1 Safety-related information

– Before using this product, carefully read the instructions for use and those of the associated products.

– Strictly follow the instructions for use. The user must fully understand and strictly observe the instructions. Use the product only for the purposes specified in the intended use section (see section 3.3).

– Do not dispose of the Instructions for Use. Ensure that they are retained and appropriately used by the product user.

– Only trained and competent users are permitted to use this product.

– Comply with all local and national rules and regulations associated with this product.

– Only specialist, trained personnel are permitted to check, repair and maintain the product as described in these instructions for use and the technical manual. Further maintenance work that is not detailed in these instructions for use or in the technical manual must only be carried out by Dräger or personnel qualified by Dräger. Dräger recommend a Dräger service contract for all maintenance activities.

– Use only genuine Dräger spare parts and accessories. Otherwise, the proper functioning of the product may be impaired.

– Do not use a faulty or incomplete product. Do not modify the product.

– Notify Dräger in the event of any product or product component fault or failure.

– Use of the breathing apparatus must be consistent with NFPA 1550 - Standard for Emergency Responder Health and Safety, and NFPA 1852 - Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus.

– The air supply must meet the requirements for breathing air according to CGA G – 7.1, grade D or higher quality. Where appropriate, the air supply must be in accordance with NFPA 1989 Standard on Breathing Air Quality for Emergency Services Respiratory Protection.

– All approved respiratory equipment shall be selected, fitted, used, and maintained in accordance with MSHA (Mine Safety and Health Administration), OSHA (Occupational Safety and Health Administration), and other applicable regulations.

– Before occupational use of this respirator a written respiratory protection program must be implemented meeting all the local government requirements. In the United States employers must comply with OSHA 29 CFR 1910.134 which includes medical evaluation, training, and fit testing.

– This device has been tested and complies with the FCC (Federal Communications Commission) and IC (Industrial Commission) rules. Changes or modifications to the product may render it non-compliant.

2 Conventions in this document

2.1 Definitions of alert messages

The following alert messages are used in this document to alert the user to potential hazards. The definitions of the alert messages are as follows.

⚠ **WARNING**
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**
Indicates a potentially hazardous situation which, if not avoided, could result in physical injury. It may also be used to alert against unsafe practices.

NOTICE
Indicates a situation which, if not avoided, could result in damage to the product or the environment.

2.2 Trademarks

Trademark	Trademark owner
3M	3M Company Corporation
AirBoss	Dräger
Bluetooth	Bluetooth SIG, Inc.
CRC	CRC Industries, Inc.
Energizer	Energizer Brands, LLC
Energizer Max	Energizer Brands, LLC
FPS	Dräger
Molykote	DDP Specialty Electronic Materials US 9, LLC.
NFPA	National Fire Protection Association, Inc.

The following website lists the countries in which the Dräger trademarks are registered: www.draeger.com/trademarks.

The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by Dräger is under license.

The trademarks listed are only registered in certain countries and not necessarily in the country in which this document is published.

2.3 Typographical conventions

▶ A triangle is used in alert messages to indicate possible ways of avoiding the hazard.

ℹ An information symbol is used for notes and additional useful information.

1. Numbered paragraphs indicate that the information is sequential.

– Dashed paragraphs indicate that the information is non-sequential.

⇒ This arrow indicates the result of a process step.

✓ This check mark indicates the result of a process sequence.

2.4 Abbreviations

Abbreviation	Explanation
CBRN	Chemical, biological, radiological, and nuclear
EOSTI	End-of-service-time indicator
FCC	Federal Communications Commission
HUD	Head-up display
ID	Identity
LCD	Liquid crystal display
LED	Light-emitting diode
NFPA	National Fire Protection Association
NiMH	Nickel-metal hydride
NIOSH	National Institute for Occupational Safety and Health
PASS	Personal alert safety system
PTFE	Polytetrafluoroethylene
PTT	Push-to-talk
QNFT	Quantitative fit test
RF	Radio frequency
RFID	Radio-frequency identification
RIC	Rapid intervention crew
SAR	Supplied-air respirator
TFT	Thin film transistor
UAC	Universal air connection
UEBSS	Universal emergency breathing safety system
UI	User interface

3 Description

3.1 Product overview

The Dräger PSS AirBoss Sentinel is a breathing apparatus that provides the wearer with respiratory protection using an open-circuit, pressure-demand, compressed-air system. The product can be used as a self-contained system, or with an independent air supply for SAR operations. The product includes a Sentinel monitoring system and is compatible with Dräger compressed air cylinders, masks, and lung demand valves (second-stage pressure demand regulators).
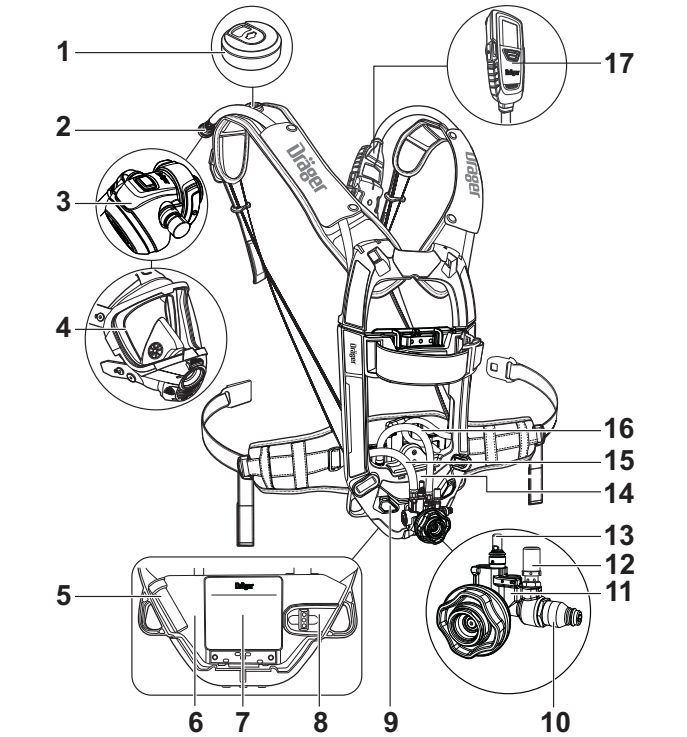

Fig. 1   PSS AirBoss Sentinel

No.	Description
1	Universal accessory clip
2	Medium-pressure coupling
3	Lung demand valve (second stage pressure demand regulator)
4	Face mask
5	Backup battery
6	Sentinel pressure module
7	Power pack
8	Charging port
9	Buddy-beacon
10	RIC UAC
11	Pressure reducer (first stage regulator)
12	Pressure relief valve
13	Warning whistle
14	Second sounder
15	Medium-pressure hose
16	High-pressure hose
17	Sentinel UI module

3.2 Feature description

3.2.1 Carrying system

The carrying system has a carbon-composite backplate, with adjustable shoulder straps and waist belt connected using quick release connectors. The carrying system has an adjustable backplate where the height can be changed to one of three preset heights to suit the body length of the wearer (short (S), medium (M) and long (L)). The waist pad is connected at a flexible joint to compensate for the twisting and bending of the user. Pneumatic hoses and other modular components are integrated into the backplate to prevent snagging and to enhance component protection. Universal accessory clips are fitted on the shoulder pads.

The carrying system is fitted with a read-only RFID tag that has a unique hexadecimal number that can be used for equipment identification. The tag is located under the rubber cover just below the pressure reducer

(first-stage regulator) and can be read wirelessly by an RFID reader. The tag is passive (has no battery) and requires an external source to provoke signal transmission.

3.2.2 Pneumatic system

The breathing apparatus uses a Dräger high-performance pressure reducer that reduces cylinder pressure. Breathing air is supplied through a medium-pressure hose and coupling to the attached lung demand valve. A pressure relief valve will activate and vent air to the atmosphere at the pressure reducer (Fig. 2) if the medium-pressure increases to 160–232 psi. High-pressure air is supplied through an internal capillary inside the high-pressure hose to the pressure module of the monitoring system.
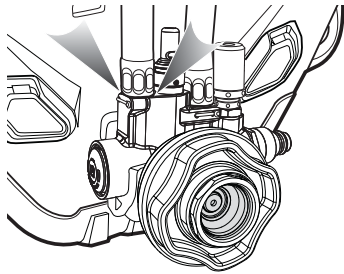

Fig. 2   Air venting from the pressure relief valve

The pressure reducer is fitted with a warning whistle that sounds when the cylinder pressure is low (for EOSTI activation ranges, see section 10). The pressure reducer also includes a male RIC UAC that allows emergency refilling of the cylinder while the user is breathing from the equipment.

3.2.3 Sentinel monitoring system

The Dräger Sentinel is a battery powered integrated electronic monitoring system used on Dräger breathing apparatus. The system provides visual and audible information about the status of the breathing apparatus, and has an integral PASS device. Visual information is provided on the LCD screen, by LEDs in the LED panel of the Sentinel user interface module (UI module), and in the buddy beacons in the backplate. Audible signals are emitted from an electronic sounder in the Sentinel UI module, and from a second sounder in the pressure module located in the backplate.

ℹ The settings specified in these instructions for use (e.g. pressure thresholds, alarm patterns, start-up options) are the default configuration settings for this product.
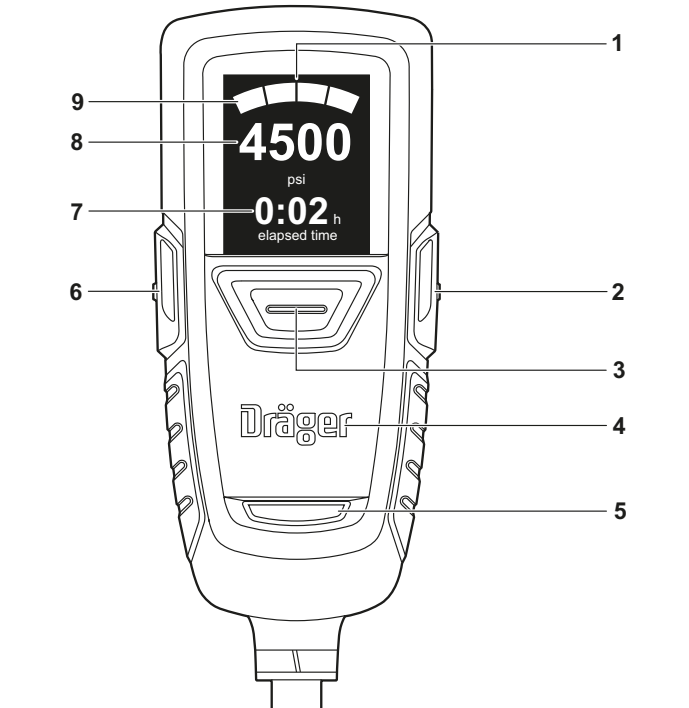
3.2.3.1 UI module

Fig. 3   UI module

No.	Description
1	LCD screen
2	Right-hand button
3	Manual alarm button
4	RFID antenna
5	LED panel
6	Left-hand button
7	Time (elapsed or remaining)
8	Cylinder pressure
9	Graphical pressure display

The UI module has a TFT type LCD screen which displays cylinder pressure, time, temperature, and other operational information. The screen deactivates to save power during operations, but automatically reactivates if a side button is pressed or a system event occurs.

The LED panel has green, blue, red, and amber LEDs which flash or pulse to provide operational information.

The UI module has buttons which control operating features of the Sentinel monitoring system. The control functions are described in section 4.3.1 and throughout these instructions for use.

Internal sounders emit audible signals to notify the user about breathing apparatus alarms and status messages. Varying sound patterns including continuous alarms and single or multiple tones are used to distinguish between different alarm types. The sounders are housed in the sounder slots and provide clear and loud alarms. The alarm sounds are described in section 3.2.8.

The Sentinel UI module incorporates a PASS (personal alert safety system) device. The PASS device provides a manual distress alarm (triggered by the wearer if they are in distress) and an automatic distress

alarm (triggered by the PASS device if the wearer has been motionless for a set amount of time). The functioning of the PASS device is detailed in section 3.2.5.

3.2.4 Monitored parameters

3.2.4.1 Cylinder pressure

The Sentinel electronic monitoring system uses a pressure sensor to measure the pressure of the air in the cylinder. The system displays the cylinder pressure and provides alarm signals at preset pressure levels. The cylinder pressure signals are also used to calculate the remaining time available.

Signals and alarms activate when the remaining pressure in the cylinder reaches the following levels:

Cylinder pressure (% actual remaining volume in brackets)		Meaning of signal	LEDs and pressure display
2216 psi	**4500 psi**		
2216 psi (100 %)	4500 psi (100 %)	Complete volume available	Blue pulse
1662 psi (75 %)	3150 psi (70 %)	3/4 remaining volume warning	Blue pulse
1086 psi (49 %)	2025 psi (45 %)	1/2 remaining volume warning	Amber pulse
753 psi (34 %)	1395 psi (31 %)	EOSTI alarm	Red flash

The EOSTI alarm activates at the level of the end of service time indicator. The EOSTI alarm signals are described in section 3.2.8.1.

The system has a second pressure sensor as a backup, which operates independently of the main pressure sensor. The second pressure sensor is powered by a backup battery and transmits pressure readings to the HUD (head-up display) via Bluetooth. The HUD signals are described in section 3.2.13.1.

