assembly	
6	-	Reducer/Cylinder Valve	See RCV Module
7	-	. Breathing Hose	See RCV Module
8	1027714	Quick-fire Strap	
9	1024442	Bag - (Standard)	10 minute duration cylinders
9	2009601	Bag - (Standard)	15 minute duration cylinders
9	2009610	Bag - (Anti-static)	10 minute duration cylinders
9	2009611	Bag - (Anti-static)	15 minute duration cylinders
10	2009903	. Shoulder Strap	
11	1033977	Tamperproof Tag	Pack of 5


1
2
3
4
5
6
7
8
9
10
11
SABRE ELSA
EN 1146
AS/NZS 1716
10 MINS
ESCAPE USE ONLY
Serial No.
Date
Shelf Life
TA0437

7.2 FIVE-YEAR SERVICE KIT

Item	Article No.	Description	Remarks
1	2002408	Five-year Service Kit	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TA0438

1. TECHNICAL DESCRIPTION

This hood is fabricated in high-visibility, flame-retardant PVC or PVC-coated materials with a rubber neck seal.

The outer surface of the hood is constructed from a uni-directional, stretch PVC-coated viscose fabric and incorporates spring steel ribs that shape the hood when worn. A closed-cell foam pad at the rear of the hood ensures that the inner mask is kept in permanent contact with the wearer's face and that the hood moves with the head. The visor is formed from clear polyurethane, shaped to provide optimum all-round vision and is particularly suitable for use by wearers of spectacles. The neck-seal is moulded from perish-resistant, chlorinated rubber and is designed to provide a leak-tight seal for the majority of neck sizes.

An ori-nasal inner mask prevents the build up of CO_2 within the hood. The inner mask is moulded in Evoprene→, which is a flexible thermo-plastic elastomer that resists the effects of ozone and forms comfortably to the wearers face. An exhale valve that
conducts exhaled air directly to the atmosphere is connected to the inner mask. The breathing hose elbow is attached to the front fitting of the hood by a U-Clip, which is held in position by the exhale valve fitting.

2. TOOLS

The following tool is required to service the hood:

Item	Article No.	Description	Remarks
(A)	1025884	Krytox Grease	

3. SERVICE SCHEDULE

WARNING:

DO NOT use spare parts designated for other types of apparatus. Confirm the identity of spare parts by comparing part numbers and shapes in the Assembly Diagram and Parts List at the end of this Module.

Note:

- Items not in this schedule should be replaced only when damaged or worn.
- The item number refers to the components depicted in the Assembly Diagram and Parts List provided at the end of this Module.

3.1 MAIN SERVICE SCHEDULE

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5 OR 10
HOOD ASSEMBLY (ITEM 1)	INSPECT	INSPECT	INSPECT	INSPECT	INSPECT
EXHALE VALVE AND O-RING (ITEM 9)	INSPECT	INSPECT	INSPECT	INSPECT	RENEW
LABEL (ITEM 11)	-	-	-	-	RENEW

4. SERVICING INSTRUCTIONS

4.1 HOOD INSPECTION

1. Clean and examine the hood material and neck-seal for splits, cracks, holes, or other wear and damage that may reduce respiratory protection.
2. Examine the inner mask and associated components for signs of wear or damage.
3. Examine the visor for blemishes that may impair vision or reduce respiratory protection.
4. Hoods exhibiting signs of wear or damage of any kind must be replaced immediately.

WARNING:

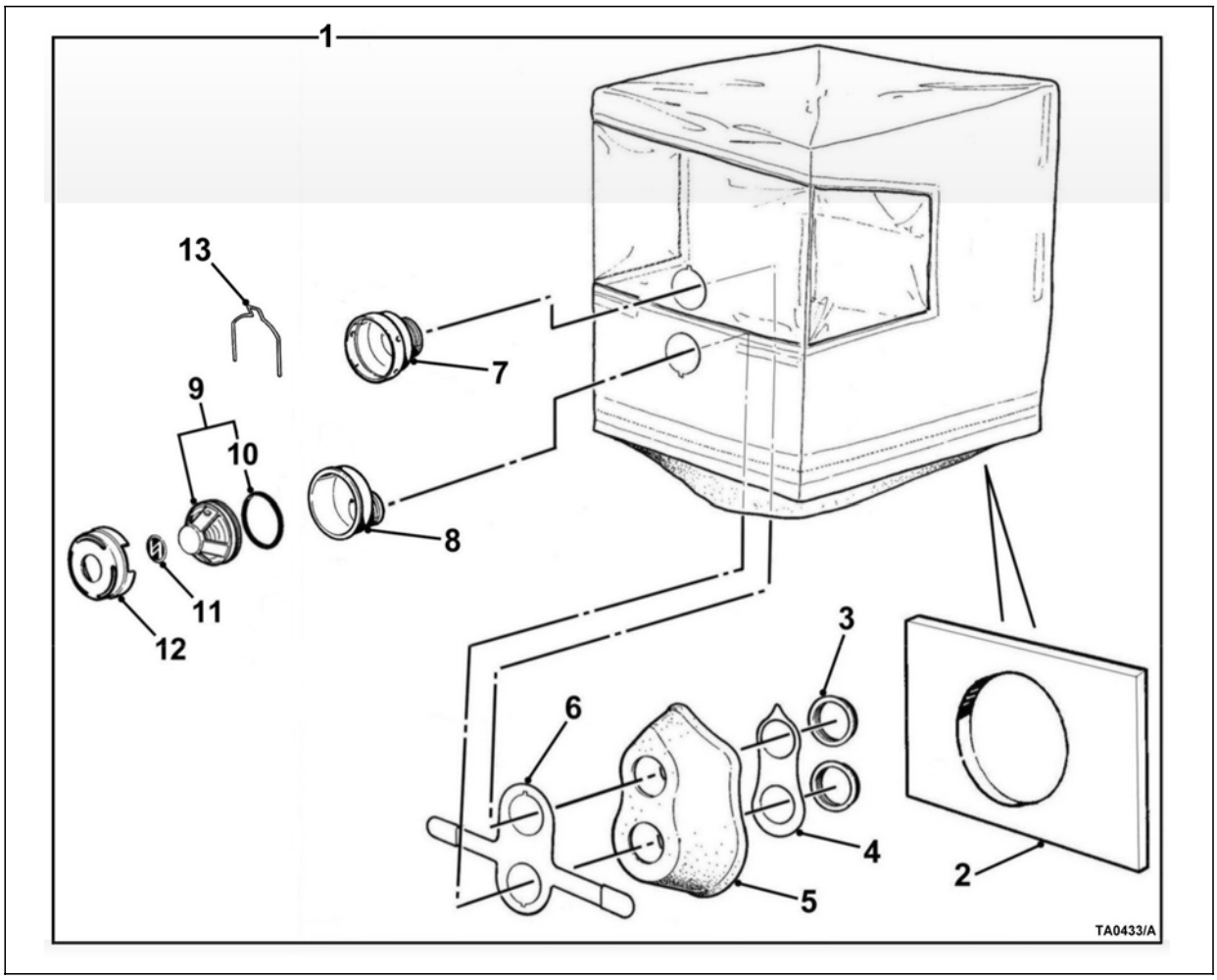
DO NOT attempt to repair damaged hoods as this will invalidate all apparatus approvals and may endanger the life or health of the wearer.

4.2 REPLACING THE EXHALE VALVE

1. Pull exhale valve cover (12) to remove from exhale valve fitting (8).
2. Pull exhale valve assembly (9) to withdraw from exhale valve fitting (8). Discard exhale valve assembly.
3. Lightly lubricate replacement O-Ring (10) with Krytox Grease (A) and fit over replacement exhale valve.
4. Affix replacement label (11) to exhale valve assembly (9).

5. Push replacement exhale valve assembly (9) into exhale valve fitting (8).
6. Fit exhale valve cover (12), ensuring that it 'clicks' into position.

5. ASSEMBLY DIAGRAM AND PARTS LIST



Item	Article No.	Description	Remarks
1	1032984	Hood Assembly	
2	-	. Foam Pad	
3	-	. Retaining Nut	
4	-	. Backing Plate	
5	-	. Inner Mask	
6	-	. Backing Spring	
7	-	. Inlet Fitting	
8	-	. Exhale Valve Fitting	
9	1032112	. Exhale Valve & O-Ring	
10	1027929	.. O-Ring	Pack of 5
11	1025990	. Label	Pack of 5
12	1032524	. Exhale Valve Cover	Pack of 2
13	1017899	. U-Clip	Pack of 5

1. TECHNICAL DESCRIPTION

This Module details the servicing procedures for the combined reducer/cylinder valve (RCV) for **ELSA** escape apparatus.

The reducer/cylinder valve screws directly into a compressed-air cylinder using an M18 parallel thread, with an O-Ring providing the necessary seal.

The constant flow of air from the cylinder to the wearer is controlled by a simple piston and spring pressure-reducer with a fixed-orifice outlet. Flow is controlled by air pressure in the chamber above the piston, which pushes the piston against the spring until the end of the piston stem closes the inlet jet. Air flowing out of the chamber reduces the pressure in the chamber, which allows the spring to lift the piston from the jet. A nylon seat in the end of the piston stem forms an air-tight seal with the jet.

