MSA
The Safety Company

Operating Manual

OptimAir TL PAPR



Order No.: 10077289/18

Print Spec: 10000005389 (R)

CR: 800000073578

US

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WARNING!

These instructions must be provided to users before use of the product and retained for ready reference by the user. Read this manual carefully before using or maintaining the device. The device will perform as designed only if it is used and maintained in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed, and persons who rely on this device could sustain serious injury or death.

The warranties made by MSA with respect to the product are voided if the product is not installed and used in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions.

Please read and observe the WARNINGS and CAUTIONS inside. For additional information relative to use or repair, call 1-800-MSA-2222 during regular working hours.

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1 Introduction

1.1 NIOSH Approval Information Cautions and Limitations

A — Not for use in atmospheres containing less than 19.5 percent oxygen.

B — Not for use in atmospheres immediately dangerous to life or health.

C — Do not exceed maximum use concentrations established by regulatory standards.

F — Do not use powered air-purifying respirators if airflow is less than four cfm (115 lpm) for tight fitting facepieces or six cfm (170 lpm) for hoods and / or helmets.

H — Follow established cartridge and canister change schedules or observe ESLI to ensure that cartridges and canisters are replaced before breakthrough occurs.

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.

L — Follow the manufacturer's User's Instructions for changing cartridges, canisters and / or filters.

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's Instructions, and / or maintenance manuals for information on use and maintenance of these respirators.

P — NIOSH does not evaluate respirators for use as surgical masks.

S — Special or critical user's instructions and / or specific use limitations apply. Refer to User's Instructions before donning.

1.2 S—Special or Critical User's Instructions

During use of the OptimAir TL PAPR, the atmosphere must be monitored for the level of contamination and a means of escape must be provided in the event that the contamination level increases to immediately dangerous to life and health (IDLH) levels.

The OptimAir TL PAPR must be properly inspected before use, properly decontaminated, if necessary, after use, properly cleaned and maintained after use, and properly stored between uses.

The OptimAir TL PAPR contains a battery and may not be taken into or used in atmospheres containing flammable or explosive gases, vapors, or dusts when the concentration of such contaminants is near or above the lower flammable limit (LFL).

Do not use the OptimAir TL PAPR for firefighting, in oxygen-deficient atmospheres, or for protection against airborne contaminants from which the cartridge does not protect.

⚠ WARNING!

- An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and training in the use of equipment, inspection and maintenance of equipment, and medical surveillance.
- This respirator will perform as designed only if used and maintained according to the manufacturer's instructions. The Program Administrator and the users must read and understand these instructions before using or servicing this product.
- If the respirator does not perform as specified in this manual, it must not be used until it has been checked by authorized personnel.

- DO NOT alter, modify, or substitute any components. The OptimAir TL PAPR has no user-serviceable parts except as indicated in this manual. DO NOT disassemble the product beyond the manufacturer's recommendations.
- Inspect the respirator regularly and maintain it according to the instructions. Repairs must only be made by properly trained personnel.
- This respiratory protective device does not supply oxygen. Use only in adequately ventilated areas which conform to the appropriate standard.
- This respirator must be used in conjunction with the proper chemical or particulate canister/cartridge(s) for protection against specific contaminants. If you cannot determine that the filter canister/cartridge(s) used with this device is designed for the contaminant, or if you do not know the identity of the contaminant, do not use this device. Call MSA Customer Service, 1-800-MSA-2222 (1-800-672-2222) for more information.
- DO NOT use when concentrations of contaminants are unknown.
- DO NOT allow blockage of the cartridge inhalation port.
- DO NOT use when appropriate exposure limit (PEL, REL, TLV, etc.) is not known.
- Leave the contaminated area immediately if:
    - Breathing becomes difficult
    - Dizziness or other distress occurs
    - You taste or smell the contaminant
    - You experience nose or throat irritation
    - Instructed by responsible individuals
    - An alarm sounds
- Use strictly according to the instructions, labels, and limitations pertaining to this device. Follow an established canister/cartridge(s) change out schedule.
- This respirator may not provide a satisfactory seal with certain facial characteristics, such as beards or large sideburns that prevent direct contact between the skin and the sealing surface of the facepiece. Do not use this facepiece if such conditions exist.
- DO NOT wear eyeglasses under the facepiece. The temples or sidebars on eyeglasses will prevent an air-tight seal. If you must wear glasses, install the spectacle kit.
- The user must perform a respirator fit test (Quantitative Test or Qualitative Test) when tightfitting facepieces are used and follow all warnings and limitations specified.
- Wear impermeable protective clothing to prevent exposure to gases and vapors that can poison by skin absorption.
- DO NOT use this respiratory protective device in explosive atmospheres.
- DO NOT use for urethane paints or other paints containing isocyanates unless an appropriate cartridge change-out schedule is developed. Due to their poor warning properties, over exposure can occur without user awareness and result in severe permanent damage to the respiratory system. If unable to develop an appropriate change-out schedule, use an air supplied respirator or SCBA.
- DO NOT drop the OptimAir TL PAPR. If the OptimAir TL PAPR is dropped leave the contaminated area immediately and inspect the unit for damage. If the plastic cartridge or blower housing is cracked it may cause contaminants to get into the system.
- Follow cartridge installation instructions (see the Installing the Cartridges section) very carefully to prevent cross threading.

