

Dräger Breathing Systems

Guidance for Basic Machine Cleaning and Drying

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1 Safety-related information

- It is recommended some tasks and procedures in this guidance are only carried out by trained service personnel that have attended a relevant maintenance course. Untrained personnel must not attempt to service or repair the equipment.
- For correct and effective equipment maintenance it is essential to follow the instructions in this guidance and the appropriate product instructions for use.
- Comply with all local and national rules and regulations associated with this product.
- Only trained and competent personnel are permitted to inspect, repair, and service the product.
- Use only genuine Dräger spare parts and accessories. Otherwise, the proper functioning of the product may be impaired.
- Notify Dräger in the event of any component fault or failure.
- Any air supply used must meet the requirements for breathing air according to CGA G – 7.1, grade D or higher quality, or the relevant national regulations in the country of use.
- If any aspect of this guidance is not clear, please contact your local Dräger supplier for further information.

2 Conventions in this document

2.1 Meaning of the warning notices

The following warning notices are used in this document to alert the user to potential hazards. The meanings of the warning notices are defined as follows:

Warning sign	Signal word	Classification of the warning notice
	WARNING	Indicates a potentially hazardous situation. If not avoided, it could result in death or serious injury.
	CAUTION	Indicates a potentially hazardous situation. If not avoided, it could result in physical injury. It may also be used to alert against unsafe practices.
	NOTICE	Indicates a potentially hazardous situation. If not avoided, it could result in damage to the product or environment.

2.2 Trademarks

Trademark	Owner
Molykote	DDP Specialty Electronic Materials US 9, LLC

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

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

2.3 Abbreviations used in this document

Abbreviation	Meaning
IFU	Instructions for use
SCBA	Self-contained breathing apparatus
LDR	Lung demand regulator

3 Overview

3.1 General

This guidance provides the procedures to prepare, clean, and dry Dräger breathing apparatuses using an industrial spray nozzle washing machine (HARSTRA Wash 4, Wash 6 HP, 9 and 9 HP) and dryer. The components of the breathing apparatus that can be cleaned using this guidance are:

- PSS 7000 NFPA (2013 and 2018 editions)
- PSS 5000 NFPA (2013 and 2018 editions)
- FPS 7000 RA, PE, P
- Panorama Nova RA,PE, P
- X-plore 5500/6000 Series
- CDR 4500
- FPS-COM 5000
- FPS-COM 7000
- HPS SafeGuard

Industrial washing machines use a spray-washing system to clean the breathing apparatus with a detergent solution and then rinse off the detergent using clean water or a neutralizer. The dryers use a controlled heated airflow inside a drying cabinet to dry the breathing apparatus quickly with an automatic switch-off when dried. Examples of products that can be used to clean and dry Dräger breathing apparatuses are provided in this document. Other washers and dryers can be used only if they are able to meet the cleaning specifications in this guidance. Contact Dräger for questions or further explanation about breathing apparatus preparation and cleaning specifications. Contact the washing machine supplier for questions or further explanation about the washing or drying equipment.

This guidance describes procedures to externally clean correctly prepared breathing apparatuses in a spray nozzle machine.

3.2 Additional information

The suitable and approved cleaning and neutralizing agents for the US and Canada are

- Dr. Weigert Mediclean Forte (manual and mechanical cleaning agent)
- Dr. Weigert Polyklar (neutralizing agent, optional)

Specific product information including instructions for manual cleaning and basic maintenance can be found in the respective IFU. These documents can be found at www.draeger.com/IFU.

The following documents must also be observed:

- The instructions for use and the safety data sheet for the detergent.
- The instructions for use for the respective washing machine.
- The instructions for use for all components.

4 Product preparation

This section describes the product preparation for Dräger PSS series breathing apparatuses. Select the relevant tasks and sealing parts for the breathing apparatus to be cleaned.

⚠ CAUTION

If water is trapped and then freezes inside the pneumatic system of the SCBA (such as the first stage regulator or lung demand regulator), operation will be impaired.

- ▶ Properly fit the relevant sealing parts prior to washing the breathing apparatus to prevent water from entering and damaging the pneumatic system.
- ▶ Thoroughly dry the breathing apparatus after cleaning.

4.1 Preparing the LDR

The following section applies to the preparation of all LDRs.