3.2.4.2 Time

The Sentinel UI module displays elapsed or remaining time depending on the selected settings. Elapsed time counts and displays the time since the system was switched on. Remaining time is the calculated time in minutes until the EOSTI alarm activates. The system uses the cylinder pressure and the current consumption rate of the wearer to calculate and display the time. An initial calculation is made using a default consumption rate of 38 L/min. The calculation is then updated once per second using the actual consumption rate of the wearer (a minimum consumption rate of 38 L/min is applied to the calculation).

3.2.4.3 Temperature

The Sentinel electronic monitoring system has a thermal sensor contained in the pressure module. The thermal sensor measures the temperature that the sensor is currently being exposed to. The current temperature is displayed on the screen of the Sentinel UI and is used to activate thermal exposure alarms. Thermal exposure alarms are for the safety of the wearer and also for incident monitoring.

The Sentinel electronic monitoring system starts to monitor thermal exposure when the temperature is above a set start temperature (the default start temperature is 176 °F (80 °C)). There are two thermal alarms which are activated when the exposure exceeds the threshold for each alarm. The alarms warn the wearer that they have been exposed to elevated temperatures for an extended period, or that they have been exposed to unsafe high temperatures for a short period.

The thermal exposure alarms can be disabled, or the start temperature can be configured to meet the individual operational needs of the user using Dräger PC Link. Refer to the PC Link instructions for use or contact Dräger for more information.

3.2.5 PASS (personal alert safety system)

The PASS device provides manual and automatic distress alarms. The manual distress alarm is activated by pressing the manual alarm button to call for help or attention. The automatic distress alarm uses a motion sensor and timer to measure the time that the wearer has been motionless (moving less than normal walking movement). The PASS device uses this information to activate a pre-alarm and a full alarm at predetermined intervals to indicate that the wearer could be unconscious or trapped. The automatic distress alarm activation times are in section 10. The alarm signals are in section 3.2.8.

A limitation of the automatic distress alarm is that the motion sensor detects movement or vibration to which the wearer is subjected. If the wearer is motionless but on a moving platform (on moving or vibrating machinery for example) the automatic distress alarm might not activate.

3.2.6 Buddy-beacon

The buddy-beacon signal makes the breathing apparatus more visible in poorly lit or smoke-filled areas, to aid visual location and rescue. The color and pattern of the LED signal also displays the alarm condition of the breathing apparatus. The LEDs are located in the backplate and on the Sentinel UI module.

Under normal operating conditions, blue LEDs pulse every 3 seconds. When warnings and alarms activate, the signal changes to indicate the status (see section 3.2.4.1 and section 3.2.8).

3.2.7 Power pack

The power pack is located in the pressure module (Fig. 1).

For operation of the product, only use the following power packs:
– Primary power pack with 5 replaceable 1.5 V batteries.
– Rechargeable power pack with an integrated 6 V nickel-metal hydride (NiMH) battery.

The primary power pack is supplied with batteries fitted. To replace the batteries in a primary power pack, see section 4.6.9.3.

For primary battery use, the estimated time between battery replacement is 6 months (based on 80 uses lasting 30 minutes each). For rechargeables battery use, the typical operating time is 25 hours. An estimated storing time with battery inserted and not connected to clip charger is 4 weeks.

The actual power pack life may differ depending on system settings. Actual durations will vary depending on equipment usage patterns, duration of use, equipment configuration, environmental conditions and storage conditions.

The following precautions should be taken before using the equipment in low temperature conditions:
– When using a primary power pack, replace the batteries (see section 4.6.9.3).
– When using a rechargeable power pack, perform 3 health checks (see section 4.6.9.5).

A small amount of power is consumed when the system is not in use or in standby. For a system fitted with a rechargeable power pack that is stored ready for use, Dräger recommends usage of a Dräger clip charger (see the clip charger instructions for use). The clip charger ensures that the rechargeable power pack remains fully charged at all times.

Dräger recommends checking the battery level as part of the start of shift procedure.

Before using a rechargeable power pack for the first time, Dräger recommends that 3 consecutive health checks are performed. For instructions on how and when to perform health checks, refer to section 4.6.9.5 (see also the desktop charger instructions for use).

3.2.8 Alarms

3.2.8.1 EOSTI alarm (low pressure alarm)

When the remaining pressure in the cylinder reaches the level of the end of service time indicator, the EOSTI alarm activates as follows:
– An intermittent high-pitched alarm sounds.
– The red LEDs flash once every 3 seconds.
– The graphical pressure display shows as red.

[i] The EOSTI is indicated by the following systems: the EOSTI alarm, the warning whistle and the HUD. These systems operate independently of each other, and will activate within the EOSTI activation range (see section 10). Respond to the earliest indication.

3.2.8.2 Automatic distress alarm (PASS)

Pre-alarm

If the motion sensor has not been moved for approx. 20 seconds, the pre-alarm activates as follows:
– An alarm sounds in 3 tones with increasing volume.
– The red and blue LEDs flash twice every second.
– [icon] displays on the screen.

Full alarm

If the motion sensor has still not been moved for 12 to 13 seconds after the pre-alarm activation, the full alarm activates as follows:
– A high-pitched repeating alarm tone sounds.
– The red and blue LEDs flash six times every second.
– [icon] displays on the screen.

3.2.8.3 Manual distress alarm (PASS)

If the manual alarm button is pressed, the manual distress alarm activates as follows:
– A high-pitched repeating alarm tone sounds.
– The red and blue LEDs flash six times every second.
– [icon] displays on the screen.

3.2.8.4 Critical battery alarm

If the charge level of the power pack reaches the critical level during use, the battery alarm activates as follows:
– The red LEDs flash twice every second.
– [icon] displays on the screen.

For more information, see section 4.4.2.3.

3.2.9 Connectivity

The Sentinel electronic monitoring system can communicate with other systems to provide enhanced capabilities, as follows.

3.2.9.1 Configurable settings and parameters

The PSS AirBoss can be connected to the optional software application, Dräger PC Link. When connected, certain settings and parameters can be changed, such as user interface settings and start-up options. Readable information can also be accessed, such as product identification details and the datalog. Refer to the PC Link instructions for use or contact Dräger for more information.

3.2.9.2 Datalog

The datalog is a record of the event history which is automatically recorded in the system memory. The datalog stores approximately 200 hours of the most recent system events. The datalog can be downloaded and viewed using Dräger PC Link. Refer to the PC Link instructions for use or contact Dräger for more information.

3.2.9.3 Card reading system

The Sentinel UI module has a reader which can upload information from programmable cards to the system memory. User ID cards store information about the wearer (for example, user name, brigade name, and station number). When the card is read, the system records the user ID in the datalog.

PC Link can also read and write information on programmable cards which are available from Dräger for use with this product. Refer to the PC Link instructions for use or contact Dräger for more information.

3.2.10 Compressed air cylinders

The breathing apparatus is compatible with carbon composite material cylinders of 30 to 60 minute duration, and 2216 psi or 4500 psi pressure. Full descriptions and user instructions are contained in separate instructions supplied with the cylinder.

3.2.11 Masks

The breathing apparatus is compatible with Dräger FPS 7000 full face masks. Full descriptions and user instructions are contained in separate instructions supplied with the mask.

3.2.12 Lung demand valves

The breathing apparatus is compatible with Dräger Air lung demand valves with a PX push-in connector. Full descriptions and user instructions are contained in separate instructions supplied with the lung demand valve.
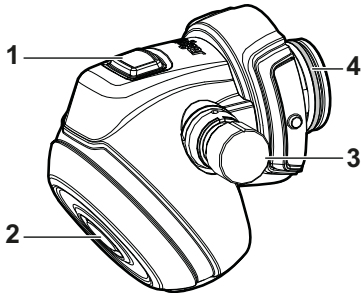

Fig. 4   Example of a lung demand valve

No.	Description
1	Reset button
2	Front button
3	Bypass button
4	Push-in connector O-ring

3.2.12.1 Extra air flow

The bypass valve can be opened (see section 4.4.4.1) to provide constant extra air flow (85 to 130 liters/minute) into the mask. A red dot indicates the status of the bypass valve.
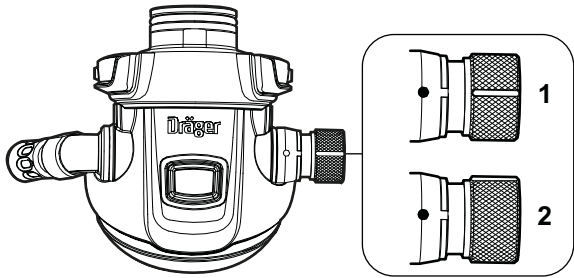

Fig. 5   Bypass status

No.	Description
1	Bypass valve is closed
2	Bypass is open

3.2.12.2 Hose routing

Variants of the lung demand valve are available that correspond to the routing of the medium-pressure hose of the breathing apparatus.
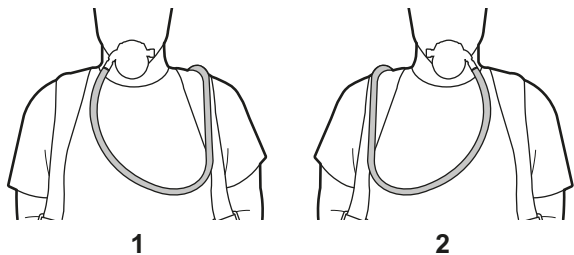

Fig. 6   Lung demand valve variants

No.	Description
1	Left shoulder variant
2	Right shoulder variant

Contact Dräger for more information.

3.2.13 HUD (head-up display)

The Dräger FPS HUD AirBoss is a head-up display unit fitted in the face mask to provide a visual indication of system conditions. Signals from the Sentinel electronic monitoring system are transmitted from the pressure module to the HUD via Bluetooth.

3.2.13.1 Pairing

The electronic monitoring system can be paired with the HUD in the following ways:
– Automatic
– Manual

Once paired, the devices remain paired until the electronic monitoring system is switched off.

Automatic pairing is the default method of pairing. When the electronic monitoring system is in automatic pairing mode, it pairs with and connects to the nearest HUD on the equipment being worn in the standard position on the user's body (automatic pairing mode requires that the set is worn on a human body). The devices remain paired until the electronic monitoring system is switched off.

Manual pairing can also be used for activities when the equipment is not being worn on a human body, e. g. during maintenance or testing (see section 4.6.10).

3.2.13.2 Cylinder contents LED patterns

During use, the HUD indicates approximate volume of air in the cylinder as shown in the following table.

Approximate volume of air	LED			
	Red	Amber	Green	Green
100 % to 75 %	🔴	🟠	🟢	🟢
75 % to 50 %	🔴	🟠	🟢	⚪
50 % content alarm (amber flashes for 20 seconds)	🔴	☀️	⚪	⚪
50 % to EOSTI	🔴	🟠	⚪	⚪
EOSTI to 100 psi (red flashes continuously)	☀️	⚪	⚪	⚪
Breathing apparatus switches off	HUD enters sleep mode			

3.3 Intended use

When the breathing apparatus is used with an approved compressed air cylinder, mask and lung demand valve, the product provides a wearer with respiratory protection for working in contaminated or oxygen-deficient conditions, including in CBRN environments.

The Sentinel electronic monitoring system provides accurate cylinder pressure, time, and temperature information, and activates alarm signals at critical points. The integrated PASS device provides clear, distinct, and easily recognized alarm signals that indicate wearer immobilization or a call for help or attention.

The compressed air cylinder, mask, lung demand valve, and other accessories used with this product must be certified Dräger components. They must be assembled in an approved configuration and used as described in this document and in separate instructions supplied with the accessories, otherwise operation of the product may be impaired.

Approved configurations are detailed in the following approval tables:
– 3737484 PSS AirBoss
– 3737485 PSS AirBoss for use in CBRN environments

3.4 Limitations on use

⚠️ **WARNING**
Using unapproved combinations is unsafe.
► Only use approved combinations of breathing apparatus, lung demand valve, compressed air cylinder and mask in CBRN environments.

To ensure protection in CBRN environments, the breathing apparatus must be used only as part of an approved configuration as defined in CBRN approval table, 3737485 PSS AirBoss for use in CBRN environments.

All electronic devices could suffer a temporary loss of function if subjected to high levels of RF radiation. The system operates with no loss of performance or function when the RF radiation is removed.

A limitation of the PASS automatic distress alarm is that the motion sensor detects movement or vibration to which the wearer is subjected, and may not activate if the wearer is motionless on a moving platform (for example on moving or vibrating machinery).

Manual force must not be used to pull the yoke of the backplate (for example, during an attempt to rescue a breathing apparatus wearer). A pulling force like this can only be applied to a correctly fitted PSS AirBoss grab handle. Refer to the assembly instructions of the grab handle.

3.5 Approvals

Electronic subassemblies are intrinsically safe. They conform to UL 913:
– Class I, Div. 1 Groups A-D T4
– Class II, Div. 1 Groups E,F,G.
– Class III
– -30 °C ≤ Ta ≤ + 60 °C

They are certified to CAN/CSA C22.2 No. 60079-0, 60079-11:
– Ex ia IIC T4 Ga
– Ex ia IIIB T135 °C Da
– -30 °C ≤ Ta ≤ + 60 °C

In addition, the product conforms with the following regulations:
– The PSS AirBoss is certified by NIOSH to 42 CFR Part 84. In certain combinations, the product is certified by NIOSH to provide respiratory protection from CBRN hazards. The product is also certified by SEI to meet the requirements of NFPA 1970:2024. The apparatus must only be used with compressed air cylinders approved by NIOSH and in the approved configuration in section 3.3.
– This device (model: PSS AirBoss) complies with part 15 of the FCC Rules. Operation is subject to the following 2 conditions: 1) this device may not cause harmful interference, and 2) this device must accept any interference received, including interference that may cause undesired operation.
– This device (model: PSS AirBoss) complies with RSS-Gen – General Requirements for Compliance of Radio Apparatus for Canada. Operation is subject to the condition that this device does not cause harmful interference.