When the cylinder is fully-charged and ready for use, the actuator, held by the firing pin, closes the outlet to the face-piece. This creates a build-up of pressure in the chamber above the piston of approximately 10 bar. At this pressure the piston is held firmly against the jet, closing it. When the firing pin is withdrawn the actuator is pushed up by pressure in the chamber and opens the outlet to the face-piece. This starts the constant flow of air, at 38 litres per minute, to the face-piece.

The flow of air from the chamber to the face-piece reduces pressure in the chamber, allowing the spring to lift the piston from the jet. Air flowing into the reducer pressurises the chamber and forces the piston to close the jet. Air flowing to the face-piece lowers the pressure on the piston, allowing the spring to lift the piston seat from the jet. Air flows into the reducer and the next cycle begins. The cycle is repeated at high frequency to ensure a precise flow-rate.

The reducer outlet is protected from over-pressurisation by a pressure relief valve located in the top of the pressure chamber. The relief valve comprises a brass slug with an O-Ring and a spring that holds the slug in place against pressures of between 11 and 15 bar. Pressure above this activates the relief valve by pushing the slug out of the relief valve port. If this occurs, air will flow from the chamber, through holes in the reducer cap, to the atmosphere.

If the pressure relief valve is activated, the cause of the over-pressurisation must be investigated and repaired. The relief valve must be replaced as it may be damaged when activated.

As air in the cylinder is used up, cylinder pressure falls, eventually to a level where the piston is pushed further into the pressure chamber than is usual. This opens the warning whistle port, normally inaccessible due to the position of the piston stem O-Ring, allowing air to flow to the warning whistle.

The charging adaptor has a non-return valve that enables the cylinder to be charged without adjusting or altering the escape apparatus.

If the contents gauge becomes damaged, a restrictor in the gauge ensures that air loss cannot exceed 25 litres per minute.

Versions of the reducer/cylinder valve are available fitted with a 250 bar burst disc, which protects the system from over-charging.

2. TOOLS

The following tools are required to service the reducer/cylinder valve:

Item	Article No.	Description	Remarks
(A)	1033841	Torque Wrench	
(B)	1033800	Socket Handle	3/8” Square Drive
(C)	1033967	Crowfoot Spanner	27mm A/F
(D)	1033983	3/8” A/F Socket	3/8” Square Drive
(E)	1033999	Reducer Cap Tool	3/8” Square Drive
(F)	1033705	Spanner	13mm x 17mm A/F
(G)	1033790	Instrument Screwdriver	
(H)	1033710	Allen Key	2mm A/F
(I)	1033794	O-Ring Tool	
(J)	1033987	Piston Seat Removal Tool	
(K)	1025884	Krytox Grease	
(L)	1034527	Loctite 542	10ml bottle
(M)	1017147	Loctite 222	10ml bottle

CAUTION:

Set the Torque Wrench as required and apply force in the direction of the arrow. Once it has clicked DO NOT continue to apply force.

Note:

For full toolkit details, please refer to the Toolkit Module within the Tests and Toolkit section.

3. SERVICE SCHEDULE

WARNING:

DO NOT use spare parts designated for other types of apparatus. Confirm the identity of spare parts by comparing part numbers and shapes in the Assembly Diagrams and Parts Lists at the end of this Module.

Note:

- The reducer/cylinder valve must be fully-serviced at FIVE-YEARLY intervals.
- Items not in this schedule should be replaced only when damaged or worn.

3.1 HOSES

Hoses must be replaced immediately if signs of damage or deterioration of any kind are evident. In any event, hoses should be replaced after twelve years in service.

Life-expired and damaged hoses must be destroyed or rendered unusable to prevent accidental re-use.

3.2 MAIN SERVICE SCHEDULE

In the following schedule, the item number refers to the components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2 provided at the end of this Module.

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5 OR 10
RELIEF VALVE & O-RING (ITEM 11)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - ACTUATOR (ITEM 15)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - ACTUATOR (ITEM 16)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - PISTON (ITEM 23)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	RENEW
O-RING - PISTON STEM (ITEM 24)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	RENEW
PISTON SEAT (ITEM 25)	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST	FLOW-TEST
CHARGING ADAPTOR ASSEMBLY (ITEM 29)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - CONTENTS GAUGE (ITEM 36)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - REDUCER BODY (ITEM 40)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW

Note:

Cylinders must be tested in accordance with current regulations and the reducer/ cylinder valve must be serviced when the cylinder shell is tested. Please contact **Scott Safety Limited** for further information.

In the following schedule, the item number refers to the components depicted in Assembly Diagram and Parts List 5.3 provided at the end of this Module.

DESCRIPTION	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5 OR 10
HOSE ASSEMBLY (ITEM 1)	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1	LEAK-TEST & INSPECT SEE SECTION 3.1
O-RING - SUPPLY HOSE (ITEM 2)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW
O-RING - HOOD CONNECTOR (ITEM 5)	LEAK-TEST	LEAK-TEST	LEAK-TEST	LEAK-TEST	RENEW

4. SERVICING INSTRUCTIONS

WARNING:

Fully depressurise the system prior to servicing the reducer/cylinder valve.

CAUTION:

The charging adaptor must not be used to exert pressure when removing components from, or attaching components to the reducer body.

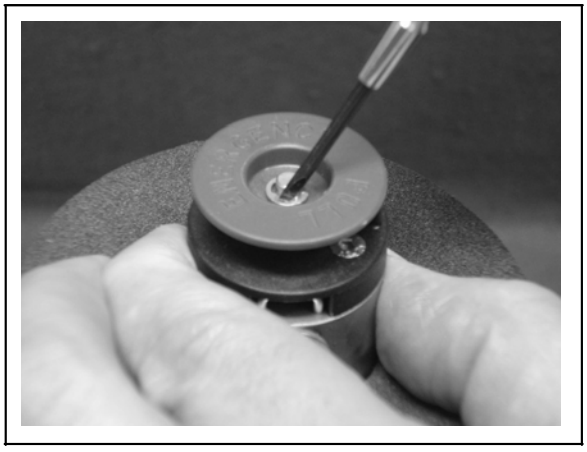
Note:

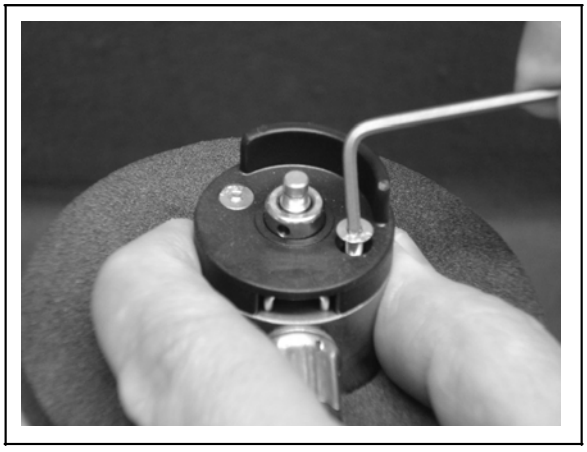
Bracketed numbers in these instructions e.g: (4) refer to components depicted in the Assembly Diagrams and Parts Lists at the end of this Module. Bracketed letters e.g: (B) refer to the tools listed in Section 2 of this Module.

4.1 DISMANTLING THE REDUCER/CYLINDER VALVE

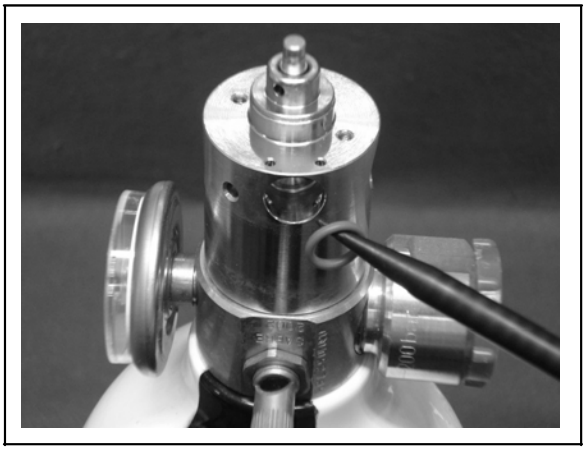
Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

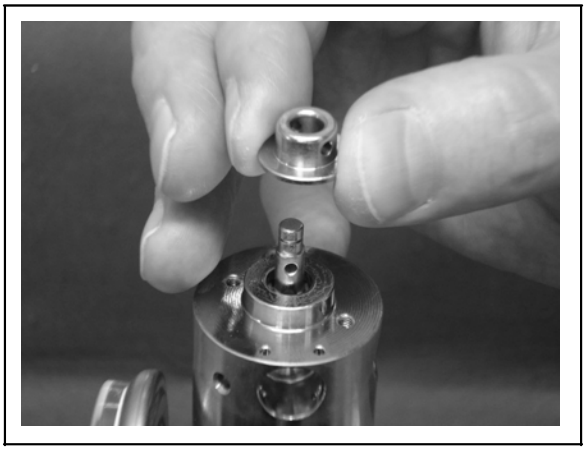


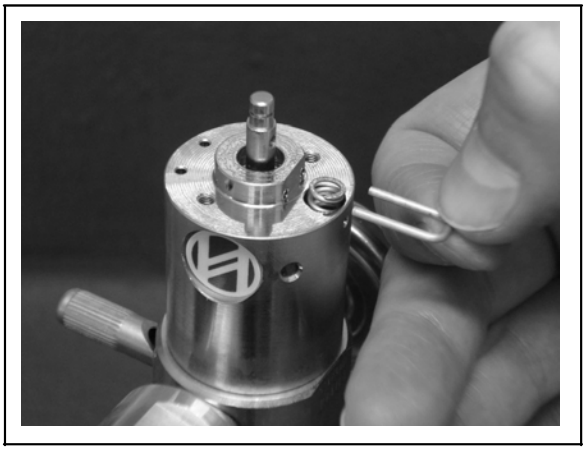


1. Use Instrument Screwdriver (G) to remove circlip (2) and actuator disc (3).
2. Use Allen Key (H) to unscrew reducer cap retaining screws (4). Remove reducer cap (5).