If the LDR is connected to the SCBA:

1. Fit the protection cap LDR 3734474 (set of 12) to the mask connector port of the LDR.



2. Press the reset button on the LDR.

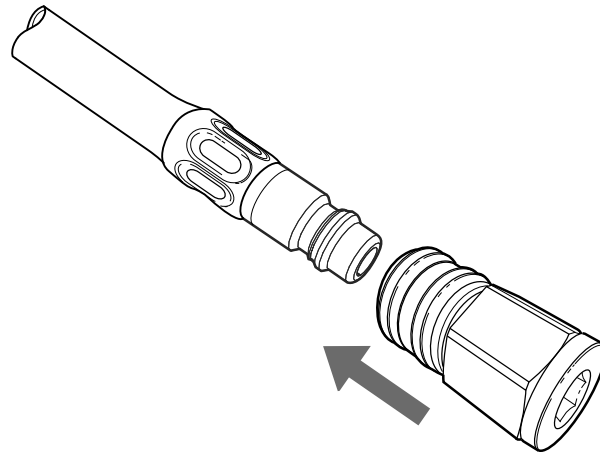
⚠ CAUTION

Do not remove the bayonet cap or attempt to expose the internal components of the LDR. This should only be done by trained personnel.

- ▶ Lift the rubber cover of the LDR only.
3. Lift, but do not attempt to remove, the rubber cover of the LDR. Do not remove the bayonet cap or any other internal part.
 4. Place the LDR into the holder of the SCBA, if applicable.
(Note: This can only be done with some combinations of LDR and LDR holders.)

If the LDR is not connected to the breathing apparatus or is to be cleaned separately:

1. Fit the protection cap LDR 3734474 (set of 12) to the mask connector port of the LDR.
2. Fit the female coupling blank 6910458 to the male medium-pressure coupling of the LDR.



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4.1.1 Internal cleaning of the LDR

NOTICE

Internal cleaning of the LDR is recommended. For the best results however, this should only be performed by trained personnel.

Service instructions for internal machine cleaning of the LDR can be found in Dräger document 3363265. Maintenance data can be found in the IFU and, where appropriate, the technical manual of the LDR. Contact your local DrägerService for more information.

4.2 Preparing the medium-pressure connection of a breathing apparatus

Select the relevant tasks and sealing parts for the breathing apparatus to be cleaned.

⚠ CAUTION

If the correct sealing parts are not fitted before cleaning, liquid can enter and damage the product.

► Properly fit the relevant sealing parts before cleaning.

1. If the LDR is not fitted to the breathing apparatus, fit the protection cap 3355993 (set of 2) to the female coupling of the set.
2. In a similar manner, fit the female medium pressure coupling blanks, or refit the original dirt caps, to any other medium-pressure hoses (for example, a second person attachment, rescue hose, decontamination hose, supplied-air respirator (SAR) hose, emergency breathing support system (buddy breather) or universal emergency breathing safety system (UEBSS) connection).

For female couplings which are marked with “AC”, “SF”, or “LF”, the grey protection caps 3355993 can be used.
For older female connections, the smaller protection cap 3334048 (set of 2) can be used.
For male couplings, the male protection cap 3335757 (set of 2) can be used.

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4.3 Preparing the gauge of a breathing apparatus

Select the relevant tasks and sealing parts for the breathing apparatus to be cleaned. Not all gauges mentioned here will be relevant to all products or available in all regions.

⚠ CAUTION

If the correct sealing parts are not fitted before cleaning, liquid can enter and damage the product.

- ▶ Properly fit the relevant sealing parts before washing.

NOTICE

For electronic versions such as the Sentinel 7000, ensure the power pack (with the Tally fitted in the gauge) or a dummy battery pack (without batteries) 3736222 is fitted during cleaning and drying to prevent alarm activation.

If a dummy battery pack is fitted, the date and time on the Sentinel 7000 will need to be reset after washing.

1. For mechanical gauges, Sentinel II, and TX Gauge versions:
Fit clamping 6926879 to the gauge, or use a similar blank.



⚠ CAUTION

If a Tally cannot be used (version dependent), or a dummy battery pack is not used during cleaning, the breathing apparatus alarms may sound during preparation or during cleaning.

- ▶ Consider any safety precaution to ensure the breathing apparatus can be cleaned.