3.6 Product marking and symbols

ℹ️ Do not remove or alter any product label or marking.

Labels on the product show information about the equipment, including the following:
– Product name and type.
– Equipment part numbers and serial numbers.
– Product approval information (see section 3.5).
– Manufacturing information.

Examples of Dräger part numbers and serial numbers are as follows:

Dräger part number: 3712345 or R12345
Dräger serial number: BRXX-1234

Labels are in the following locations on the product:
– Inside the backplate, between the tops of the shoulder straps.
– Printed on the reflective strips of the backplate.

– On the back of the Sentinel UI module.
– On the Sentinel pressure module.
The following symbols can be found on the product.

Symbol	Description
📇	Equipment identification RFID tag
⧖	Observe the disposal information
📖	Observe the instructions for use

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

For information on the symbols shown on the screen of the Sentinel UI module, see section 14.

4 Use

⚠️ **WARNING**
Only trained and competent users (those who have attended a relevant training course) are permitted to prepare and use this product.
► Ensure that any accessories, ancillary equipment, and other protective clothing items do not interfere with the breathing apparatus and do not create a safety hazard.

⚠️ **WARNING**
The effective working duration of the breathing apparatus depends on the initial air supply available and the breathing rate of the wearer.
► Fill compressed air cylinders to their full rated pressure before use.
► Do not commence any operation using a cylinder that is less than 90 percent full.

⚠️ **CAUTION**
Equipment damage can cause the release of high-pressure air.
► Do not apply excessive force or use tools to open or close a cylinder valve.
► Do not drop or throw down the breathing apparatus.

4.1 Prerequisites

Refer to the following additional information before preparing or using the product.
– The special instructions (see section 11).
– The quantitative fit test instructions (see section 4.1.1).
– For non-CBRN use, see the separate NIOSH approval table 3737484 for approved configurations.
– For CBRN use, see the separate NIOSH CBRN approval table 3737485 for approved configurations.

4.1.1 Quantitative fit test

⚠️ **WARNING**
If there is not a good seal between the mask and the face of the wearer, the mask may leak inward or outward during use.
► In a CBRN environment, use only face mask sizes that have been confirmed by a quantitative fit test (QNFT).
► Conduct the QNFT strictly in accordance with the requirements outlined in the OSHA Respiratory Protection Standard 29 CFR, Part 1910.134.

1. Select and test the face mask from the available sizes.

    ℹ️ The face mask is available in 3 sizes. The size is marked on the left side of the mask.
    – S (small)
    – M (medium)
    – L (large)
    The nose cup is available in 3 sizes. The size is marked on the front of the nose cup, and is visible through the visor.
    – 1 (small)
    – 2 (medium)
    – 3 (large)

4.2 Preparation for use

4.2.1 On first use of the breathing apparatus

ℹ️ On receipt of the product, the LCD screen and LED panel have thin flexible film covers for protection.

NOTICE
► The LCD screen and LED panel also have hard protective covers. Do not remove the hard protective covers.
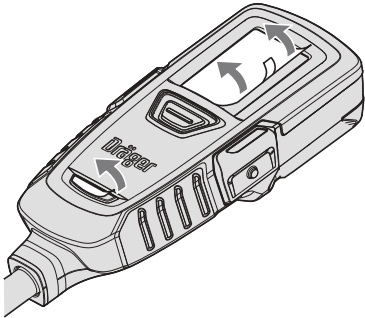
1. Remove the film covers before the first use (Fig. 7).

Fig. 7   Removing film covers

4.2.2 Preparing to use the breathing apparatus
1. Carry out a visual inspection of the breathing apparatus (see section 6.3.1).

2. If using a breathing apparatus with universal accessory clips, ensure that blanking plugs are fitted to all clips that are not fitted with accessories (see section 4.6.7).
3. If necessary, fit the HUD to the face mask (refer to the HUD instructions for use).
4. If necessary, fit the batteries for a primary power pack (see section 4.6.9.3).
5. If necessary, perform the health check for a rechargeable power pack (see section 4.6.9.5).
6. If necessary, fit the power pack to the recess (see section 4.6.9.1).
7. Fit the cylinder (see section 4.6.8.1).
8. Set the backplate height to the position required by the wearer (see section 4.6.4).
9. Check the male element of the medium-pressure quick coupling for burring (see section 6.3.2).
10. Check the push-in connector on the lung demand valve for lubricant (see section 4.6.5).
11. Press the lung demand valve reset button (Fig. 4, 1) to switch off the positive pressure.
12. Close the lung demand bypass if necessary:
    a. Press and rotate the bypass button 90° counterclockwise (Fig. 4).
    b. Release the bypass button.
13. Carry out a full functional test of the breathing apparatus (see section 6.3.4).
14. Connect the lung demand valve to the mask (refer to the lung demand valve instructions for use).
15. Put on the breathing apparatus (see section 4.6.1).
16. If using the breathing apparatus in a CBRN environment, perform:
    a. A buddy check (see section 4.6.3.1)
    b. A negative pressure fit check (see section 4.6.3.2).

4.3 Using Sentinel

4.3.1 System controls
The following controls activate product functionality.
– Press = Press and release the button.
– Hold = Press and hold the button for 2 seconds.
Each time a button is pressed a single tone sounds.

Control	Action	Function
Left-hand button	Press	Selects the choice indicated on screen
		Activates the LCD screen if deactivated
		Cycles through available operational information (remaining time, temperature, etc.)
	Hold	Displays a menu if menu options are available
Right-hand button	Press	Selects the choice indicated on screen
		Activates the LCD screen if deactivated
		Cycles through available operational information (remaining time, temperature, etc.)
Both buttons	Hold	Switches on the system if switched off
		Switches off the system if switched on (note that system will not switch off if still pressurized)
		Silences or cancels alarms
Manual alarm button	Hold	Activates the manual distress alarm (including when the system is switched off)
Cylinder valve	Open	Switches on the system if switched off
Sentinel UI module	Move	Cancels the PASS pre-alarm when activated
Programmable card	Read	Uploads card data to the system memory

For information on the symbols shown on the screen of the Sentinel UI module, see section 14.

4.3.2 Switching on

4.3.2.1 Normal switch on
Switch on the system by doing any of the following actions:
– Install the power pack.
– Simultaneously hold both of the side buttons.
– Open the cylinder valve to pressurize the pneumatic system.

4.3.2.2 Self-test
When the system switches on (with or without an air cylinder fitted), the self-test runs. The system indicates a self-test pass or fail.
– Self-test pass. The system enters the start-up sequence (see section 4.3.3).
– Self-test fail. The Sentinel UI module displays the fault code, and the red and blue LEDs flash 3 times intermittently.
    – Note the fault code and contact service personnel or Dräger (see section 5.5).
    – The system automatically switches off after the preset time. To switch off immediately, press the right-hand button 🔴.

4.3.2.3 System information switch on
Hold the left-hand button to switch on and display system information including serial numbers, firmware versions and approval information.
– If there is more than one page, press the left-hand button to scroll through system information.
– Press the right-hand button to return to the normal switch on sequence.

4.3.2.4 Alarm switch on
If the manual alarm of the PASS device activates when the system is off, the system automatically switches on in alarm mode. The self-test and start-up sequences are omitted when the system switches on in an alarm mode.

To switch on the system and immediately activate the manual distress alarm, press the manual alarm button.

4.3.3 Start up

When the self-test completes successfully (see section 4.3.2.2), the Sentinel UI module displays the start-up menu. The contents of the menu can be configured individually for different switch-on methods.

ℹ Some start-up menu content is mandatory when the device is switched on by installing the power pack.

When all applicable menu options have been displayed, the device enters operational mode (see section 4.4.1).

– Press the left-hand button or right-hand button to accept or acknowledge the on-screen message and progress to the next stage immediately.

– If failure conditions are detected, the system switches off. Failure conditions include critical battery level, system time-out, leak detected, and system errors.

ℹ If the system switches off and is still pressurized, it could immediately switch on and restart the start-up sequence.

4.3.3.1 Start-up sequence

1. Battery level (see section 4.3.3.2 and section 4.3.3.3).
2. System information (see section 4.3.2.3).
3. Read card (see section 4.3.3.4).
4. Cylinder selection (if applicable) (see section 4.3.3.5).
5. PC Link. Select ✓ to enable wireless connection to PC Link (refer to the PC Link instructions for use).
6. High-pressure leak test (see section 6.3.4.2).

4.3.3.2 Battery level on start-up

When the system is started up, the initial battery level is indicated as follows:

Battery good

The battery charge is sufficient to remain above the critical level during the current operation (Fig. 8).
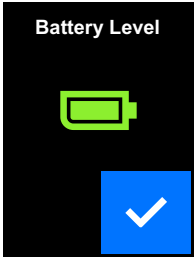
1. Select ✓ to proceed.

Fig. 8   Battery good

Battery warning

The battery charge is sufficient to begin operation, but could reach the critical level during the maximum operating time available for the breathing apparatus configuration (Fig. 9).

1. Select ✓ to proceed, or select ⏻ to switch off.
2. Replace the power pack before the next operational use (see section 4.6.9).
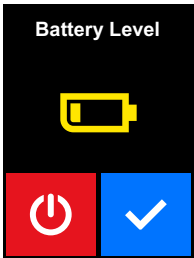
Fig. 9   Battery warning

Battery critical

The battery charge is not sufficient to support an operational use (Fig. 10). The breathing apparatus cannot be used until the power pack is replaced.

1. Select ⏻ to switch off.
2. Replace the power pack (see section 4.6.9).

Fig. 10   Battery critical

4.3.3.3 Backup battery level on start-up

ℹ If the backup battery level is good, a level indication will not be shown during start-up.

When the system is started up, the initial battery level of the backup battery is indicated as follows:

Backup battery warning

The backup battery charge is sufficient to begin operation, but could reach the critical level during the maximum operating time available for the breathing apparatus configuration (Fig. 11).

1. Select ✓ to proceed, or select ⏻ to switch off.

2. Replace the backup battery before the next operational use (contact service personnel).
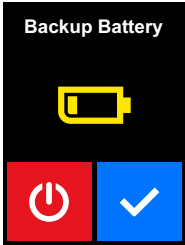
Fig. 11   Backup battery warning

Backup battery critical or not fitted

The backup battery is not fitted or is not operational due to critical battery level (Fig. 12). The backup pressure sensor is not operational.

1. Select ✓ to proceed, or select ⏻ to switch off.
2. Replace the backup battery before the next operational use (contact service personnel).
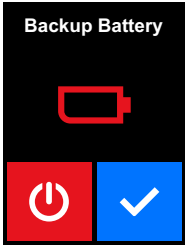
Fig. 12   Backup battery critical or not fitted

4.3.3.4 Read card

ℹ This function is only available if configured during manufacture or if enabled using Dräger PC Link. Refer to the PC Link instructions for use or contact Dräger for more information.

Use this procedure to upload information from a user ID card or a configuration card. See section 3.2.9.3 for more information about card types.

1. Switch on the system.
2. During the start-up sequence, present the card when the read card symbol 📇 is displayed.
3. Hold the card against the front of the Sentinel UI module and follow the on-screen instructions.
4. Observe the following:
   – Incorrect user ID or configuration data displayed. Select 🔄 to retry using the correct card.
   – Invalid card content 📇. Invalid or corrupt data on card. Select 🔄 to retry, or ✕ to return to the start-up sequence.
   – No card detected 📇. Card not read within the permitted time. Select 🔄 to retry, or ✕ to return to the start-up sequence.
5. If card read errors continue to occur, contact service personnel or Dräger.

4.3.3.5 Cylinder selection

ℹ The cylinder selection screens are only displayed if all of the following conditions are true:

– The equipment is a 4500 psi breathing apparatus.
– The system has not been switched on by opening the cylinder valve.

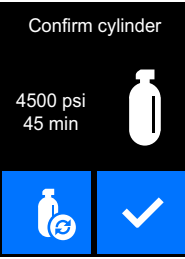The **Confirm cylinder** screen (Fig. 13) shows the currently selected cylinder.

Fig. 13   Confirm cylinder

1. Select ✓ to confirm the currently displayed cylinder type, or select 🛢 to open the **Select new cylinder** screen (Fig. 14).

Fig. 14   Select cylinder

2. Select 🛢 to cycle through the available cylinder types, or select ✕ to confirm the currently displayed cylinder type.

4.4   During use

⚠ **WARNING**
If the end of service time indicator (EOSTI) activates, the air supply is dangerously low.
► Monitor the remaining air supply at all times by using the pressure gauge.
► Ensure that you are in a safe area before the EOSTI activates.
► If the EOSTI activates when you are in danger, evacuate to a safe area immediately.
► Ensure that all cylinder valves are fully open during use to avoid a false activation of the EOSTI.