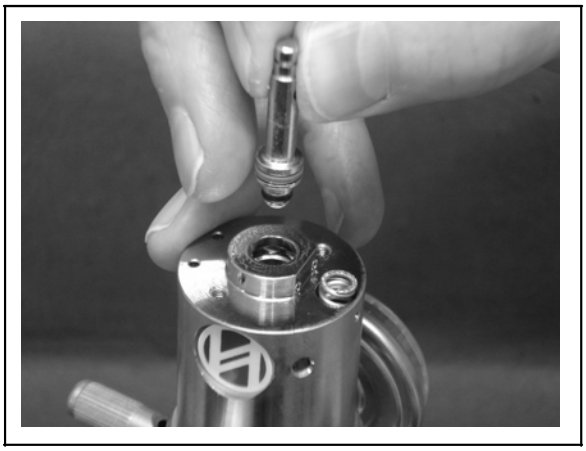


3. Withdraw U-Clip (6) and remove breathing hose (7) from reducer head (18).
4. Remove foam ring (17) from reducer head (18).
5. Remove O-Ring (8) from reducer head (18) using O-Ring Tool (I). Discard O-Ring.





6. Withdraw pin bearing (13) from reducer head (18).
7. Withdraw actuator U-Clip (9) from reducer head (18).



8. Withdraw actuator assembly (14) from reducer head (18).
9. Withdraw spring (10) and relief valve (11) from port in reducer head (18).

10. Use Reducer Cap Tool (E) fitted to Socket Handle (B) to unscrew reducer head (18).

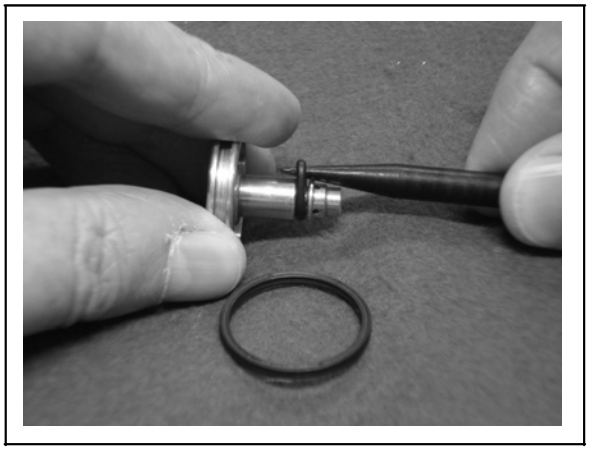
11. Remove reducer head (18) and withdraw piston assembly (21) and spring (26).

12. Carefully inspect conical jet in reducer body (27) to ensure that it is clean and undamaged.

4.2 REPLACING THE PISTON O-RINGS AND SEAT

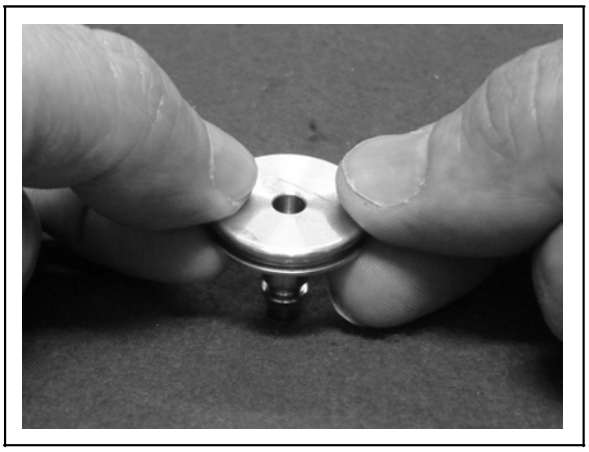
Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.



1. Use O-Ring Tool (I) to remove piston O-Rings (23 & 24) from piston (22). Discard O-Rings.

2. Use Piston Seat Removal Tool (J) to push out piston seat (25) from end of piston (22). Discard seat.



3. Carefully fit replacement piston seat (25), chamfered end first, into end of piston (22). Place seat on a clean, hard surface and ensuring that seat remains square to piston, push down on piston firmly until seat fully enters piston. Inspect seat to ensure that it is clean, undamaged and correctly inserted.

4. Lightly lubricate replacement O-Rings (23 & 24) with Krytox Grease (K).

5. Fit O-Rings (23 & 24) to piston (22), taking care to ensure that O-Rings lie squarely in grooves and are not twisted.

4.3 REPLACING THE HIGH-PRESSURE BURST DISC (IF FITTED)

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagram and Parts List 5.2.

1. Use 3/8” A/F Socket (D) with Socket Handle (B) to remove burst disc body (42).

2. Withdraw and discard burst disc and washer (43).

3. Lightly lubricate replacement burst disc and washer (43) with Krytox Grease (K) and <u>insert burst disc first</u>, followed by washer into reducer body (27).

4. Apply ONE drop of Loctite 222 (M) to thread of burst disc body (42). Screw into reducer body (27) and tighten to a torque of 10 Nm using 3/8” A/F Socket (D) and Torque Wrench (A).

CAUTION:

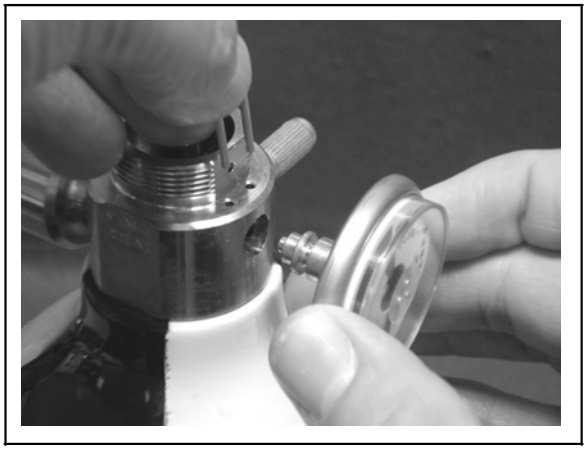
If the burst disc has been ruptured, the cylinder and valve should be examined to determine the cause and to ensure that the cylinder and valve are safe to use.

4.4 REPLACING THE CONTENTS GAUGE O-RING AND RESTRICTOR

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

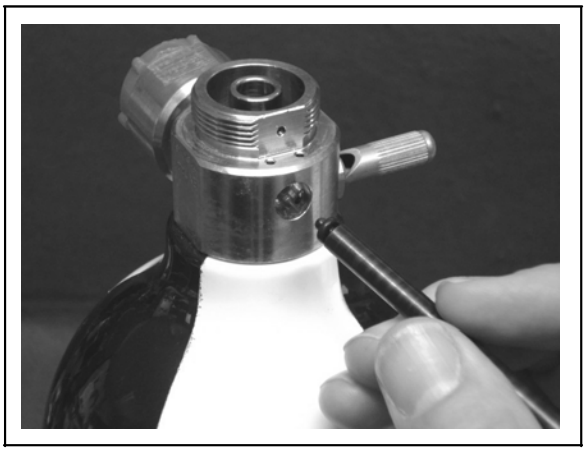
1. Remove reducer cap (5) and reducer head (18) as described in Section 4.1 of this Module.



2. Withdraw contents gauge U-Clip (37) and remove contents gauge (34) from reducer body (27).

3. Remove contents gauge O-Ring (36) from reducer body (27) using O-Ring Tool (I). Discard O-Ring.

4. Tap reducer body (27) GENTLY to release restrictor (35) from reducer body. Discard restrictor.



5. Locate replacement restrictor (35) into position within contents gauge port, taking care to ensure that restrictor is seated correctly.

6. Lightly lubricate replacement O-Ring (36) with Krytox Grease (K) and fit onto gauge spindle.

7. Insert contents gauge (34) into reducer body (27) and secure with U-Clip (37).

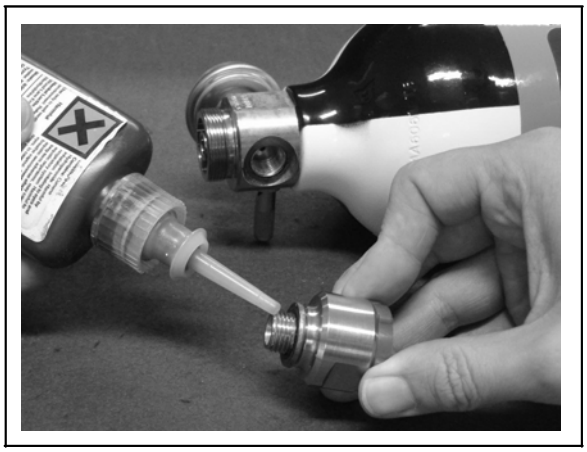
4.5 REPLACING THE CHARGING ADAPTOR

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

1. Use Crowfoot Spanner (C) with Socket Handle (B) to release charging adaptor assembly (29). Discard blanking plug (30), charging adaptor body (31), slug and O-Ring (32) and bonded seal (33).