2. For Sentinel 7000 where appropriate:
Fit the Tally to disable the motion sensor (Note: this is not relevant for all versions).



3. For Sentinel 7000 where appropriate:
Fit the dummy battery pack 3736222 (Note: Date and time on the Sentinel 7000 will need to be reset after cleaning and drying).

4. Clean the gauge with the cover on and the protective lens (sacrificial lens) in place.

4.4 Preparing the regulator of the breathing apparatus

Select the relevant tasks and sealing parts for the breathing apparatus to be cleaned. Not all regulator types or handwheels mentioned here will be relevant to all products or available in all regions.

⚠ CAUTION

If the correct sealing parts are not fitted before cleaning, liquid can enter and damage the product.

- ▶ Properly fit the relevant sealing parts before washing.

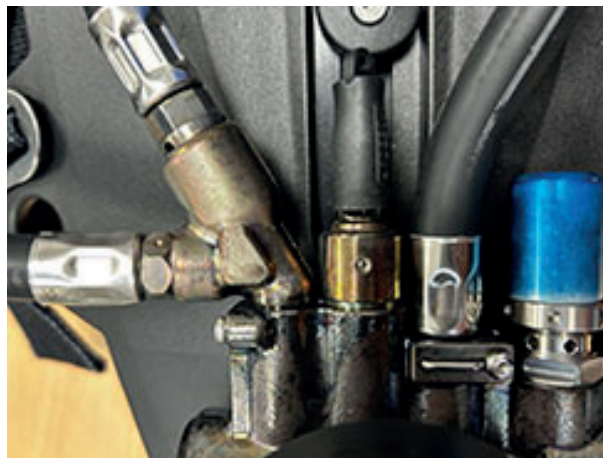
NOTICE

These instructions are intended for cleaning of pressurized breathing apparatuses only - this can be achieved using air supplied by a cylinder or via an air supply in the washing machine.

⚠ CAUTION

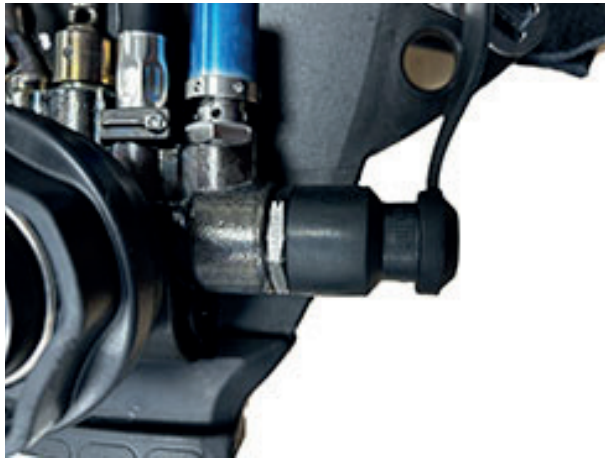
The following diagrams show regulator handwheels without a cylinder or washing machine high-pressure umbilical connected – this is for indication only and not the intended way to clean these products.

- For breathing apparatuses with electronic gauges (e.g. Sentinel 7000):
 - a. Fit the protection cap 3734472 (set of 12) to the whistle on the first-stage regulator.



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- For breathing apparatuses with with a rapid intervention crew universal air connector (RIC UAC):
 - a. Fit the dust cap to the high-pressure connection (RIC UAC coupling).



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- b. Fit the protection cap 3734473 (set of 12) to the relief valve on the regulator (RIC UAC relief valve).



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4.5 Preparing a full facepiece

NOTICE


During machine-based reprocessing of the full facepieces, increased mechanical, thermal and chemical loads may occur. As a result, in comparison with the manual procedure, the replacement of parts may become necessary prematurely. For some full facepieces, special instructions must be followed. Read these instructions carefully before the machine-based reprocessing of facepieces.

NOTICE

Removal of the mask components is recommended for the best results, however this can only be performed by trained personnel.

1. If fitted, remove the communication unit from the full-facepiece.
2. If necessary, remove coarse dirt with a soft bristle brush.

3. Dräger recommends to open the exhalation valve cover of the facepiece (screw may need to be removed).

 For the best cleaning results, Dräger recommends removing the exhalation valve, inhalation valve (valve seat and disc) and inner mask and clean them separately in a small basket in the machine. This facilitates cleaning and rinsing of the individual components. However, for basic cleaning the parts do not have to be disassembled.