ℹ The EOSTI is indicated by the following systems: the EOSTI alarm, the warning whistle and the HUD. These systems operate independently of each other, and will activate within the EOSTI activation range (see section 10). Respond to the earliest indication.

4.4.1 Operational mode of the Sentinel UI module

In the operational mode, the display is divided into an upper and lower part:

– The upper part (Fig. 15, 1) always shows the pressure (see section 4.4.1.1).
– The lower part (2) shows additional information (see section 4.4.1.2).
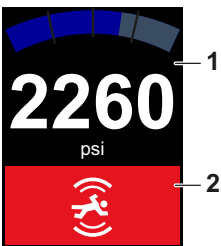
Fig. 15   Parts of the display

If necessary, the HUD manual pairing procedure can be done during operational mode (see section 4.6.10).

The display will switch off after some time, unless an alarm is indicated or user input is required. The display can be switched on by pressing the left-hand or right-hand button. The display automatically switches itself on if there is a notification on the display, or if the pressure crosses one of the configured pressure thresholds.

4.4.1.1 Pressure display

The graphical pressure display shows the pressure (Fig. 15, 1) relative to the rated capacity of the selected cylinder. If the measured pressure exceeds the rated capacity, the pressure bar will be full. The numeric pressure display shows the pressure in the configured pressure unit (psi). The colors of the numeric and graphical pressure display will change as the measured pressure crosses configured thresholds.

4.4.1.2 Additional information display

The lower part of the display shows additional information and user prompts. The additional information includes notifications, alarms and battery charging status. Other items can be configured to display here, see section 4.4.1.3.

The configurable items are ordered into a list when configured. The lower part of the display shows the first item in this list, and the other items can be cycled through by pressing a side button. After a short time, the display reverts to the first item.

When one or more alarms are active (see section 3.2.8), the most severe alarm is indicated in the lower part of the display (Fig. 15, 2). The indicated alarm takes priority over any other information items. The items can still be cycled through by pressing a side button.

Certain events trigger a notification in the lower part of the display, accompanied by two short beeps. Notifications will disappear after a short time, or can be dismissed by pressing a side button.

The lower part of the display also indicates button functions and user prompts. User prompts have a blue background and appear next to the side button which will confirm the action if pressed. If a side button is held, the action will appear next to the held button and a 3 second countdown is shown.

4.4.1.3 Configurable information items

The following information options can be configured to show in the lower part of the display:

– Elapsed time
– Time to whistle
– Temperature

4.4.2 Normal operation

4.4.2.1 Cylinder pressure

1. Regularly check the cylinder pressure and time on the LCD screen and on the HUD.

   ℹ The graphical pressure display turns amber when approximately three-quarters of the cylinder air capacity remains, and red when approximately half remains (see section 3.2.4.1).

2. Begin to retreat immediately if the EOSTI alarm activates (see section 3.2.8).

   ℹ When the EOSTI alarm activates, approximately one-third of the cylinder air capacity remains (see section 3.2.4.1).

4.4.2.2 Using PASS alarms

Manual distress alarm

To call for emergency help or attention, do the following:

1. Press the manual alarm button to activate the alarm.
2. To cancel the alarm (if required), simultaneously hold the left-hand and right-hand buttons until the alarm stops.

Automatic distress alarm

If the automatic distress alarm activates, do the following:

1. To cancel the pre-alarm (if required), move the Sentinel UI module or press one or both buttons.

   ℹ️ If the pre-alarm is not canceled, the full alarm activates after the preset time.

2. To cancel the full alarm (if required), simultaneously hold the left-hand and right-hand buttons until the alarm stops.

4.4.2.3 Critical battery alarm

If the battery reaches the critical level during use, the critical battery alarm activates and is indicated on the display (Fig. 16).

2260
psi

Fig. 16   Critical battery alarm

ℹ️ When the alarm activates, there is approximately 1 hour of battery use remaining.

1. If the critical battery alarm activates, evacuate to a safe area immediately.

4.4.2.4 System faults during use

ℹ️ If a system fault occurs during use:

– The fault is recorded in the system memory.

– The Sentinel UI module displays a fault code when the system switches off (see section 5.5).

1. If a system fault occurs, note the fault code and contact service personnel or Dräger.

Motion sensor fault

ℹ️ If a motion sensor fault occurs during use, the full alarm activates (see section 3.2.8).

1. If a motion sensor fault occurs, do the following:

   a. Cancel the alarm.

   b. Evacuate to a safe area immediately.

   ℹ️ A recurring motion sensor fault activates the alarm continuously during the evacuation.

Pressure sensor fault

ℹ️ If a pressure sensor fault occurs during use:

– The pressure value is blanked and no pressure is shown on the display (Fig. 17)

– The time display continues to count as normal.

1. If a pressure sensor fault occurs, evacuate to a safe area immediately.

psi
1:05 h
elapsed time
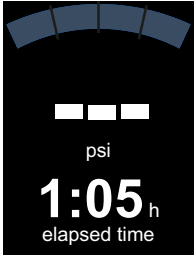
Fig. 17   Pressure sensor fault

4.4.3 Using supplementary air

Supplementary air can be used to clear a misted visor or to provide a temporary increased air supply.

⚠️ **WARNING**
Using supplementary air may greatly reduce the operating time of the breathing apparatus.
► Do not use supplementary air unless necessary.

1. Briefly press the front or bypass button of the lung demand valve.

4.4.4 Emergency air flow procedures

⚠️ **WARNING**
Emergency air flow procedures may greatly reduce the operating time of the breathing apparatus.
► When a procedure is used, the user must immediately evacuate to a safe area.
► The reason for using the procedure must be investigated and repaired before reusing the breathing apparatus.

4.4.4.1 Extra air flow

The extra air flow emergency procedure should only be used in the unlikely condition of low or blocked air flow.

1. Open the bypass valve:

   a. Press and rotate the bypass button 90° clockwise (Fig. 5).

   b. Release the bypass button.

4.4.4.2 Excessive air flow or loss of air flow

The following emergency procedure should only be used in the unlikely event of excessive air flow or a loss of air flow. It uses the cylinder valve as a regulating valve to set the air flow. This procedure can be used with screw-type and ratchet-type cylinder valves.

1. Close the cylinder valve.

2. Immediately begin to slowly open the cylinder valve.

3. Continue to slowly open the cylinder valve until the air flow meets the user requirement.

4.5   After use

4.5.1 Switching off the Sentinel UI module

ℹ️ The system cannot be switched off unless the cylinder pressure indicated on the Sentinel UI module is below a preset value.

1. Close the cylinder valve and fully vent the pneumatic system before attempting to switch off.

   ℹ️ The battery level is displayed as the system switches off.

2. Hold the right-hand and left-hand buttons until the display clears, then immediately release the buttons.

3. If the Sentinel UI module displays a fault as the system switches off, note the fault code and contact service personnel or Dräger.

4.5.2 After using the breathing apparatus

1. Take off the breathing apparatus (see section 4.6.2).

2. Carry out a visual inspection of the breathing apparatus (see section 6.3.1).

3. Carry out a full functional test of the breathing apparatus (see section 6.3.4).

4. Check the push-in connector on the lung demand valve for lubricant (see section 4.6.5).

5. Remove the cylinder if necessary (see section 4.6.8).

6. Charge the cylinder (see section 6.3.6).

7. Pass the breathing apparatus to the service department with details of any faults or damage that occurred during use.

4.6   Common tasks

4.6.1 Putting on the breathing apparatus

1. Fully loosen the shoulder straps and waist belt.

2. Put on the breathing apparatus.

3. Check that the shoulder pads are not twisted.

4. Take the weight of the breathing apparatus on the shoulders by pulling the shoulder pull-down straps. Do not fully tighten at this stage.

5. Close the waist belt buckle.

6. Pull the ends of the waist belt forward (Fig. 18). The belt padding should fit securely and comfortably over the hips.
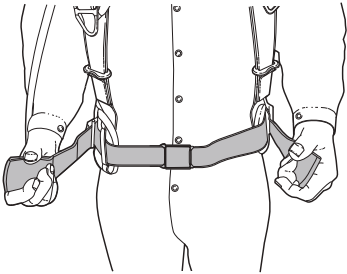
Fig. 18   Pulling the ends of the waist belt

7. Tuck the belt straps behind the waist pad.

8. Pull the shoulder pull-down straps until the breathing apparatus rests securely and comfortably on the hips. Do not over tighten.

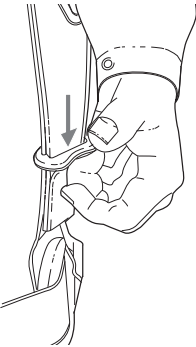9. Pull the strap retainers down to secure the strap ends (Fig. 19).

Fig. 19   Securing the strap ends

10. Fully loosen the mask straps.

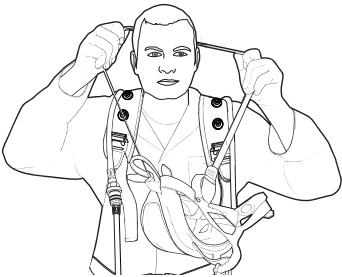11. Place the neck strap over the back of the neck (Fig. 20).

Fig. 20   Positioning the neck strap

12. Press the lung demand valve reset button (Fig. 4, 1).

13. Open the cylinder valve slowly, but fully, to pressurize the system.

14. Carry out the start-up condition checks (see section 4.3.3) and leak tests (see section 6.3.4.2). Carry out other start-up functions as required.

   – On completion of the start-up sequence, the system enters active mode.

   ℹ️ Dräger recommend that the cylinder should be full at the start of any operation or sequence of operations. The cylinder pressure must be at least 1450 psi to carry out the high-pressure leak test.

15. Check the cylinder pressure reading. Ensure that there is sufficient air in the cylinder for the operation.

16. Carry out a functional test of the electronic system (see section 6.3.4.1).

⚠️ **WARNING**
If there is not a good seal between the mask and the face of the wearer, the mask may leak inward or outward during use.
► In a CBRN environment, use only face mask sizes that have been confirmed by a quantitative fit test (QNFT).
► Conduct the QNFT strictly in accordance with the requirements outlined in the OSHA Respiratory Protection Standard 29 CFR, Part 1910.134.

17. Put on the mask and check the seal between the mask and the face (for non-CBRN use, refer to the mask instructions for use; for CBRN use, see section 4.6.3).

4.6.2 Taking off the breathing apparatus

⚠️ **WARNING**
Removing the breathing apparatus in a hazardous breathing environment is unsafe.
► Do not remove the breathing apparatus until in a safe breathing environment.

⚠️ **CAUTION**
Exposure to CBRN contaminants could make the breathing apparatus unsafe to use in the future.
► If it is known or suspected that the breathing apparatus has been exposed to a CBRN contaminant, carry out an appropriate risk assessment to establish any required actions. For example, consider the suitability of the equipment for future use.

NOTICE
The product can be damaged if removed incorrectly.
► Do not remove the mask by pulling the lung demand valve.

1. Loosen the mask straps.

2. At the point when the seal between the mask and face is broken, press the reset button (Fig. 4, 1).

3. Close the bypass valve if necessary:

   a. Press and rotate the bypass button 90° counterclockwise (Fig. 5).

   b. Release the bypass button.

4. Fully remove the mask and extend all the straps.

5. Close the cylinder valve.

6. Press the lung demand valve front button (Fig. 4, 2) to vent the pneumatic system.

7. Press the lung demand valve reset button (Fig. 4, 1).

8. Release the waist belt buckle.

9. Lift the shoulder harness ends to release the strap retainers (Fig. 21) and then lift the shoulder strap buckles to loosen the straps.
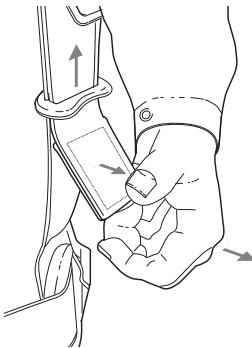
Fig. 21   Releasing the strap retainers

10. Take off the breathing apparatus.

4.6.3 Putting on the mask (CBRN use)

⚠️ **WARNING**
Correct fit of the face mask can only be achieved if the complete mask seal contacts the skin.
► Do not allow head hair styles (buns, pony-tails, hairpieces, etc.) to affect the fit of the face mask.
► Do not allow head hair, facial hair (including beard stubble and sideburns), earrings, other facial piercings, and normal spectacles to interfere with the face mask seal.

1. Carry out the instructions in section 4.1.1.

2. Inspect the face mask. Ensure the following:

   – The head harness is securely attached.

   – The nose cup is correctly located and secure.

   – All parts are in good condition.

3. If fitted, move the spectacle frame to the preferred position.

4. Fully extend the straps of the head harness (Fig. 22).
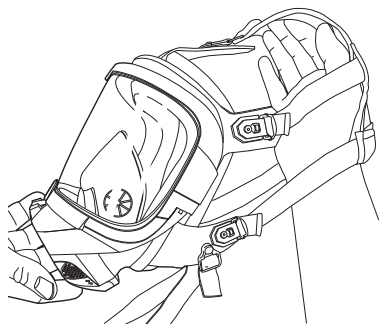

Fig. 22   Extending the straps of the head harness

5. Place the carrying strap over the head and locate the face mask on the chest. This is to avoid damage and ingress of dirt when the mask is not on the face.
6. If fitted, attach the communication system push-to-talk (PTT) button to a suitable location on the chest.
7. Spread the head harness and place the chin into the face mask.
8. Pull the head harness over the head and center the fabric panel (Fig. 23). Ensure that the straps are flat and not twisted.