2. On replacement charging adaptor assembly (29), lightly lubricate O-Ring on slug (32) with Krytox Grease (K) and fit into charging adaptor body (31).



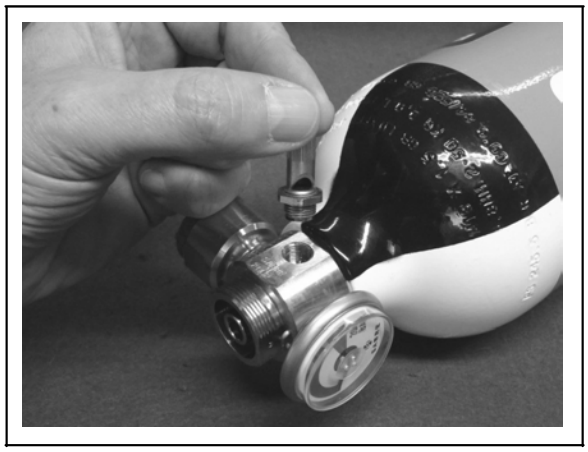
3. Fit bonded seal (33) to charging adaptor body (31). Apply ONE drop of Loctite 542 (L) to adaptor body thread and screw charging adaptor assembly (29) into reducer body (27).

4. Use Crowfoot Spanner (C) with Torque Wrench (A) set at 20 Nm to secure charging adaptor assembly (29).

4.6 REPLACING THE WHISTLE

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.



1. Use Spanner (F) to release lock-nut (39) and unscrew whistle flute (38) from reducer body (27).

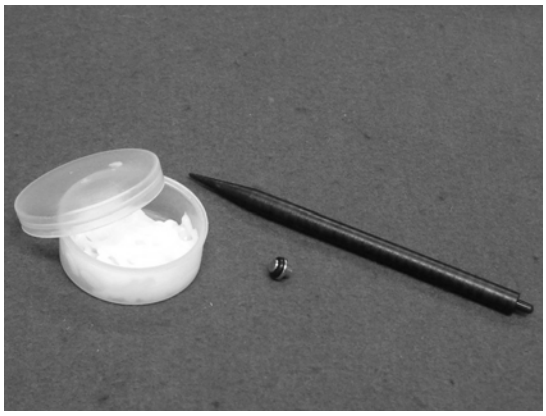
2. Screw replacement whistle flute (38) into reducer body (27) and use Spanner (F) to tighten lock-nut (39) until hand-tight. DO NOT over-tighten.

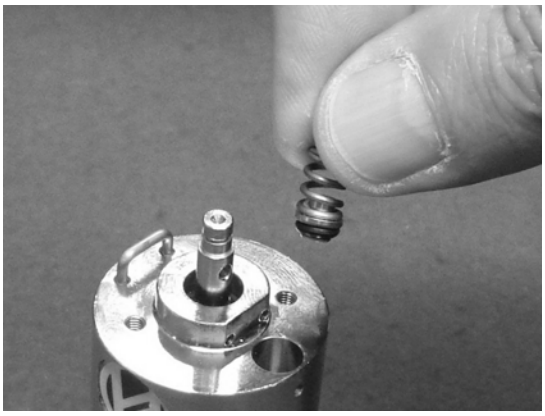
4.7 REPLACING THE PRESSURE RELIEF VALVE O-RING

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

1. Remove spring (10) and relief valve with O-Ring (11) from reducer head (18) as described in Section 4.1 of this Module.





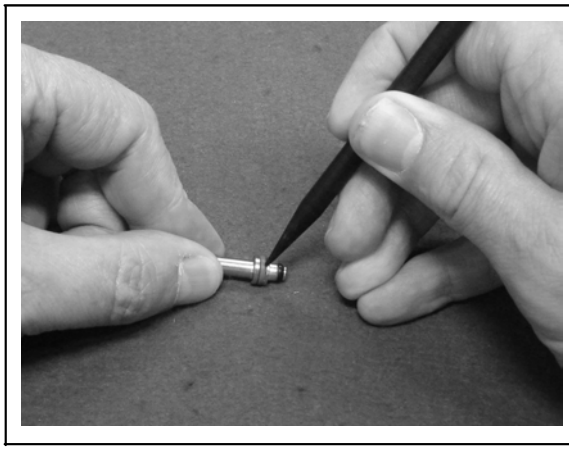
2. Use O-Ring Tool (I) to remove O-Ring (12). Discard O-Ring.
3. Lightly lubricate replacement O-Ring (12) with Krytox Grease (K) and fit onto relief valve slug (11).
4. Check to confirm that spring (10) is in good condition. Replace if necessary.
5. Fit spring (10) over relief valve slug (11) with cone of slug facing outermost.
6. Insert assembled spring (10) and valve slug (11), cone first, into relief valve port; and secure in position with U-Clip (9).

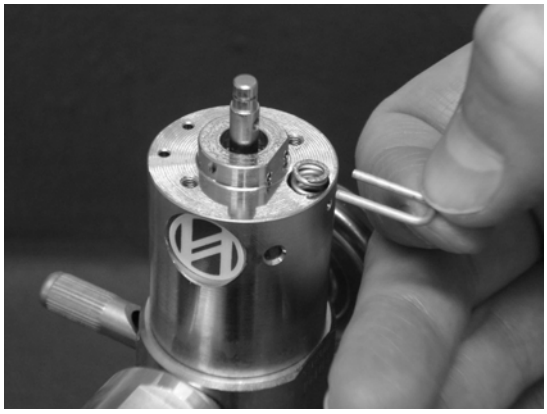
4.8 REPLACING THE ACTUATOR O-RINGS

Note:

Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

1. Remove actuator assembly (14) from reducer head (18) as described in Section 4.1 of this Module.





2. Use O-Ring Tool (I) to remove O-Rings (15 & 16). Discard O-Rings.
3. Lightly lubricate replacement O-Rings (15 & 16) with Krytox Grease (K) and fit onto actuator assembly (14).
4. Insert actuator assembly (14) into reducer head (18) and secure in position with U-Clip (9).

4.9 REPLACING THE BREATHING HOSE AND FITTINGS

Note:

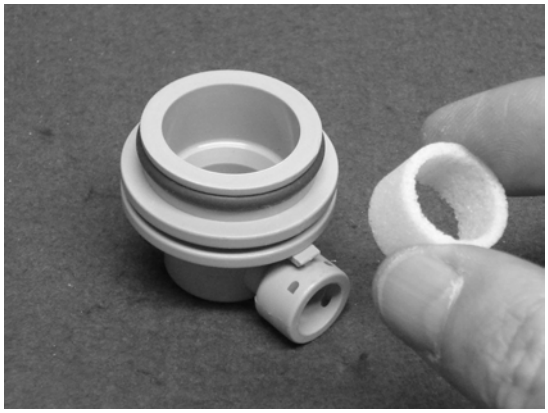
Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagram and Parts List 5.3.

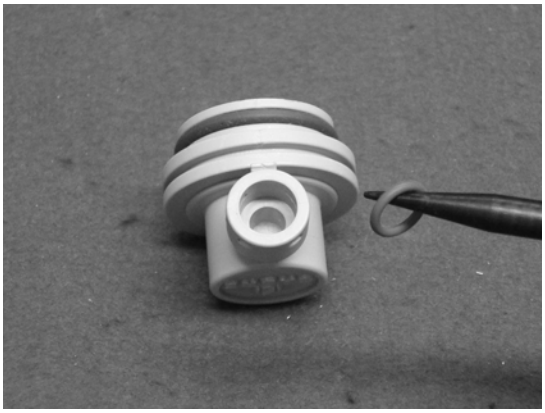
1. Remove breathing hose assembly from reducer head as described in Section 4.1 of this Module.

2. Use Instrument Screwdriver (G) to remove U-Clip (4) from hood connector (3) and withdraw hose from connector.

3. Use O-Ring Tool (I) to remove O-Ring (5) from hood connector (3). Discard O-Ring.

4. Lightly lubricate replacement O-Ring (5) with Krytox Grease (K) and fit onto hood connector (3).





5. Check to confirm that silencer (6) is clean and in good condition. Replace if necessary.

6. Use O-Ring Tool (I) to remove O-Rings (2) from port within reducer head and hood connector. Discard O-Rings.

7. Lightly lubricate replacement O-Rings (2) with Krytox Grease (K) and fit onto hose ends.

8. Insert hose end into port within hood connector (3) and secure in position with U-Clip (4).

9. Insert opposite hose end into port within reducer head and secure in position with U-Clip (4).

4.10 RE-ASSEMBLING THE REDUCER/CYLINDER VALVE

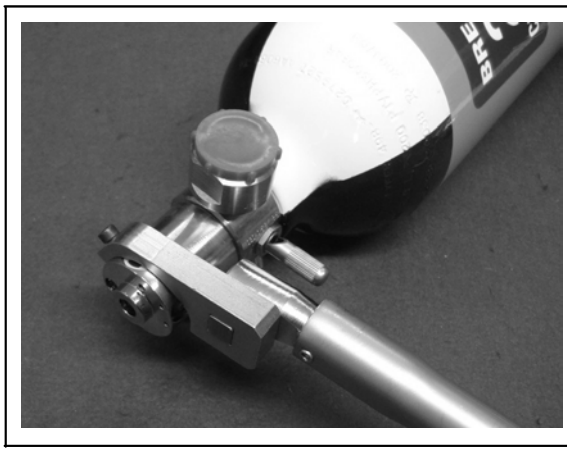
Note:

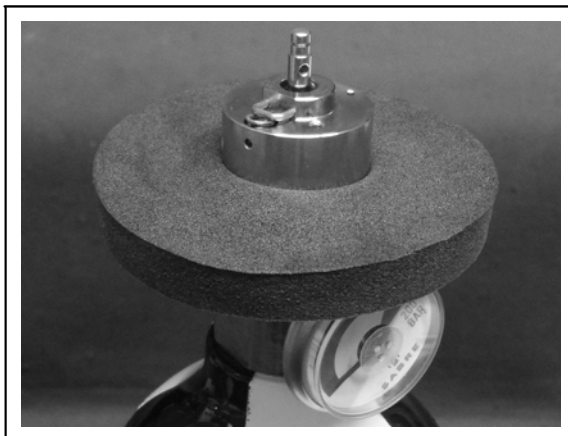
Bracketed numbers in this Section e.g: (4) refer to components depicted in Assembly Diagrams and Parts Lists 5.1 and 5.2.