4.6 Preparing the FPS-COM 5000/7000

CAUTION

Potential damage to component parts!

Do not use solvents (e.g. acetone, alcohol) or cleaning agents with abrasive particles for cleaning and disinfecting. Only apply the methods described in this document and only use the listed cleaning agents and disinfectants. Other agents or processes, dosages and contact times may damage the product. Radio connection cable or Bluetooth adapter may remain attached to the communication unit. The plug inserted into the radio unit must not be immersed in water. Alternatively, the blind cap should be attached to the radio connector. If the contacts of the radio connector on the communication unit are open, water can penetrate the communication unit and damage it.

1. If neither a radio cable nor a Bluetooth adapter is connected to the communication unit, fit the blind cap R58773.
2. If no earphone is connected, fit the appropriate screw plug to the earphone connector R62719.
3. Tough dirt marks can be removed using a soft brush. In the process, ensure that the loudspeakers are not touched with the brush.

4.7 Preparing the HPS SafeGuard

During machine reprocessing, fire helmets are subject to considerably greater mechanical stress than they are during manual cleaning. Cleaning can have a negative impact on the life span of the fire helmet. The mechanical stress during reprocessing in a drum washing machine is greater on the whole, than it is during reprocessing using the spray nozzle machines. Machine cleaning can have a negative impact on the life span of the fire helmet. Coated visors, especially visors with a permanent anti-fog coating, are subject to particularly high stresses during machine cleaning with longer contact times with the result that the coating may come off or be permanently damaged. Coated visors must be thoroughly air-dried or be dried in the drying cabinet. After drying, coated visors should be aired out for at least one day in normal climatic conditions mentioned in the IFU so that the coating can regenerate and an optimum service life can be achieved. The helmet, and the textile components in particular, must be dried very thoroughly to prevent mould formation. The helmet might get damaged if the following specifications are not taken into account.

⚠ CAUTION

Potential damage to the helmet or the visor!

Do not use solvents (e.g. acetone, alcohol) or cleaning agents with abrasive particles for cleaning and disinfecting. Only apply the methods described in this document and only use the listed cleaning agents and disinfectants. Other agents or processes, dosages and contact times may damage the product. Do not disinfect coated visors. The disinfection agents damage the coating. If coated visors are cleaned using machines, the coating may become damaged. In this case, the life span of the coated visors could be shortened.

i Generally, cleaning the fire helmet after use will suffice. The internal helmet components can be disinfected if the fire helmet has been used in contaminated areas.

1. Remove accessories (e.g. HPS FlashLight helmet lamp, HPS-COM communication unit, HPS BuddyLight rear light, aluminium/aramid fiber neck-guard) from the fire helmet and clean them separately.
2. Fold up the face-guard and eye-guard.
3. Remove textile components from the internal helmet components (e.g. the harness) and the neck-guard and clean them separately either manually or mechanically in a washing net in a drum washing machine.

4.8 Pressurizing the breathing apparatus

Washing machines are intended for cleaning with the breathing apparatus pressurized by its own air cylinder or an internal air supply in the machine. The Harstra Wash 4 washing machine is intended for cleaning with the air cylinder fitted. The Wash 6 HP washing machine is intended for cleaning without the air cylinder fitted, but with the breathing apparatus connected to an internal high pressure air supply. See the washing machine instructions for further information regarding breathing apparatus pressurization.

⚠ CAUTION

The breathing apparatus must be pressurized during machine cleaning to prevent liquid from entering and damaging the pneumatic system.

- ▶ Ensure that the breathing apparatus remains pressurized during machine cleaning.
-

⚠ CAUTION

Over-pressurization during machine cleaning could damage the breathing apparatus pneumatic system.