Fig. 23   Correct position of the head harness

9. Ensure that nothing is interfering with the face seal (including hair, the head harness and the carrying strap).
10. Ensure that every part of the full face seal is in contact with the skin (including all facial contours).
11. Tighten the neck straps (Fig. 24, 1) and then the temple straps (2) evenly towards the back of the head. Ensure that the fabric panel of the head harness remains positioned in the center of the head.
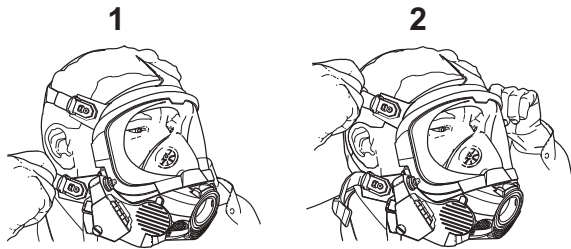
Fig. 24   Tightening the mask straps

4.6.3.1 Buddy check

Immediately after putting on the mask, each wearer must be checked by a second person to ensure that the fitting is correct.

1. Use a second person to check for and rectify the following fitting errors:
   – Hair between the seal and face, or a visible separation of the seal from the face (Fig. 25).
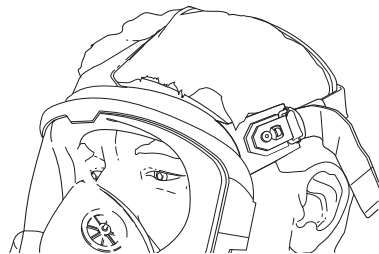
Fig. 25   Hair interfering with face seal

   – A separation of the seal from the face that can be felt with the fingers (Fig. 26).
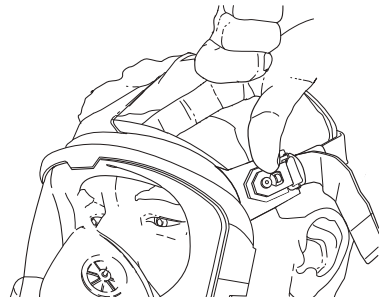
Fig. 26   Checking for gaps in face seal

   – Head hair, sideburns, piercings, or anything else that could be interfering with the face seal.
   – Twisted straps.
   – Any other indications that the face mask is not being worn correctly.

4.6.3.2 Negative pressure fit check

Carry out a negative pressure fit check as follows:

1. Inhale and hold breath. Ensure that there is no audible leak.

---

2. Recommence breathing. Exhaled air should flow easily from the exhalation valve.
3. Press the bypass button and check that additional air is delivered into the face mask. Release the bypass button.
4. Close the cylinder valve and breathe normally to empty the system. When the breathing apparatus gauge indicates zero (system empty), inhale and hold breath for approximately 8 seconds. Ensure that the mask collapses and holds on to the face to indicate a positive seal.
   ⇒ If the negative pressure holding the mask on to the face decreases, the mask is not sealing properly. Readjust the mask, or remove and refit the mask, and then repeat the negative pressure fit check.

⚠ **WARNING**
If there is not a good seal between the mask and the face of the wearer, the mask may leak inward or outward during use.
▶ If a satisfactory face seal is not achieved after a second attempt at fitting the mask, the wearer is not permitted to use the breathing apparatus for CBRN applications.

5. Open the cylinder valve slowly, but fully, to pressurize the system, and proceed as detailed in the breathing apparatus instructions for use.

4.6.3.3 Face mask fit test using a P100 filter

ℹ The fit test that follows is performed using a filter with a P100 protection rating.

Work equipment
– Dräger face mask (as defined in the CBRN approval table 3737485)
– Mask blanking plug
– Mini-rap adapter
– P100 filter

1. Put on the face mask (see section 4.6.3) and carry out the buddy check (see section 4.6.3.1).
2. Carry out a negative pressure fit check as follows:
   a. Ensure that the O-ring of the mask blanking plug is not damaged.
   b. Push the O-ring end of the mask blanking plug into the connector on the front of the mask until it clicks into position.
   c. Inhale and hold breath for approximately 8 seconds. Ensure that the mask collapses and holds on to the face to indicate a positive seal.
   ⇒ If the negative pressure holding the mask on to the face decreases, the mask is not sealing properly. Readjust the mask, or remove and refit the mask, and then repeat the negative pressure fit check.
3. Press and hold the release button on the front of the mask, remove the mask blanking plug, and breathe normally.
4. Ensure the O-ring of the mini-rap adapter is not damaged.
5. Hold the mini-rap adapter and screw a P100 filter into the threaded end of the adapter. Fully tighten the filter to the sealing gasket by hand.
6. Push the O-ring end of the mini-rap adapter into the connector on the front of the mask until it clicks into position. Check the attachment by gently attempting to pull the coupling apart.
7. Breathe normally and perform the required test protocol.

NOTICE
The equipment can be damaged if removed incorrectly.
▶ Do not remove the mask by pulling on the lung demand valve.

8. Following a satisfactory test, remove the face mask as follows:
   a. Loosen the neck straps and the temple straps by lifting and pulling the buckles forward (towards the front of the face mask).
   b. Hold the body of the mask and pull and lift to remove the mask.
   c. Fully extend the straps of the head harness in preparation for the next use (Fig. 27).
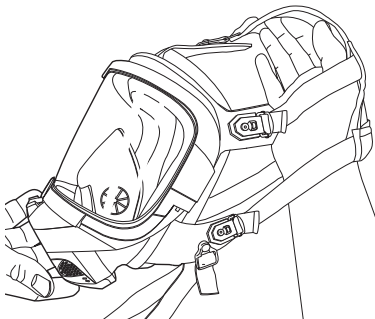

Fig. 27   Extending the straps of the head harness

9. Simultaneously press both buttons on the side of the mini-rap adapter then remove the mini-rap adapter and filter from the face mask.
10. Unscrew the filter from the mini-rap adapter.

4.6.4 Adjusting the backplate height

1. Lift the apparatus into the vertical position.
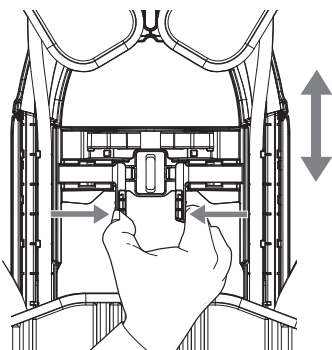2. Simultaneously press the two spring-loaded buttons (Fig. 28).

Fig. 28   Pressing the spring-loaded buttons

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3. Slide the yoke in the required direction then release the buttons.
4. Continue sliding the yoke until the buttons engage and lock the yoke in the required position

4.6.5 Checking the push-in connector

1. Check for lubricant on the O-ring of the push-in connector.
   ℹ As a guide, lubricant should be felt on the fingers but not seen.

Further steps
If relubrication is required, lightly apply Molykote 111 to the O-ring of the push-in connector.

4.6.6 Fitting an accessory to a universal accessory clip
Work equipment
– 7/64 ″ (2.5 mm) hexagon key

1. Use the hexagon key to push down the spring of the universal accessory clip (Fig. 29). Remove the blanking plug.
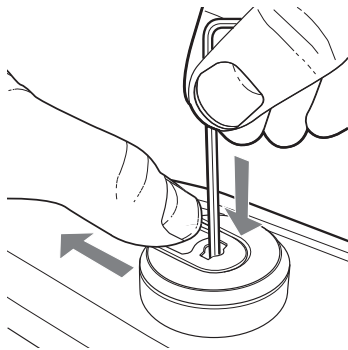

Fig. 29   Removing the blanking plug

2. Slide the compatible accessory into the universal accessory clip (Fig. 30).
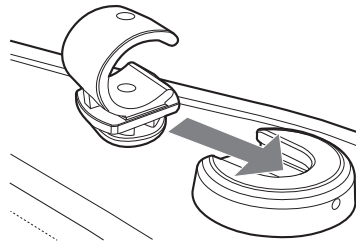

Fig. 30   Fitting the accessory

3. Ensure that the accessory is securely retained by the universal accessory clip.

4.6.7 Removing an accessory from a universal accessory clip
Work equipment
– 7/64 ″ (2.5 mm) hexagon key

1. Use the hexagon key to push down the spring of the universal accessory clip (Fig. 31). Remove the accessory.
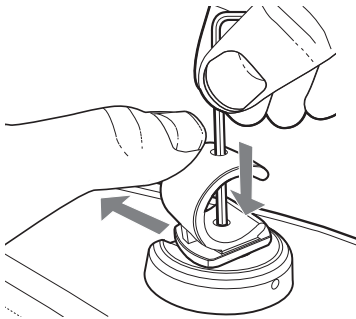

Fig. 31   Removing the accessory

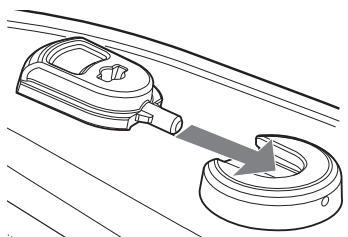2. Slide a blanking plug into the universal accessory clip (Fig. 32) to protect it.

Fig. 32   Fitting the blanking plug

3. Ensure that the blanking plug is securely retained by the universal accessory clip.

4.6.8 Fitting and removing compressed air cylinders

⚠ **WARNING**
High-pressure air release can cause injury to the user or other personnel near the breathing apparatus.
▶ Close the cylinder valve and fully vent the system before attempting to disconnect a cylinder.

⚠ **WARNING**
Impact damage to the cylinder valve or pressure reducer connector can prevent valve connection or cause an air leak.
▶ Handle the cylinder and breathing apparatus with care.

NOTICE
► Observe the correct pressure rating shown on the hand wheel of the pressure reducer.

For cylinder connector types not described in this document, refer to the instructions for use supplied with the connector.

4.6.8.1 Fitting a compressed air cylinder

1. Ensure that the cylinder is fully charged (see section 6.3.6).
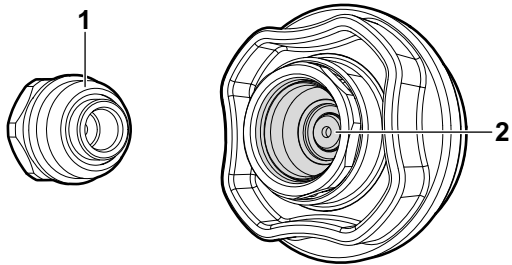2. Ensure that male adapter (Fig. 33, 1) is fitted on the cylinder valve port.

Fig. 33   Quick connect coupling components

   a. If that male adapter is not fitted on the cylinder valve port, refer to the assembly instructions of the adapter.
3. Ensure that male adapter on the cylinder valve port (1) and the bore of the pressure reducer (2) are clean and undamaged.
   a. If the quick connect cylinder coupling requires cleaning, see section 6.2.2.
4. Lay the backplate horizontal, with the pressure reducer uppermost.
5. Fully extend the cylinder strap. If necessary, pull open the hook-and-loop fastener of the cylinder strap and open the cam-lock buckle.
6. Insert the cylinder through the cylinder strap.
7. Align the cylinder valve with the pressure reducer.
8. Push the cylinder valve port into the bore of the hand wheel until a click is heard (Fig. 34).
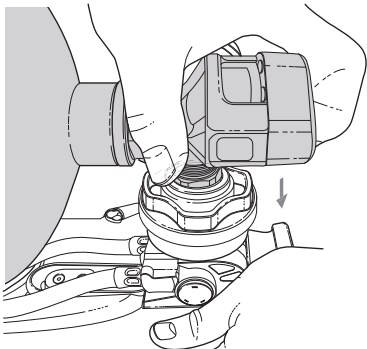
Fig. 34   Aligning the cylinder valve

  ⇒ The hand wheel will rotate by approximately 45 degrees to indicate that the cylinder is connected to the pressure reducer.
9. Take up the slack in the cylinder strap (Fig. 35).
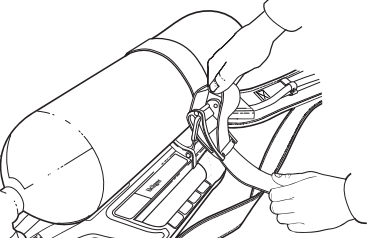
Fig. 35   Tightening the cylinder strap

10. Pull the strap over the cylinder to operate the cam-lock buckle (Fig. 36).
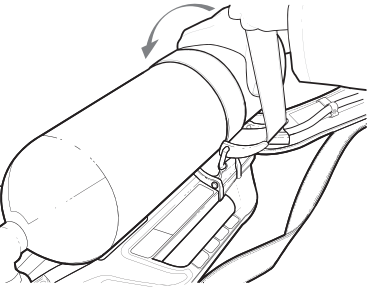
Fig. 36   Securing the cylinder strap

11. Secure the cylinder using the hook-and-loop fastener. Check that the cylinder is secure.

4.6.8.2 Removing a compressed air cylinder

1. Close the cylinder valve and fully vent the system.
2. Lay the backplate horizontal, with the cylinder uppermost.
3. Loosen the free end of the cylinder strap from the hook-and-loop fastener.