1. Secure charging adaptor assembly (29), contents gauge (34), whistle flute & plug (38), and burst disc assembly (41) to reducer body (27) as described in the previous Sections of this Module.

2. Carefully insert piston assembly (21) into reducer head (18).

3. Insert spring (26) into reducer body (27) and carefully screw reducer head (18) onto reducer body by hand.

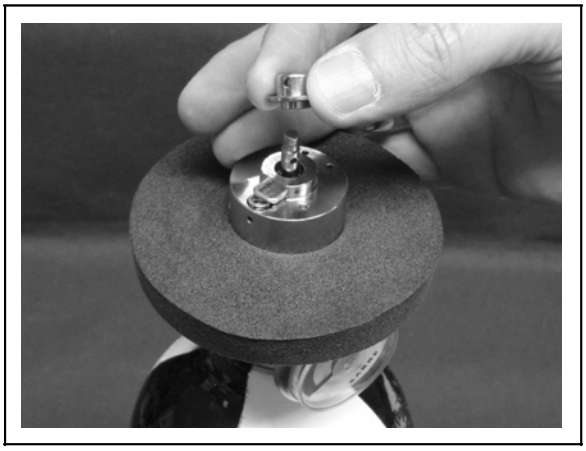




4. Use Reducer Cap Tool (E) with Torque Wrench (A) set at 14 Nm to tighten reducer head (18).

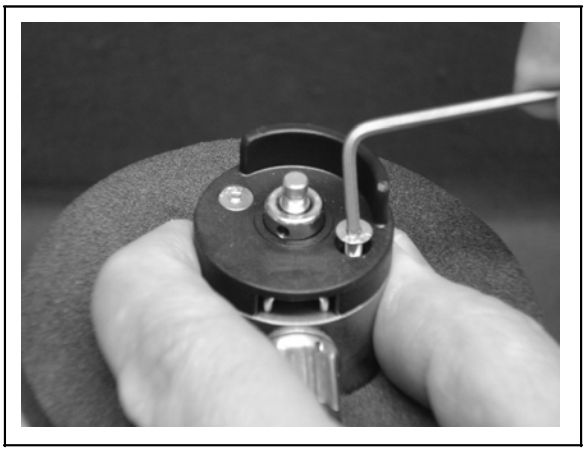
5. Secure pressure relief valve (11) and actuator assembly (14) to reducer head (18) as described in Sections 4.7 and 4.8 of this Module.

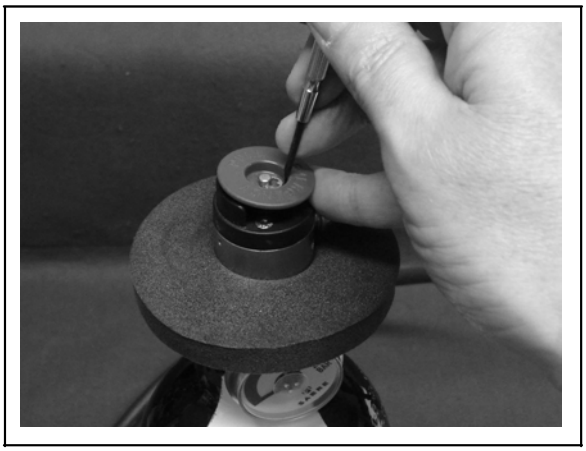
6. Locate foam ring (17) over reducer head (18) and slide into position until ring makes contact with contents gauge (34).



7. Slide pin bearing (13) over actuator assembly (14) and into position within reducer head (18).

8. Secure breathing hose (7) to reducer head (18) as described in Section 4.9 of this Module.





9. Locate reducer cap (5) into position on reducer head (18) and secure with fixing screws (4) using Allen Key (H) until hand-tight. DO NOT over-tighten.

10. Locate actuator disc (3) over stem of actuator (14) and secure in position with circlip (2) using Instrument Screwdriver (G).

4.11 TESTING

1. Carry out a flow-setting and test as detailed in the appropriate FS Module.

2. Carry out tests described in the appropriate Product Module.

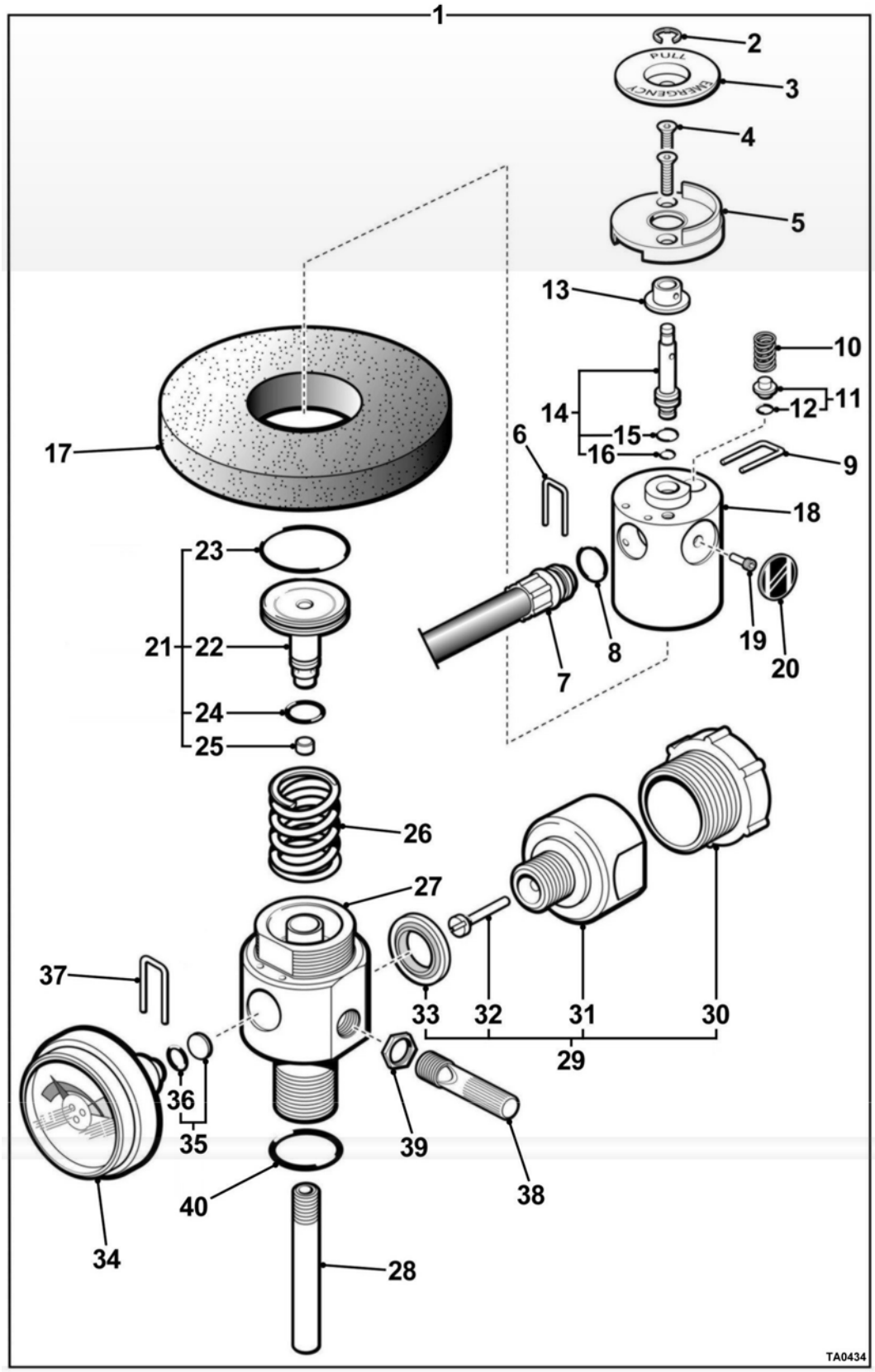
3. Follow instructions given in the appropriate Product Module to insert cylinder into bag and fit anti-tamper tag.