- ▶ Ensure that any air cylinder fitted to the breathing apparatus does not contain more than:
 - 1640 psi of air pressure for a 2216 psi cylinder
 - 3265 psi of air pressure for a 4500 psi cylinder
-

- When the air cylinder is fitted to the SCBA:
 - a. Pressurize the air cylinder to
1450 psi to 1640 for a 2216 psi cylinder
1450 psi to 3265 psi for a 4500 psi cylinder
 - b. Fit the cylinder to the breathing apparatus as described in the product instructions for use.
 - c. Open the cylinder valve to pressurize the system.
 - d. If fitted, ensure that the protection caps are still correctly fitted.
- When the air cylinder is to be cleaned without being attached to the breathing apparatus:
 - a. Ensure that the air cylinder pressure is below
1640 psi for a 2216 psi cylinder
3265 psi for a 4500 psi cylinder
 - b. Fit a blanking screw to the cylinder valve outlet.

5 Cleaning procedure

5.1 Pre-cleaning

It is recommended to manually pre-clean the equipment that is soiled with any dirt, substances, or chemicals that could be difficult to remove during machine washing. This prevents contamination of the machine and multiple water changings in the machine.

⚠ CAUTION

Potential damage to the pneumatic system

If the breathing apparatus is not pressurized during pre-cleaning, liquid may enter and damage the pneumatic system.

- ▶ Ensure that the breathing apparatus remains pressurized during pre-cleaning.

i Dr. Weigert Mediclean Forte can be used for manual and mechanical cleaning.

1. Prepare the breathing apparatus for washing (see "Product preparation", page 7).
2. Clean the equipment using a soft brush or cloth and a recommended cleaning agent.
3. Thoroughly rinse the equipment with clean water afterwards.



For information on suitable cleaning agents and disinfectants and their specifications, see document 9100081 at www.draeger.com/IFU.

5.2 Machine cleaning

Prerequisites

- The breathing apparatus is pre-cleaned (see "Pre-cleaning", page 16) or prepared for washing (see "Product preparation", page 7).

⚠ CAUTION

Read and comply with the instructions for use supplied with the washing machine. Most washing machines have an emergency stop which can be used to stop the machine immediately in an emergency.

- ▶ Ensure that you fully understand and correctly follow all safety, cleaning, and maintenance instructions.
- ▶ Ensure that you know the location and operation of the emergency stop before starting a washing cycle.

1. Put the breathing apparatus, with lung demand regulator fitted where appropriate, inside the washing machine. Ensure that the breathing apparatus is securely held and does not obstruct moving parts of the washing machine. Make sure that all systems are pressurized and the cylinder valves are open.
2. For cleaning without the air cylinder fitted, connect the breathing apparatus to the internal air supply of the Wash 6 HP.

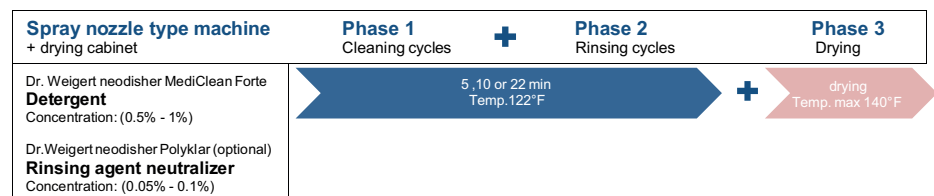
3. If the air cylinder is to be cleaned separately, put it inside the washing machine. Ensure that the air cylinder is securely held and does not obstruct moving parts of the washing machine.
4. Place the full facepieces in the dedicated devices. If disassembled, place small parts such as exhalation valves separately in suitable receptacles (e.g., washing rack with lid). Position the facepieces in such a way that all parts which convey breathing air can be sufficiently reached by the rinsing jets. Covered areas may possibly neither be cleaned nor disinfected. Do not block the spraying or rinsing device.
5. If the LDR is to be cleaned separately, place it into the washing machine.
6. Place the FPS-COM 5000 / FPS-COM 7000 into the washing machine.
7. Place the HPS SafeGuard without textile components into the washing machine.
8. After all sets are connected and all devices are placed, make sure that the internal air supply is open before starting the cleaning cycle. Finally, close the washing machine.



NOTICE

Washing machine properties and tolerances, and the degree of product soiling, can affect cleaning performance. Comply with the specifications in this section to ensure that the breathing apparatus is cleaned but not damaged. Contact Dräger before using any other washing specifications.

9. Select a washing program depending on the degree of soiling of the components observing the following specifications recommended by Dräger for 5-, 10-, or 22-minute cleaning cycles.