4. Lift the cylinder strap against the cam lock buckle to release the buckle tension and loosen the strap (Fig. 37).
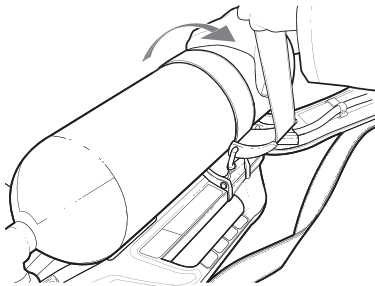
Fig. 37   Loosening the cylinder strap

5. Turn the hand wheel fully clockwise until it stops (Fig. 38), then push down on the hand wheel. Lift the cylinder valve to disconnect it from the connector.
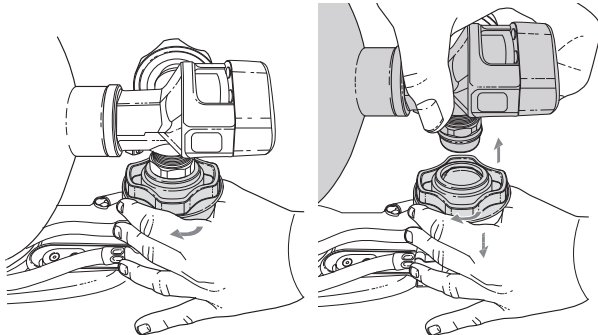
Fig. 38   Removing the cylinder valve from the quick connect coupling

6. Lift the cylinder away from the pressure reducer and remove the cylinder.

4.6.9   Using and replacing batteries

4.6.9.1 Fitting the power pack
1. Inspect the power pack and recess (see section 6.3.1), paying particular attention to the battery terminals and sealing rim.
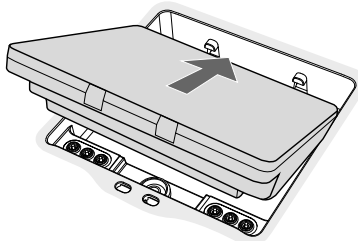2. Insert the power pack into the recess (Fig. 39).

Fig. 39   Inserting the power pack

3. Lock the power pack as follows:
   a. Use both thumbs to push down firmly in the bottom center of the power pack (Fig. 40).
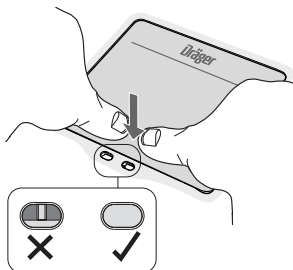
Fig. 40   Locking the power pack

   b. Push down firmly again.
   c. Ensure that the 2 sliding latches are engaged when viewed through the 2 keyholes (Fig. 40).
   ⓘ Each sliding latch emits an audible click when it locks into position.
✓ When the power pack connects successfully, a tone sounds and the start-up sequence commences (see section 4.3.3).

4.6.9.2 Removing the power pack
Work equipment
– Removal key
ⓘ A removal key (Dräger part number 3356667) is supplied with the breathing apparatus.
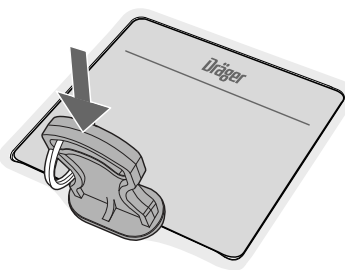1. Insert and press down the removal key (Fig. 41).

Fig. 41   Removing the power pack

2. Remove the power pack.

4.6.9.3 Replacing primary power pack batteries
⚠ WARNING
Improper handling and use of batteries may cause an explosion, a fire, or a chemical hazard.
► Do not remove or install the batteries in an explosive or flammable atmosphere.
► Do not expose the batteries to heat sources.
► Do not attempt to recharge any non-rechargeable battery.
► Do not short out the battery terminals.
► Use only the recommended battery type.
► Replace batteries as a matched set and do not mix new and used batteries.

NOTICE
Batteries that are not correctly disposed of may cause an environmental hazard.
► Dispose of used batteries in accordance with national or local regulations.

Use only the following approved battery types:
– Energizer E91 Max alkaline (AA, 1.5 V)

Work equipment
– 7/64 ″ (2.5 mm) hexagon key
– Torque wrench (1 Nm)

1. Remove the power pack (see section 4.6.9.2).
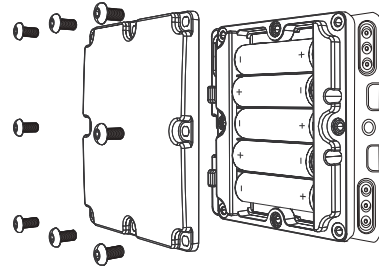2. Remove the 8 screws (Fig. 42) using a 7/64 ″ (2.5 mm) hexagon key.

Fig. 42   Replacing 1.5 V batteries

3. Remove the battery cover.
4. Remove the batteries.
5. Install a new set of batteries observing the polarity marked inside the pack.
6. Inspect the sealing ring inside the battery cover. Contact Dräger or service personnel if sealing ring replacement is necessary.
7. Refit the battery cover and tighten the screws. Do not over tighten (Dräger recommends tightening to 0.7 lbf ft (1 Nm)).
8. Fit the power pack (see section 4.6.9.1).

4.6.9.4 Charging the rechargeable power pack
The rechargeable power pack can be recharged while it is fitted to the breathing apparatus by connecting a Dräger PSS AirBoss Clip Charger.

ⓘ The rechargeable power pack can alternatively be removed from the breathing apparatus and charged using a Dräger PSS AirBoss 5-Way Desktop Charger. For information, see the desktop charger instructions for use.

⚠ WARNING
Risk of electrical shock or equipment damage.
► Use only compatible Dräger equipment and the approved methods to charge the rechargeable power pack.

1. Before you connect the clip connector to the equipment, do the following:
   a. Ensure that both connectors are clean, undamaged and free from debris.
   b. Ensure that the breathing apparatus is securely stored.
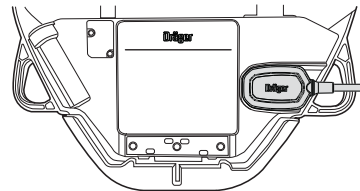2. Connect the clip connector to the charging port (Fig. 43).

Fig. 43   Connecting a clip charger

3. When charging is complete, remove the clip connector from the charging port, if necessary.

Further steps
For further information on using the clip charger, see the clip charger instructions for use.

4.6.9.5 Power pack health check (rechargeable power pack only)
ⓘ The power pack health check is performed using the PSS AirBoss 5-Way Desktop Charger.

The health check fully discharges and recharges the power pack, and checks the condition of the power pack.

At the end of the check, the power pack is recalibrated to ensure the accuracy of the charge level signals.

Repeating the health check may improve the battery capacity, particularly for power packs that have been unused for a long period.

If using a rechargeable power pack, Dräger recommends performing a health check on the power pack before use as follows:

Condition	Recommended action
Before using the power pack for the first time	Perform 3 health checks before use
The rechargeable power pack has not been used for a month or longer	Perform 1 health check before use
The rechargeable power pack will be used in cold temperatures (-20 °C or below)	Perform 3 health checks before use

To perform the power pack health check, refer to the instructions for use of the desktop charger.

4.6.10 Manual pairing with the HUD

1. During operational mode, press and hold the left-hand button of the user interface module until the menu opens.
   ⇒ First a countdown from 3 to 0 is indicated, then 🔒 and 🔄 display on the screen.
2. Select 🔒 to proceed.
   ⇒ The 🔒 symbol displays on the screen and the user interface module beeps twice to indicate that the SCBA is ready to pair.
3. Hold the RFID antenna of the user interface module against the mask where the LED panel of the HUD is located.

   ℹ The RFID antenna is located beneath the Dräger logo on the front of the user interface module.
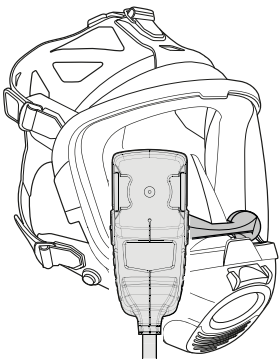
Fig. 44   Position for manual pairing

⇒ If pairing is successful, the user interface module beeps twice and the 🔒 symbol displays on the screen for about 10 seconds or until a button is pressed.

ℹ The breathing apparatus will only connect to the HUD it was paired with. They will remain paired until the breathing apparatus is switched off at which point the pairing information will be discarded. The next time that the breathing apparatus is switched on, automatic pairing will be active.
If no HUD is paired within the time limit, the symbol will time out, there will be no feedback.

5   Troubleshooting

The troubleshooting guide shows fault diagnosis and repair information applicable to users of this product. Further troubleshooting and repair information is available in instructions for use supplied with associated equipment.

Where the troubleshooting guide shows more than one fault or remedy, carry out repair actions in the order that they appear in the guide.

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

5.1   Troubleshooting for breathing apparatus

Symptom	Fault	Remedy
High-pressure air leak or failed leak test	Loose or dirty connector	Disconnect, clean and reconnect couplings and retest
	Faulty hose or component	Substitute user replaceable accessories and retest
Air leak from medium-pressure hose connector at the pressure reducer (relief valve) (Fig. 2)	Faulty O-ring, retainer, spring, or pressure reducer	Service task
Air leak from cylinder connector	Ice particles on sealing elements	Close the cylinder valve and vent the system. Disconnect then reconnect the cylinder. Pressurize the system by opening the cylinder valve slowly, but fully
High or low medium pressure	Pressure reducer fault	Service task
Poor sounding whistle	Whistle dirty	Clean the whistle flute and retest
Whistle not functioning	Activation mechanism fault	Service task

5.2   Troubleshooting for lung demand valves

Symptom	Fault	Remedy
Failed leak test	Loose or dirty connector	Disconnect, clean, and reconnect couplings and retest
	Faulty hose or component	Substitute user replaceable accessories and retest

Symptom	Fault	Remedy
Air leak from lung demand valve	Ice particles on sealing elements	Allow a rush of air to pass through the valve by pressing the front button then quickly pressing the reset button (Fig. 4)
	Insufficient lubrication on face mask connector O-ring	Lubricate the O-ring (see section 4.6.5)
	Faulty face mask connector O-ring	Service task
Fails to switch on automatically (first breath activation)	Internal fault	Press front button (Fig. 4)
		Service task
Lung demand valve allowing constant air flow into the face mask	Bypass button engaged	Turn off the bypass button (Fig. 4)
	Internal fault	Service task
Difficulty connecting or disconnecting the medium-pressure coupling	Dirty connector	Disconnect, clean, and reconnect couplings, and retest
	Burring of the male medium-pressure coupling	Service task

5.3   Troubleshooting for UI module or monitoring system

Symptom	Fault	Remedy
Fault indication during the self-test or when switching off	See section 5.5	Note the fault code and contact service personnel or Dräger
High-pressure leak test fails 🔧	Loose or dirty connector	Disconnect, clean, and reconnect couplings and retest
	Faulty hose or component	Substitute user replaceable accessories and retest
Battery warning 🔋	Low battery level	Charge or replace the batteries before the next operation[1]
Battery critical 🔋	Critical battery level	Charge or replace the batteries[1]
– Backup battery warning 🔋 – Backup battery critical 🔋	– Low backup battery level – Backup battery level critical or no backup battery fitted	Replace the backup battery before the next operation[2]
Fails to switch on	Very low battery level	Charge or replace the batteries[1]
	Power pack not inserted correctly	Remove and refit the power pack[1]
	Poor battery connection	Inspect and clean the power pack, recess and terminals (see section 6.2). Contact service personnel or Dräger if there is damage.
Fails to switch off	Pressure reading is not below the preset value	Close the cylinder valve and fully vent the pneumatic system.
LCD screen or LED panel obscured or illegible	Dirty screen or water/condensation ingress	Remove and clean the protective cover (see section 6.3.3)
	Protective cover marked or damaged	Replace the protective cover
	System fault or damage	Contact service personnel or Dräger

1) For charging and battery replacement, see section 4.6.9.
2) For backup battery replacement, contact service personnel.

5.4   Troubleshooting for the HUD

For information on how to resolve faults concerning the HUD please refer to the HUD instructions for use.

5.5   Fault indication

Faults that are detected by the system are indicated on the screen with a fault code (Fig. 45). The code is separated into groups to identify the applicable system and nature of the fault.

Fig. 45   Fault indication

If a fault indication displays during the self-test or when switching off, note the fault code and contact service personnel or Dräger. System faults which occur during use are described in section 4.4.2.4.

6   Maintenance

6.1   Maintenance table

Service and test the product, including out-of-use equipment, in accordance with the maintenance table. Record all service details and testing. Refer also to the instructions for use for other associated equipment.

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

Item	Task	Every month	Every year
Complete product	Visual inspection (see section 6.3.1)	X	
	Functional testing (see section 6.3.4)	X	
	Breathing cycle and static tests[1]		X
Lung demand valve	Check the male element of the quick coupling for burring (see section 6.3.2)		X
	Lubricate the plunger pin O-ring[1]		X
Backup battery	Replace[1]		X
Pressure reducer	Inspect the high-pressure connector O-ring[1)2]		X
Cylinder	Check test date of cylinder[3]	X	
	Recertification		According to national regulations in the country of use

1) These maintenance tasks can only be carried out by Dräger or trained service personnel. Details of the tests are contained in the technical manual which is issued to service personnel that have attended a relevant Dräger maintenance course.
2) Replace the high-pressure connector O-ring if it is found to leak during functional testing or if it is visibly damaged.
3) Carbon composite cylinders that are over 15 years old must be retired (see section 9.2).