4. Carry out routine checks described in the appropriate User Instruction Manual.

5. ASSEMBLY DIAGRAM AND PARTS LIST

5.1 REDUCER/CYLINDER VALVE WITHOUT BURST DISC

Item	Article No.	Description	Remarks
1	1030599	Reducer & Hose Assembly	
2	1019634	. Circlip	Pack of 5
3	1021926	. Actuator Disc	Pack of 5
4	1021720	. Screw	Pack of 10
5	1030581	. Reducer Cap	
6	1017800	. U-Clip	Pack of 5
7	-	. Breathing Hose Assy	See Parts List 5.3
8	2004034	. O-Ring	Pack of 5
9	1017803	. U-Clip	Pack of 5
10	1028372	. Spring	
11	1029995	. Relief Valve & O-Ring	
12	1027903	.. O-Ring	Pack of 5
13	1030583	. Pin Bearing	
14	1029938	. Actuator Assembly	
15	1027797	.. O-Ring	Pack of 5
16	2009622	.. O-Ring	Pack of 5
17	2020657	. Foam Ring	
18	2010638	. Reducer Head	
19	1021711	. Flow-setting Screw	
20	1027409	. Label	Pack of 5
21	1029936	. Piston Assembly	
22	-	.. Piston	
23	1028016	.. O-Ring	Pack of 5
24	2014896	.. O-Ring	Pack of 5
25	1029421	.. Piston Seat	Pack of 5
26	1028557	. Spring	
27	-	. Reducer Body	
28	2009845	. Rust Tube	
29	1031241	. Charging Adaptor Assembly	
30	1033612	.. Blanking Plug	Pack of 25
31	-	.. Body	
32	1029995	.. Slug & O-Ring	
33	1027821	.. Bonded Seal	Pack of 5
34	1023477	. Contents Gauge	
35	1023464	. Restrictor & O-Ring	5 of each
36	1027987	.. O-Ring	Pack of 5
37	1017803	. U-Clip	Pack of 5
38	1023220	. Flute & Plug	
39	1023239	. Lock-nut	Pack of 2
40	1028161	. O-Ring	Pack of 5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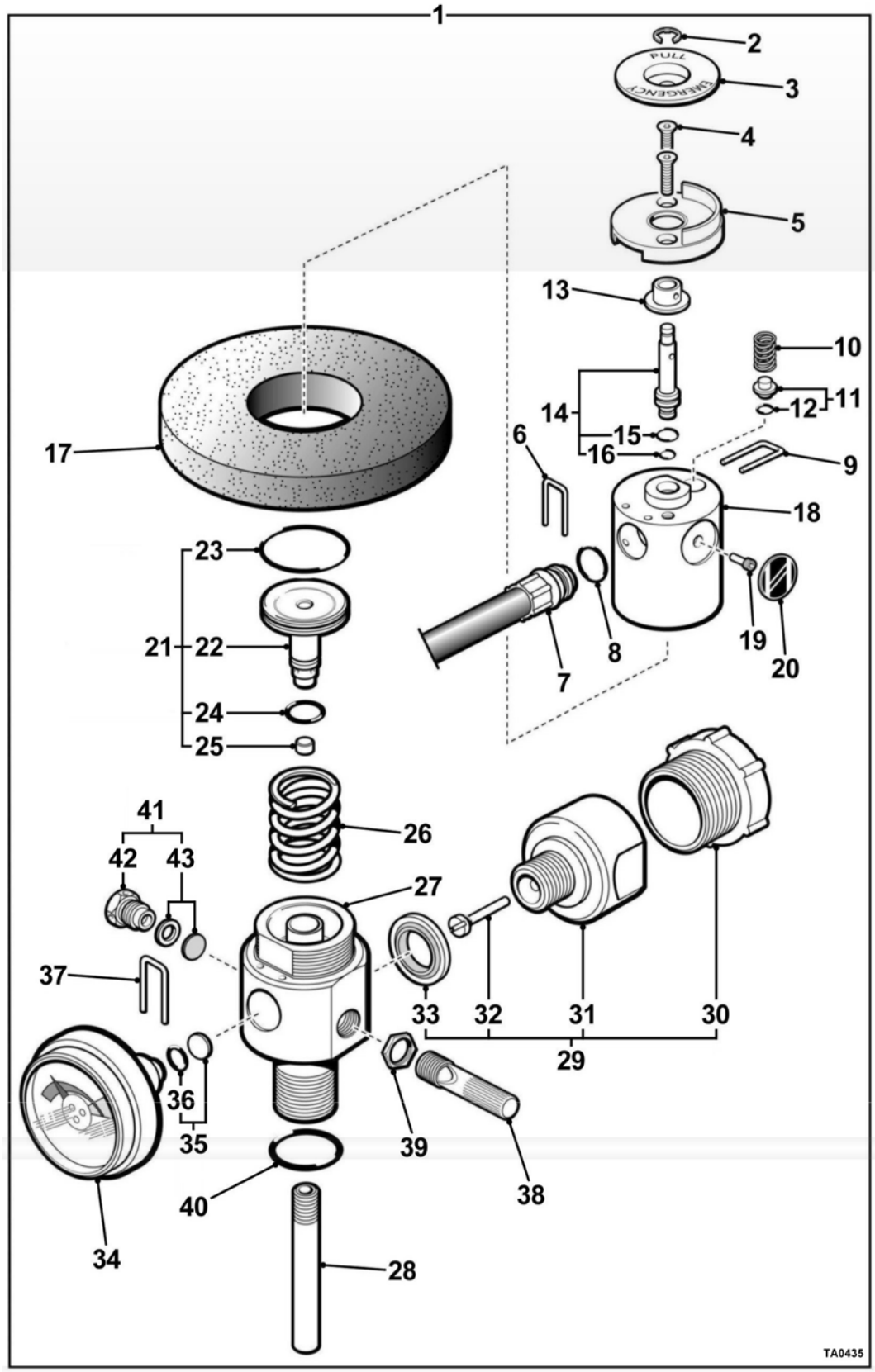
5.2 REDUCER/CYLINDER VALVE WITH BURST DISC

Item	Article No.	Description	Remarks
1	2001200	Reducer & Hose Assembly	
2	1019634	. Circlip	Pack of 5
3	1021926	. Actuator Disc	Pack of 5
4	1021720	. Screw	Pack of 10
5	1030581	. Reducer Cap	
6	1017800	. U-Clip	Pack of 5
7	-	. Breathing Hose Assy	See Parts List 5.3
8	2004034	. O-Ring	Pack of 5
9	1017803	. U-Clip	Pack of 5
10	1028372	. Spring	
11	1029995	. Relief Valve & O-Ring	
12	1027903	.. O-Ring	Pack of 5
13	1030583	. Pin Bearing	
14	1029938	. Actuator Assembly	
15	1027797	.. O-Ring	Pack of 5
16	2009622	.. O-Ring	Pack of 5
17	2020657	. Foam Ring	
18	2010638	. Reducer Head	
19	1021711	. Flow-setting Screw	
20	1027409	. Label	Pack of 5
21	1029936	. Piston Assembly	
22	-	.. Piston	
23	1028016	.. O-Ring	Pack of 5
24	2014896	.. O-Ring	Pack of 5
25	1029421	.. Piston Seat	Pack of 5
26	1028557	. Spring	
27	-	. Reducer Body	
28	2009845	. Rust Tube	
29	1031241	. Charging Adaptor Assembly	
30	1033612	.. Blanking Plug	Pack of 25
31	-	.. Body	
32	1029995	.. Slug & O-Ring	
33	1027821	.. Bonded Seal	Pack of 5
34	1023477	. Contents Gauge	
35	1023464	. Restrictor & O-Ring	5 of each
36	1027987	.. O-Ring	Pack of 5
37	1017803	. U-Clip	Pack of 5
38	1023220	. Flute & Plug	
39	1023239	. Lock-nut	Pack of 2
40	1028161	. O-Ring	Pack of 5
41	1036257	. Burst Disc Assembly	
42	-	.. Body	
43	1036268	.. Burst Disc & Washer	5 of each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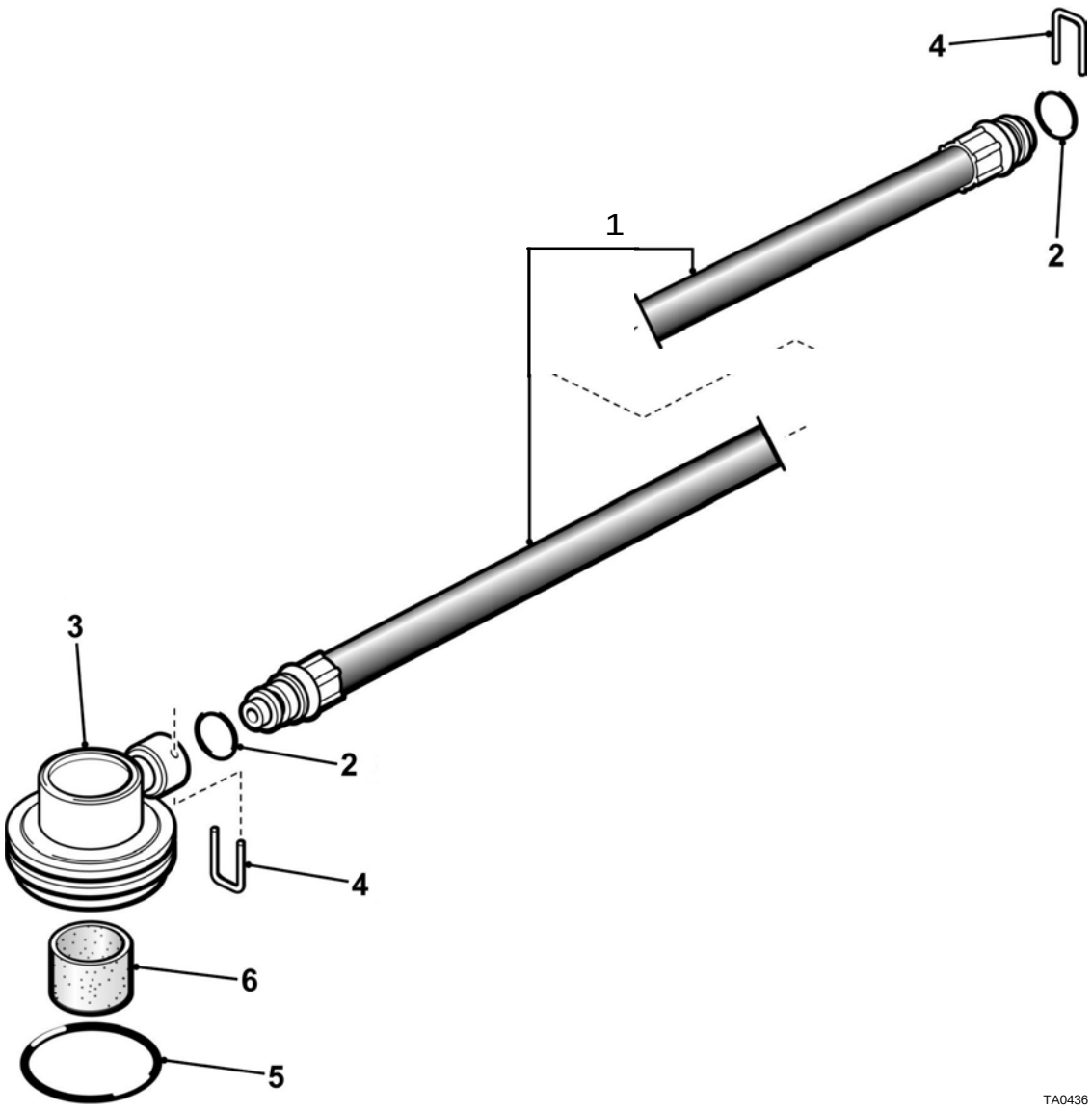
5.3 BREATHING HOSE, CONNECTOR AND FITTINGS