6 Drying procedure

⚠ WARNING

Make sure all cleaning residues have been completely removed before drying. Take care to ensure water does not enter the pneumatic system. Use a towel or an airgun to remove leftover water. Dry all internal air supply connectors with a towel, before connecting them for the next cleaning cycle.

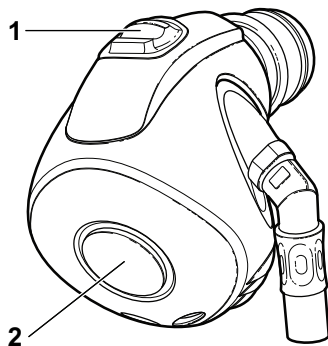
6.1 Preparing the LDR

1. With the rubber cover still lifted, shake the LDR to remove any excess water, leave the rubber cover lifted for drying.
 2. Remove all connected blanks from the LDR.
-

⚠ WARNING

Do not direct the airflow to the face, eyes or skin.

3. If the LDR was not fitted to the breathing apparatus:
 - a. Connect the LDR to a medium-pressure breathing air supply (85 psi to 130 psi (6 bar to 9 bar)).
 - b. With the LDR pressurized, lightly press the LDR front button (item 2) for a minimum of 10 seconds to ensure that no moisture remains in the LDR. If required afterwards, press the reset button to switch the LDR off (item 1).
 - c. Disconnect the LDR from pressure and place it into a basket in a drying cabinet.



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6.2 Preparing the SCBA

1. Wipe any water drops from the SCBA using a clean lint-free cloth or an airgun.
2. Close the cylinder valve or shut off the internal air supply of the washing machine.
3. Fully vent the pneumatic system of the SCBA, then remove the internal air supply connection.
4. Remove all sealing parts from the SCBA.
Wipe any water drops from the previously sealed areas.
5. If fitted, remove the air cylinder from the SCBA as described in the product IFU.
6. Place or hang the SCBA in a drying cabinet.

6.3 Preparing full facepieces, communication units and HPS SafeGuard

1. Wipe any water drops from the devices using a clean lint-free cloth or an airgun.
2. Place the devices in a basket or onto a hanger and put them into a drying cabinet. If parts are disassembled, separately put them in a small basket into the drying cabinet.

6.4 Drying

Dry the components (except air cylinders) as follows:

1. The recommended temperature for drying is 120 °F - 140 °F. Some dryers have a drying function which automatically switches off when the equipment is dry (e.g. all Harstra professional drying cabinets). It is acceptable to use an automatic drying function even if the drying time exceeds the recommended 30-minute limit.
2. Ensure the total drying time is kept to a minimum and remove components from the drying facility immediately when dry.
3. Dry all parts in the air or in a drying cabinet (temperature: max. 140 °F) very thoroughly and sufficiently. Do not expose to direct sunlight.
4. Refit the LDR rubber cover.
5. Perform a visual inspection of the full facepieces. Replace damaged, severely deformed or sticky components.
6. If the sacrificial lens of the Sentinel pressure gauge becomes clouded or foggy, remove the lens and wipe down the lens and the gauge. Replace the lens afterwards.

6.5 Post-drying tasks


Perform the following tasks when all parts are completely dry:

1. Check lung demand regulator push-in type connectors for lubricant.
2. For P18 connectors, check the O-ring on the lung demand regulator. As a guide, lubricant should be felt on the fingers but should not be seen. If relubrication is required, lightly apply Molykote 111 (other lubricants are not tested and may damage the equipment).
3. Carry out a visual inspection and full functional test of the breathing apparatus as described in the product IFU.
4. Perform a functional test and leak test of the full face masks as described in the product IFU. Store the masks.

7

Order list

Part	Part number	Remarks
Protection cap LDR	3734474	Set of 12
Blanking kit for NA PSS 5000/7000	3734475	1 piece
Self-sealing coupling for LDRs	6910458	1 piece
Female protective cap (AC, SF, LF)	3355993	Set of 2
Female QRC cap (smaller QRC couplings)	3334048	Set of 2
Male plug cap	3335757	Set of 2
Dummy battery pack	3736222	1 piece
Gauge clamping plug (set)	6926879	Set of 6
Protection cap whistle 9 mm	3734472	Set of 12
Protection cap relief valve 18 mm	3734473	Set of 12
Blind cap	R58773	1 piece
Screw plug to the ear- phone connector	R62719	1 piece

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