6.2   Cleaning and disinfecting

⚠ **CAUTION**
Trapped water and ice inside the pneumatic system can impair the operation of the product.
► Prevent any liquid from entering the pneumatic system, and thoroughly dry the product after cleaning and disinfecting.

NOTICE
Using cleaning and disinfecting methods not described in this section can damage the equipment.
► Do not exceed 140 °F (60 °C) for drying, and remove components from the drying facility immediately when dry. Drying time in a heated dryer must not exceed 30 minutes.
► Do not immerse pneumatic or electronic components in cleaning and disinfecting solutions or water.

[QR code] For information about suitable cleaning and disinfecting agents and their specifications refer to document 9100081 at www.draeger.com/IFU.

6.2.1   Cleaning and disinfecting the breathing apparatus

Clean the breathing apparatus if it is dirty. If the equipment has been exposed to contaminants, disinfect any components that come into direct and prolonged contact with the skin.

Refer also to the instructions for use for the lung demand valve, mask, and other associated equipment. Contact service personnel or Dräger if disassembly of pneumatic or electronic components is required.

Work equipment
– Clean lint-free cloths

1. Clean the breathing apparatus manually using a cloth moistened with cleaning solution to remove excess dirt. Remove and clean the following:
   – The protective covers (see section 6.3.3). Clean the protective covers, the LCD screen, and LED panel.
   – The power pack (see section 4.6.9.2). Clean the power pack and recess, and ensure that the electrical contacts, sealing rims and locking mechanism are clean, dry and undamaged.
2. If necessary, disinfect components manually using a cloth moistened with disinfecting solution.
3. Rinse all components thoroughly with clean water to remove all cleaning and disinfecting agents.
4. Dry all components using a dry cloth, in a heated dryer, or in air.
5. Prepare the breathing apparatus for use and carry out full functional testing as described in section 6.3.4.

6.2.2   Cleaning quick connect couplings

Dirt and debris can:
– Prevent the connection of the quick connect coupling and adapter.
– Cause the adapter to become stuck inside the quick connect coupling.

If dirt and debris are present, clean the quick connect coupling and adapter as described in this section.

Prerequisites
– Remove the compressed air cylinder from the breathing apparatus (see the breathing apparatus instructions for use).

Work equipment
– Torque wrench (335 6172)
– 2 × blind plugs
– Degreaser (3M Industrial Cleaner Citrus Base or CRC Citrus Degreaser)
– PTFE lubricant
– Non-metallic scouring pad
– Clean, lint free cloths

⚠ **CAUTION**
If used incorrectly, or if they come into direct contact with eyes or skin, consumable materials such as cleaning agents can be harmful to health.
► Read and comply with all safety precautions and instructions provided by the manufacturers of the consumable materials.
► Wear appropriate personal protective equipment when working with consumable materials.

⚠ **CAUTION**
Lubricants entering the pneumatic system can impair the safe operation of the product.
► To prevent any lubricant from entering the pneumatic system, fit a blind plug to the quick connect coupling and adapter.

NOTICE
Using cleaning and disinfecting methods not described in this section can damage the equipment.
► Do not immerse components of the pneumatic system in cleaning and disinfecting solutions or water.
► Do not clean the quick connect coupling and adapter with any abrasive material other than a non-metallic scouring pad.

1. Use the torque wrench to remove the adapter from the compressed air cylinder.
2. Fit blind plugs to the quick connect coupling (Fig. 46, 1) and adapter (2).
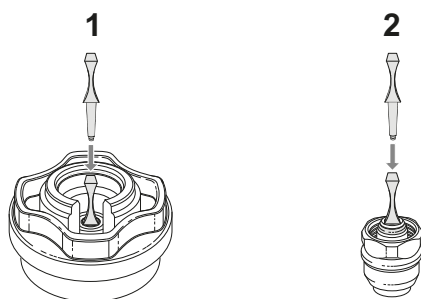
Fig. 46   Fitting blind plugs

3. Spray the degreaser on to a clean cloth.

   ⓘ Do not spray the degreaser directly on to the quick connect coupling or adapter.

4. Apply the degreaser liberally to:
   – The outside surfaces, inner surfaces, and rotating section of the quick connect coupling (Fig. 47).
   – The outside surfaces of the adapter.
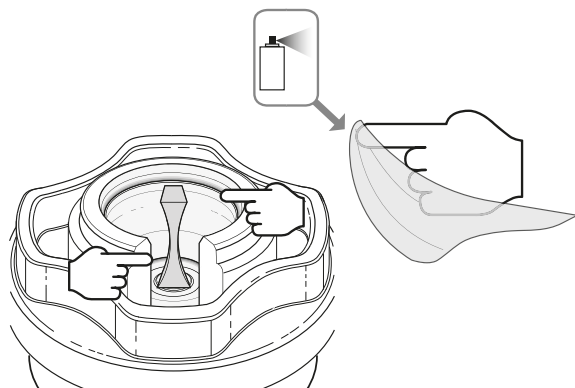
Fig. 47   Applying degreaser

5. Wait a few minutes for the degreaser to penetrate and loosen the dirt.
6. Clean the degreaser from the components.

   ⓘ Remove degreaser from the components by wiping them with a clean cloth or blowing them down with an airline. Heavy surface dirt, discoloration, and surface marking can be removed using a non-metallic scouring pad.

7. Spray the PTFE lubricant on to all metal surfaces. Ensure that the lubricant is applied to:
   – The moving parts of the quick connect coupling.
   – Areas where there is metal-on-metal contact.
8. Allow the PTFE lubricant to dry.
9. Remove the blind plugs from the quick connect coupling and adapter.
10. Fit the adapter to the cylinder valve port, refer to the assembly instructions of the adapter.

6.3   Maintenance tasks

6.3.1   Visual inspection

A visual inspection must fully check the product including all component parts and accessories.
1. Check that the product is clean and undamaged, paying particular attention to pneumatic system components, connectors, and elastomeric components such as hoses.
   – Typical signs of damage that can affect the operation of the product include impact, abrasion, cutting, corrosion, and discoloration.
2. Report damage to service personnel or Dräger, and do not use the product until faults are rectified.

6.3.2   Checking the medium-pressure coupling

1. Press the male element into the female element of the coupling until a click is heard.
2. Disconnect the male element from the female element of the quick coupling.
3. Reconnect the quick coupling as per step 1.

Further steps
If there is any difficulty disconnecting or connecting, see section 5.

6.3.3   Replacing the protective covers on the UI module

NOTICE
Sharp objects can damage the equipment.
► Do not use sharp objects or tools to remove the rubber cover.

1. Remove the retaining band and then slide it down the hose (Fig. 48).
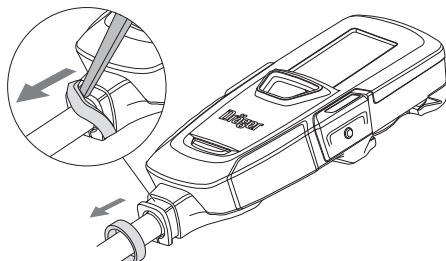

Fig. 48   Removing the retaining band
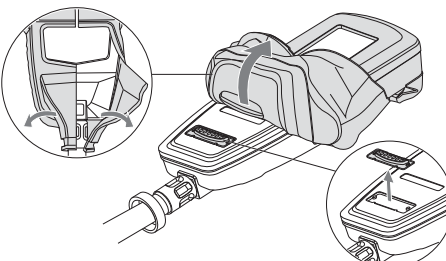
2. Fold back the rubber cover (Fig. 49).

Fig. 49   Removing the rubber cover

3. Remove the protective cover from the LED panel.
4. Fully remove the rubber cover from the UI module.
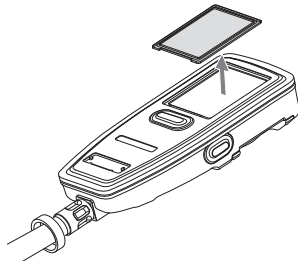5. Remove the protective cover from the LCD screen (Fig. 50).

Fig. 50   Removing the LCD protective cover

6. Clean (see section 6.2), inspect (see section 6.3.1) and replace the protective covers as necessary.
7. Ensure that the UI module is clean and undamaged.
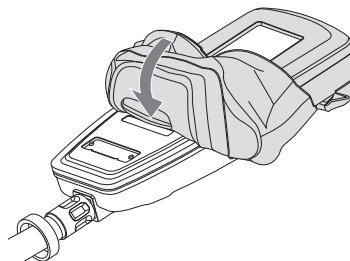8. Partly fit the rubber cover to the UI module (Fig. 51).

Fig. 51   Fitting the rubber cover

9. Fit the protective cover over the LCD screen (Fig. 52).

   ⓘ Use the partly fitted rubber cover to hold the protective screen in place.
   Ensure that the cover is orientated as shown, with the notch towards the bottom of the screen and the part number facing upwards (Fig. 52).
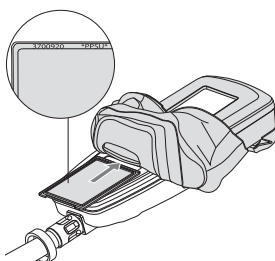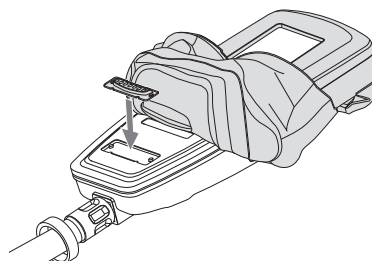

Fig. 52   Fitting the LCD protective cover

10. Fit the protective cover over the LED panel (Fig. 53).

   ⓘ Fold the rubber cover fully over the UI module while holding the LED panel in place.
   Ensure that the cover is orientated as shown, with the notch towards the bottom of the screen and the part number facing upwards (Fig. 53).

Fig. 53   Fitting the LED protective cover

11. Fit the retaining band to the bottom of the rubber cover.

6.3.4   Functional testing

⚠ **WARNING**
Failure of the product to meet any of the standards or parameters during functional testing, or any visible signs of damage, indicates a possible system fault.
► Do not use the product and report the fault to trained maintenance personnel or contact Dräger.

6.3.4.1 Testing the Sentinel electronic monitoring system

If the system fails to operate as described in this section or if any fault indication appears, stop testing. Investigate and remedy the fault before proceeding (see section 5 for remedy instructions).

The functional test is carried out on the product during preparation for use, periodic testing, and post-repair testing. To carry out a full functional test, prepare the breathing apparatus as detailed in preparation for use (see section 4.2), then carry out the following steps. To test only the Sentinel electronic monitoring system, proceed according to the following step:

1. Simultaneously hold the left-hand and right-hand buttons.
   ⇒ The self-test and start-up sequences run and the system adopts the operational mode.
2. Allow the screen to deactivate.
3. Press the left-hand or right-hand button.
   ⇒ The screen activates.
4. Press the manual alarm button.
   ⇒ The full alarm activates (see section 3.2.8.3) with the manual distress alarm symbol 🔔 on screen.
5. Simultaneously hold the left-hand and right-hand buttons until the alarm stops.
6. Immobilize the Sentinel UI module.
   ⇒ After 18 to 21 seconds, the pre-alarm activates (see section 3.2.8.2) with the automatic distress pre-alarm symbol 🔔 on screen.
7. Move the Sentinel UI module to cancel the alarm.
8. Immobilize the Sentinel UI module again and ignore the pre-alarm.
   ⇒ After 12 to 13 seconds of pre-alarm, the full alarm activates (see section 3.2.8.2) with the automatic distress alarm symbol 🔔 on screen.
9. Simultaneously hold the left-hand and right-hand buttons until the alarm stops.

6.3.4.2 High-pressure leak test

1. Press the reset button of the lung demand valve.
2. Start the leak test.
3. Follow the on-screen instructions, and observe the following:
   – Leak test pass 🔔. The system automatically progresses to the next stage.
   – Leak test fail 🔔. Close the cylinder valve, fully vent the system, and investigate and repair the leak (see section 5).
   – Timed out 🔔. On-screen instructions not carried out within the permitted time. Recommence the test.
   – Cylinder pressure too low 🔔. Recommence the test using a cylinder that has a pressure above the minimum leak test start pressure.

     ⓘ The breathing apparatus cylinder pressure must be above the minimum leak test start pressure of 1450 psi.

   – Leak test error 🔔. The error is due to system pressure failing to stabilize sufficiently within the permitted time. Reattempt the test. If the error reoccurs, do not use the breathing apparatus and contact service personnel or Dräger.

6.3.5   Whistle test

1. Fully close the cylinder valve.
2. Observe the gauge and slowly release the pressure as follows:
   a. Cover the outlet port of the valve with the palm of the hand.
   b. To switch on the lung demand valve press the front button (Fig. 4, 2).
   c. Vent the system by carefully lifting the palm of the hand from the outlet port to maintain a slow pressure decrease.
3. The whistle must begin to sound in the preset pressure range (see EOSTI indication in section 10).
4. Continue to vent the system until fully exhausted.
5. Press the reset button of the lung demand valve (Fig. 4, 1).

6.3.6   Charging a compressed air cylinder

⚠ **WARNING**
Air quality for compressed air cylinders must conform to the minimum grade requirements for Type 1 gaseous air as defined in the CGA Commodity Specification for Air, G-7.1 (Grade D or higher quality) and, where appropriate, be in accordance with: NFPA 1989 Standard on Breathing Air Quality for Emergency Services Respiratory Protection.
► Ensure that the air supply meets these requirements.