Item	Article No.	Description	Remarks
1	1025109	Hose Assembly	
2	2004034	O-Ring	Pack of 5
3	2008616	Hood Connector	
4	1017800	U-Clip	Pack of 5
5	2015406	O-Ring	Pack of 5
6	1022092	Silencer	Pack of 5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Item	Article No.	Description	Remarks
-	2020530	Escape Tool Kit	
-	2016479	. Torque Wrench	1/4” Square Drive
-	1033841	. Torque Wrench	3/8” Square Drive
-	1033934	. Adjustable Spanner	
-	1033726	. Spanner	7mm x 8mm A/F
-	1033705	. Spanner	13mm x 17mm A/F
-	1034013	. Box Spanner	32mm A/F
-	1033797	. C-Spanner	
-	1033985	. Crowfoot Spanner	7/16”
-	1033984	. Crowfoot Spanner	22mm A/F
-	1033967	. Crowfoot Spanner	27mm A/F
-	1034014	. Crowfoot Spanner	30mm A/F
-	1033800	. Socket Handle	3/8” Square Drive
-	1033983	. 3/8” A/F Socket	3/8” Square Drive
-	2016473	. Locking Ring Tool	
-	2016477	. Socket Wrench	1/4” Square Drive
-	1033838	. Hexagon Driver	5mm A/F 3/8” Square Drive
-	1033710	. Allen Key	2mm A/F
-	1033734	. Allen Key	2.5mm A/F
-	1033999	. Reducer Cap Tool	3/8” Square Drive
-	1034011	. Bladed Screwdriver	
-	1033791	. Pozi-drive Screwdriver	
-	1033865	. Tri-wing Screwdriver	
-	2016476	. Torx Screwdriver	
-	1033790	. Instrument Screwdriver	
-	1033731	. Long-nosed Pliers	
-	1033938	. Facemask Clamp Pliers	
-	1033857	. Tweezers	
-	1033837	. Latch Spring Tool	
-	1033998	. Filter Removal Tool	
-	1034016	. Plunger Tool	
-	1033987	. Piston Seat Removal Tool	
-	1033994	. Piston O-Ring Tool	
-	1033794	. O-Ring Tool	
-	1034585	. PTFE Tape	
-	1025884	. Krytox Grease	
-	1025885	. MS3 Grease	
-	2003720	. MS4 Grease	
-	1017147	. Loctite 222	10ml Bottle
-	1034527	. Loctite 542	10ml Bottle

1. TECHNICAL DESCRIPTION

In the flow-setting and test, the constant flow of air from the reducer is set (if necessary) and the flow-rate checked over the duration of the cylinder supply. This Module details the procedure used for testing and flow-setting constant-flow escape apparatus.

Note:

Prior to commencing testing and adjustment:

i) The escape apparatus must be fully-assembled, but with the cylinder removed from its bag.

ii) The cylinder must be fully charged and at ambient temperature.

2. TEST EQUIPMENT

The following items are required in order to carry out this flow-test:

1035827	Test Kit	
1033726	Spanner	7mm x 8mm A/F
1033705	Spanner	13mm x 17mm A/F
-	Stop-watch	

Note:

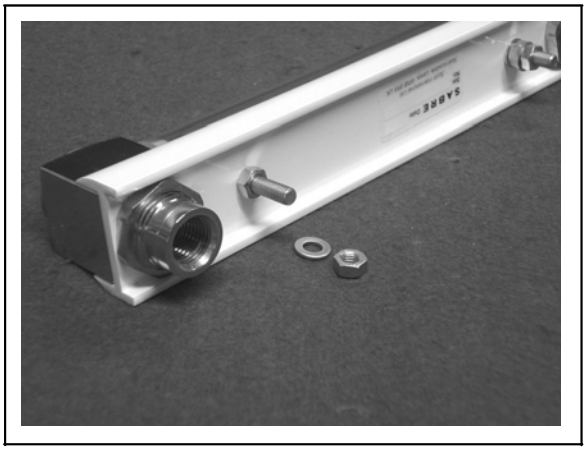
The test kit contains additional components which are not required when carrying out this flow-test. The only components required for this test are those shown in the photograph above.

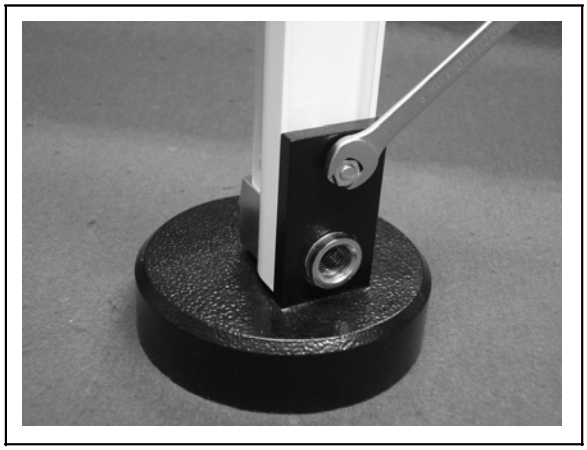
The following items will also be required if the flow-rate is to be re-set:

1033710	Allen Key	2mm A/F
1034527	Loctite 542	10ml Bottle
1027409	Label	(Pack of 5)

3. ASSEMBLING THE TEST EQUIPMENT

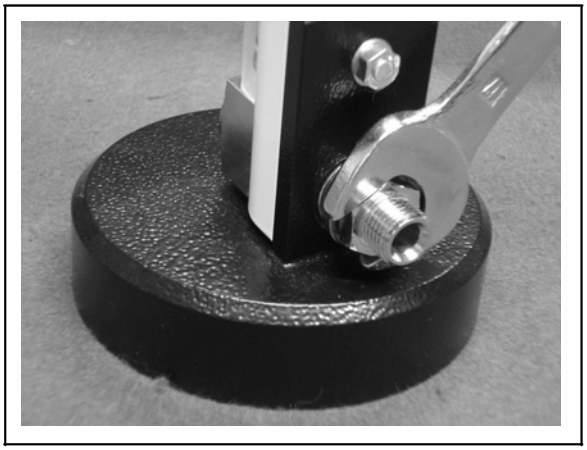
1. Remove required components (see photograph on page 1 of this Module) from carrying case and place on a clean, dry, flat work surface.

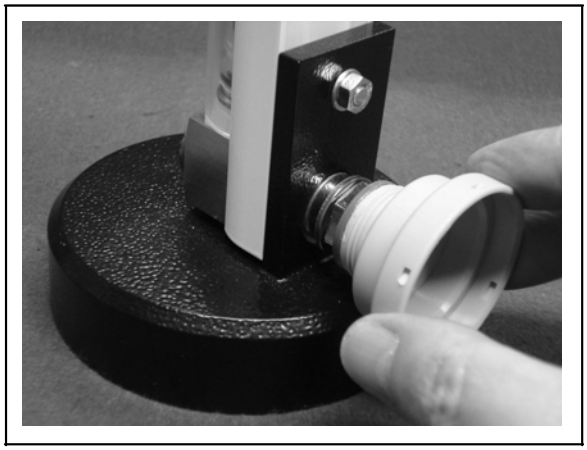




2. Remove fixing nut and washer from lower stud on reverse of flow-meter. Place fixings aside.

3. Locate flow-meter onto bench stand and secure with washer and nut using 8mm Spanner. DO NOT over-tighten.



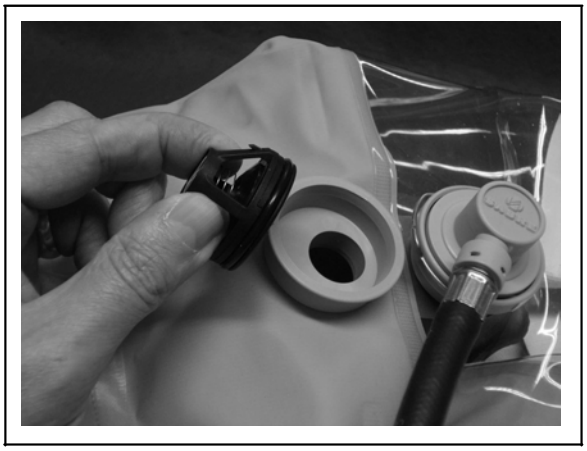


4. Locate bonded seal over adaptor thread and screw adaptor and seal into lower port on reverse of flow-meter until finger-tight. Secure in position using 17mm Spanner. DO NOT over-tighten.