Refer to the instructions for use supplied with the cylinder and the charging apparatus for details of charging a compressed air cylinder.

7   Transport

Transport the product in its original packaging.

8   Storage

8.1   Storage preparation

– Extend the shoulder straps, waist belt, and the straps of the mask (see section 4.6 and the mask instructions for use).
– Place the mask in a protective bag (contact Dräger for supply of a suitable bag).

– Route pneumatic hoses in such a way that the bend radius is not too acute and the hose is not stretched, compressed, or twisted.
– Remove the power pack (see section 4.6.9.2).
  – If the power pack has replaceable 1.5 V batteries, remove the batteries from the power pack (see section 4.6.9.3).

8.2 Storage conditions

– Store the product between 5 °F and 73 °F (-15 °C and +23 °C).
– Ensure that the environment is dry, free from dust and dirt, and does not subject the equipment to wear or damage due to abrasion.
– Do not store the equipment in direct sunlight.
– Fix the product securely to any raised mounting point to prevent it from falling.
– If storing the equipment in a vehicle, ensure that the breathing apparatus is securely retained and does not interfere with the operation of the vehicle.

9 Disposal

9.1 General

Dispose of the product in accordance with applicable rules and regulations in the country of use.

9.2 Life span

– All components are designed to last the lifetime of the equipment if they are regularly inspected and maintained as described in section 6.
– If equipment can no longer be repaired to a fully serviceable condition, retire the equipment in accordance with NFPA 1852 - Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus.
– Carbon composite cylinders that are over 15 years old must be retired.

10 Technical data

Compressed air cylinders

Capacity	30 minutes to 60 minutes
Pressure rating	2216 psi or 4500 psi
Materials	Carbon composite

Operating pressure

Atmospheric operating pressure	11 psi to 29 psi

Cylinder high-pressure connector

Connector types	Quick connect coupling (2216 psi or 4500 psi)

RIC UAC connector

Connector type	2216 psi or 4500 psi, male, quick coupling with relief valve

Lung demand valve to face mask connector

Connector type	Dräger PX push-in connector

EOSTI indication

Activation commencement range	2216 psi rating: 710 psi to 798 psi 4500 psi rating: 1305 psi to 1485 psi

PASS

Pre-alarm activation	Approximately 20 seconds
Full alarm activation	12 to 13 seconds after pre-alarm activation

RFID

Transmit power	2 dBμA/m at 10 m
Operating frequency	13.56 MHz

Bluetooth Low Energy

Transmit power	2.5 mW
Operating frequency	2400 to 2483.5 MHz

11 Special instructions

11.1 Cautions and limitations

11.1.1 Standard cautions and limitations

D	Air-line respirators can be used only when the respirators are supplied with respirable air meeting the requirements of CGA G-7.1, Grade D or higher quality.
E	Use only the pressure ranges and hose lengths specified in the User Instructions.
I	Contains electrical parts that may cause an ignition in flammable or explosive atmospheres.
J	Failure to properly use and maintain this product could result in injury or death.
M	All approved respirators shall be selected, fitted, used, and maintained in accordance with MSHA, OSHA, and other applicable regulations.
N	Never substitute, modify, add, or omit parts. Use only exact replacement parts in the configuration as specified by the manufacturer.
O	Refer to User Instructions, and/or maintenance manuals for information on use and maintenance of these respirators.
S	Special or critical User Instructions and/or specific use limitations apply. Refer to User Instructions before donning.

11.1.2 Cautions and limitations for CBRN use

Q	Use in conjunction with personal protective ensembles that provide appropriate levels of protection against dermal hazard.
R	Some CBRN agents may not present immediate effects from exposure, but can result in delayed impairment, illness or death.
T	Direct contact with CBRN agents requires proper handling of the respirator after each use and between multiple entries during the same use. Decontamination and disposal procedures must be followed. If contaminated with liquid chemical warfare agents, dispose of the respirator after decontamination.

U	The respirator should not be used beyond 6 hours after initial exposure to chemical warfare agents to avoid possibility of agent permeation.
EBSS	EBSS Activation or engagement of EBSS in either the donor or receiver mode changes the SCBA use to Escape-Only, approved service time for either the donor, or the receiver is no longer applicable. Additional critical cautions and limitations apply. Refer to the section EBSS in the User Instructions.

The Dräger PSS AirBoss is certified by National Institute for Occupational Safety and Health (NIOSH), for chemical, biological, radiological or nuclear (CBRN) use and by the Safety Equipment Institute (SEI) to meet the requirements of NFPA 1970.

– Approvals are only valid when the apparatus is used with compressed-air cylinders approved by NIOSH.
– Equipment configurations for CBRN use are detailed in a CBRN approval table (see CBRN approval table 3737485).

Dräger recommends that a quantitative fit test (QNFT) be performed on the face mask before use in a CBRN environment. The fit test must be conducted strictly in accordance with the requirements outlined in the OSHA Respiratory Protection Standard 29 CFR, Section 1910.134.

11.2 S - Special or critical users' instructions

– The EOSTI alarm set point of this SCBA is as follows:
  – **2216 psi**: 34 % ± 2 % of the rated cylinder pressure.
  – **4500 psi**: 31 % ± 2 % of the rated cylinder pressure.
– For EOSTI activation ranges, see section 10 (technical data).
– Minimum ambient temperature of operation: -25 °F (-31.7 °C).
– For air quality requirements and further special or critical users' instructions, see the sections that follow.

11.2.1 SAR (supplied airline respirator)

The following instructions are for use of an independent air supply (supplied airline respirator (SAR) connection).

⚠ **WARNING**
Risk to life.
► Air quality must conform to the statutory requirements.

Independent air supplies must meet the following standards:

Air type	Type-1 gaseous air as defined in: CGA Commodity Specification for Air, G-7.1 (Grade D or higher)
Standard	NFPA 1989 Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection
Air supply pressure	87 psi to 125 psi
Airline flow rate	550 liters/minute
Airline hose length	5 feet to 300 feet (maximum working hose length must not exceed 12 individual hose lengths)
Minimum ambient temperature of operation	-25 °F (-31.7 °C)

Use an independent air supply as follows:

⚠ **WARNING**
Risk to life.
► When used as a combination supplied-air respirator/self-contained breathing apparatus (SAR/SCBA), not more than 20 percent of the air supply can be used during entry.
► The time required for the wearer to escape to a safe area must be within the remaining breathing time of the cylinder, taking into account the remaining air content in the cylinder and the breathing rate of the wearer.
► During supplied air use, the cylinder valve must remain closed.

ℹ When using an independent air supply, the warning whistle will operate as normal. The mechanical gauge will show cylinder pressure when the cylinder valve is open.

1. Turn on the independent air supply.
2. Connect the independent air supply coupling to the secondary supply hose (refer to the instructions for use for the UEBSS/SAR connection) and breathe normally.
3. Close the cylinder valve. If the whistle sounds, silence it by taking several short deep breaths or momentarily operating the lung demand valve bypass button (Fig. 4, 3).
4. If there is a failure of the air supply, or if you need to disconnect the airline and exit the working area, immediately do the following:
   a. Open the cylinder valve (counterclockwise) slowly, but fully, and breathe normally from the cylinder.
   b. Disconnect the independent air supply coupling.
   c. Leave the hazardous area by the shortest and safest escape route.

   ℹ The remaining duration begins from the time of opening the cylinder valve and disconnecting the independent air supply.

11.2.2 RIC UAC (rapid intervention crew universal air connection)

⚠ **WARNING**
Risk to life.
► The RIC UAC must only be used to receive air from a donor. Do not use the RIC UAC to supply air to another person.
► Do not use the RIC UAC as a UEBSS connection.
► The secondary air supply pressure to the RIC UAC must not exceed maximum rated working pressure of the cylinder(s) being filled.
► If a leak is detected while refilling in a contaminated or oxygen-deficient gaseous atmosphere, stop refilling and immediately leave the hazardous area.
► If the relief valve of the RIC UAC activates, the SCBA must be serviced before it is used again. Return the SCBA to service personnel or Dräger.

– The RIC UAC must only be used by trained and competent personnel.
– The RIC UAC must only be used to recharge a cylinder in emergency situations as defined in NFPA 1970.
– Do not allow oil, grease or other contaminants to contact the RIC UAC connection.
– Do not attempt to disassemble or repair the RIC UAC connection.

11.2.3 UEBSS (universal emergency breathing safety system)

⚠ **WARNING**
Risk to life.
► Use of a universal emergency breathing safety system (UEBSS) must comply with NIOSH and NFPA 1970 requirements.
► The time required for the wearer to escape to a safe area must be within the remaining breathing time of the cylinder, taking into account the remaining air content in the cylinder and the breathing rate of the wearers.

Refer also to the instructions for use for the UEBSS.

– UEBSS may not be engaged or activated in donor mode after the donor EOSTI has activated.
– Users must be fully trained in the operation of UEBSS in accordance with a training program conforming to the requirements of NFPA Standards 1404, Fire Service Respiratory Protection Training and 1550, Standard for Emergency Responder Health and Safety.
– Simultaneous connection of more than two users, (one donor, and one receiver), is not permitted.
– Immediately after the UEBSS connection has been completed, the cylinder valve of the receiving SCBA shall be closed.

12 Warranty information

Unless otherwise agreed between Dräger and the customer, the following shall apply in the event of defects of the product in material or workmanship: The customer shall contact the company where he bought the product ("Seller"). The warranty conditions agreed between the customer and the Seller shall apply. The product must be used in strict accordance with the instructions for use. Any use disregarding the instructions for use may void warranty.

13 Contact details

Report any issues with the product, including damage, malfunction, or failures that may present a hazard to the user to:
– Dräger US customer service – Phone 1-800-437-2437.

The certification organizations may be reached at:
– NIOSH, NPPTL – Phone 1-412-386-4000.
– SEI (NFPA) – Phone 1-703-442-5732.

14 Annex - User interface symbols

This section is a guide to the symbols shown on the screen of the Sentinel UI module at various stages of use.

14.1 Symbols shown at any time

14.1.1 Background color

The background color of symbols is used to indicate button prompts, notifications during alarm conditions, and items that are displayed during normal use.

Symbol	Description
■	Blue: button prompt
■	Yellow: notification during pre-alarm condition
■	Red: notification during alarm condition
■	Black: notification or display during normal use

14.1.2 General button prompts

The following button prompt symbols can be displayed during use.

For more information, see section 4.3.1.

Symbol	Description
✓	Confirm/yes
☰	Open menu
⟳	Cycle through options
↻	Retry
✗	Cancel/no
⏻	Shut down (when battery is low or a fault is detected)
⏻	Shut down disabled (pressure in the system)

14.2 Symbols shown during start-up

For more information on system start-up, see 4.3.3.

14.2.1 Battery level

When the system is started up, the following symbols display the charge level of the installed power pack.

Symbol	Description
	Battery level sufficient to begin operation
	Battery level sufficient to begin operation (User must charge or replace batteries before the next operation)
	Battery level insufficient to begin operation (Equipment will now shut down, and user must charge or replace batteries to allow operation)
	Battery error – battery not calibrated
	Battery error – battery level unknown

14.2.2 Read card

If enabled, the following read card symbols can be displayed during start-up.

For more information, see section 4.3.3.4.

Symbol	Description
	Read card
	Card not detected
	Card detected but does not contain valid data.

14.2.3 Cylinder selection

If enabled, the following cylinder selection symbols can be displayed during start-up.

For more information, see section 4.3.3.5.

Symbol	Description
	Open the Select Cylinder screen
	Cylinder to be selected

14.2.4 PC Link

If enabled, the following PC Link symbols can be displayed during start-up.

For more information, refer to the PC Link instructions for use.

Symbol	Description
	Connect to PC Link?
	Searching for PC Link connection
	Connecting to PC Link
	Connected to PC Link
	Disconnecting from PC Link
	Connection to PC Link timed out

14.2.5 High-pressure leak test

The following high-pressure leak test symbols can be displayed during start-up.

For more information, see section 6.3.4.2.

Symbol	Description
	Perform leak test?
	Open the cylinder valve
	Close the cylinder valve
	Leak test in progress
	Leak test timed out while waiting for user action
	Leak test passed
	Leak test failed
	Insufficient pressure for leak test
	Leak test error (pressure not stable enough to start)
	Leak test canceled by user

14.2.6 Manual pairing

The following manual pairing symbols can be displayed during start-up.

For more information, see section 4.6.10.

Symbol	Description
	Pairing query
	HUD pairing reading
	HUD pairing was successful

14.3 Symbols shown during operation

For more information on operation, see section 4.

14.3.1 Alarms

The following alarm symbols can be displayed during use.

For more information, see section 3.2.8.

Symbol	Description
	Automatic distress alarm – pre-alarm activated
	Automatic distress alarm – full alarm activated
	Manual distress alarm activated
	Critical battery alarm – shown in the lower part of the screen when the battery level is critical

14.4 Symbols shown during charging

The following symbols can be displayed when the product is connected to a charger.

For more information, see section 4.6.9.4.

Symbol	Description
	Battery is charging (one battery segment flashes slowly)
	Battery charging complete (battery segment not flashing)
	Battery is charging but battery level is insufficient to begin operation (one battery segment flashes slowly)
	Battery charging error – poor connection to battery charger

15 Manufacturer and document information

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