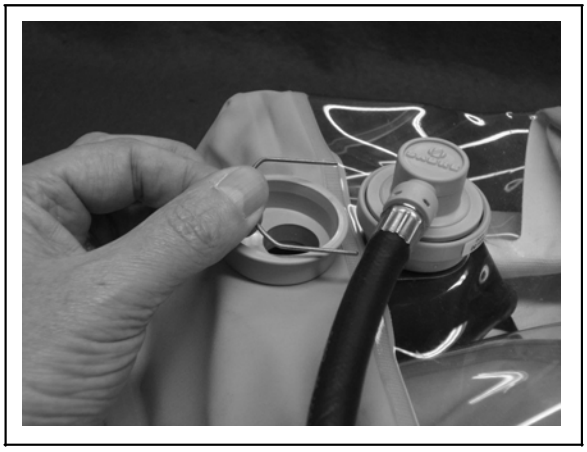
5. Attach port for hood connector to adaptor thread until finger-tight. DO NOT over-tighten.

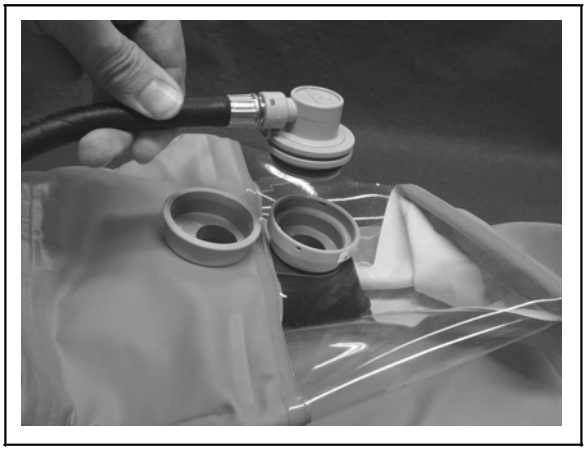
4. TEST PROCEDURE

4.1 CONNECT ESCAPE APPARATUS TO TEST EQUIPMENT

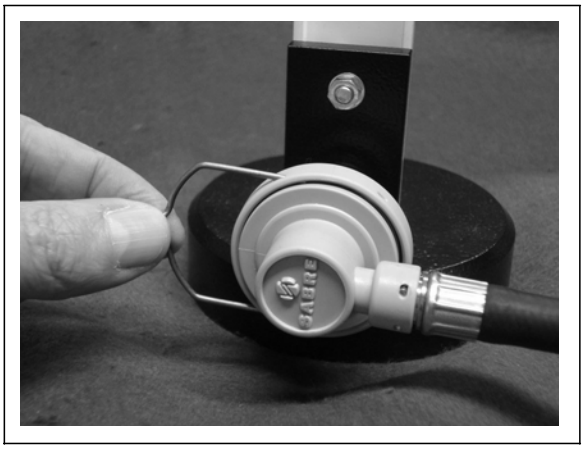


1. Pull exhale valve cover to remove from exhale valve fitting on hood.
2. Withdraw exhale valve assembly from exhale valve fitting on hood.





3. Withdraw U-Clip and remove hood connector from inlet fitting on hood.



4. Locate hood connector into port on test equipment and secure in position using U-Clip.

4.2 DURATION AND FLOW TEST

1. Ensure that escape apparatus is fully-charged.
2. Pull firing pin on escape apparatus to begin constant flow of air.
3. Activate Stop-watch and monitor duration and flow of air.
4. Check that the flow of air remains greater than 30 litres per minute for at least:
   - 9 minutes - for apparatus of 10 minutes duration
   - 14 minutes - for apparatus of 15 minutes duration
5. Check that warning whistle sounds after apparatus has completed its rated duration and that needle of contents gauge is entering the red sector.
6. If escape apparatus fails this test, follow flow-setting instructions given in Section 4.3 of this Module. Repeat this test upon completion.

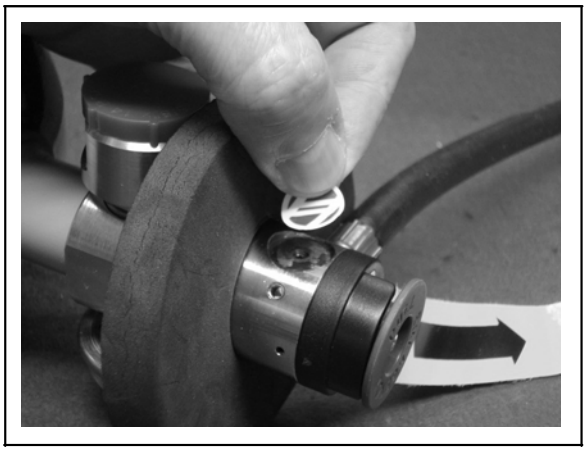
WARNING:

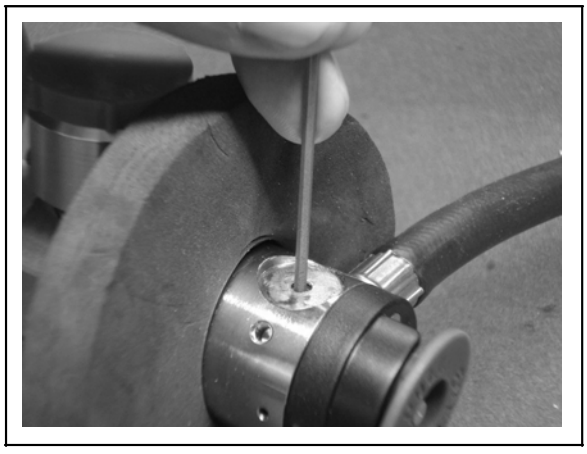
DO NOT use escape apparatus that fails the duration and flow test.

7. Once apparatus has passed this test, follow after testing instructions given in Section 4.4 of this Module.

4.3 FLOW SETTING

1. Ensure that escape apparatus is fully-charged.





2. Remove label and plug of sealant from reducer head to reveal flow-setting screw.
3. Pull firing pin on escape apparatus to begin constant flow of air.
4. Use Allen Key to adjust flow-setting screw until a reading of 38 litres per minute is achieved on flow-meter. The tolerance for this reading is +2/-0 litres per minute.
5. Fully-charge escape apparatus and repeat duration and flow test as described in Section 4.2 of this Module.

Note:

If escape apparatus again fails the duration and flow test, refer to the Fault-finding Chart contained within the Product Module of this Manual and rectify accordingly. Re-test upon completion of rectification.

WARNING:

DO NOT use escape apparatus that fails the duration and flow test.

6. Once apparatus has passed duration and flow test, seal flow-setting screw by applying a small amount of Loctite 542 sealant around screw head.

7. When sealant has set, affix replacement label in position to conceal flow-setting screw.

8. Follow after testing instructions given in Section 4.4 of this Module.

4.4 AFTER TESTING

Once apparatus has successfully passed duration and flow test:

1. Disconnect hood connector from port on test equipment and secure hood connector to inlet fitting on hood using U-Clip.

2. Locate exhale valve assembly into exhale valve fitting on hood and secure in position with exhale valve cover.

3. Fully-charge cylinder and prepare escape apparatus for service as described in the Product Module of this Manual.

4. Complete breathing apparatus log.

5. Ensure that test equipment is clean and undamaged. Store test equipment safely for future use.

1. TECHNICAL DESCRIPTION

The leak-test confirms that any leakage from the apparatus is within a safe and acceptable limit. This Module details the procedure for leak-testing constant-flow escape breathing apparatus.

2. TEST EQUIPMENT

This test requires the use of Leak-detection Fluid.

3. TEST PROCEDURE

1. Ensure that escape apparatus is fully-charged.
2. Use a soft brush to apply Leak-detection Fluid to connections and joints, particularly around:
    - Hose port;
    - Reducer head;
    - Contents gauge;
    - Charging adaptor;
    - Cylinder neck.
3. Pull firing pin on escape apparatus to begin constant flow of air.
4. Inspect connections and joints for evidence of bubbles, which will indicate a leakage of air.
5. Rectify leakage in accordance with the Fault-finding Chart contained within the Product Module of this Manual.
6. Once rectification has been completed, re-test apparatus as described above.
7. Testing is complete once no evidence of leakage is detected.
8. Upon completion, clean Leak-detection Fluid from apparatus.
9. Fully-charge cylinder and prepare escape apparatus for service as described in the Product Module of this Manual.

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