Failure to follow these warnings can result in serious personal injury or death.

⚠ WARNING!

- This respirator/filter provides LIMITED protection. A respirator paired with an appropriate particulate filter may help reduce exposure to airborne biological agents, including H1N1 (swine) flu virus, avian (bird) flu virus, other types of influenza, SARS, or other bacterial or viral biological agents and help reduce the risk for infection during a pandemic, but WILL NOT ELIMINATE the risk of exposure, infection, illness, or death.
- This respirator/filter is certified by NIOSH to comply with the requirements specified for the designated filter efficiency level; however, appropriate authorities have NOT established a safe level of exposure to biological agents. Therefore, the respirator may NOT prevent transmission of influenza virus.
- Refer to the Centers for Disease Control and Prevention (CDC) at www.cdc.gov for guidance on the use of respirators to help decrease exposure to viral pathogens or other airborne biological agents in community, home, and occupational settings. The CDC recommends fit testing, medical evaluations, and training for optimal effectiveness when a respirator is used in a non-occupational setting. Neglecting these preparatory measures may cause an unsafe condition. Respirators used in an occupational setting MUST be used in accordance with a complete respiratory protection program as required by OSHA, which includes proper selection, training, fit-testing, and fitchecking. Detailed information on a respiratory protection program is available by contacting OSHA or visiting www.osha.gov.
- Do NOT remove respirator in contaminated areas. The outer surface of the respirator MUST be treated as if it is contaminated at all times. Tight-fitting safety goggles, or a full-facepiece respirator, may further help prevent transmission of viral pathogens or other airborne biological agents.
- The CDC recommends frequent hand washing and wearing gloves to help prevent transmission of disease due to exposure to surfaces where contaminants may be present, and also immediately following removal of the respirator.
- Do NOT reuse or share maintenance-free respirators. ALWAYS clean cartridge-style respirators before reuse in accordance with the instructions provided.
- This respirator/filter is NOT for use by (a) children, or (b) people with a medical condition that may be adversely affected by using it.
- This PAPR is used with a facepiece that is equipped with an exhalation valve or with a hood. These devices do not filter air that is exhaled by the user and this unfiltered air can enter the surrounding environment. Do not use where a sterile field is required without additional, appropriate source control measures in place. Consult CDC guidance.
- NIOSH does not evaluate respirators for use as surgical masks.

Failure to follow these warnings can result in serious personal injury or death.

The tight-fitting OptimAir TL PAPR must be properly prepared for use, properly donned, and a negative pressure leak test must be conducted in an area known to be free of contaminants before it can be used.

Before entry into a contaminated area, the maximum safe duration of use must be determined. The maximum safe duration of use depends primarily on:

- The amount and type of contamination in the air and the capacity of the cartridge to filter that contaminant.
- The amount of airborne particles (dust) in the atmosphere.
- The charge contained in the battery.
- The physiological limits of the respirator user.

The maximum expected cartridge life shall be determined based on the amount of contaminant in the atmosphere and the capacity of the cartridges together with the expected air flow through the cartridges.

A fully charged battery may be used for a minimum of four (4) hours depending on the cartridge type used and the conditions under which the PAPR is used.

NOTE: It is recommended that the OptimAir TL PAPR be used in environments where the temperature is between 32°F (0°C) and 110°F (43°C). Operation in environments where the temperature is below 32°F (0°C) or above 110°F (43°C) could negatively affect battery and blower performance.

With new cartridges/filters and a fully charged battery, the standard battery should operate for a minimum of four hours and the extended life battery for a minimum of eight hours, depending on the conditions in which the PAPR is used.

⚠ WARNING!

DO NOT expose the battery to conditions that can result in electrostatic discharge. Electrostatic discharge may result in rapid reduction of the available charge on the battery and lead to a corresponding reduction in remaining service time without an alarm. Conditions that can result in electrostatic discharge include, but are not limited to, touching the battery contacts or placing the battery on a metal surface with the contactsfacing down.

Failure to follow this warning can result in serious personal injury or death.

2 General Description

2.1 Description

The OptimAir TL Respirator is a blower-assisted, air-purifying respirator referred to as a Powered Air-Purifying Respirator or a PAPR.

The filtering system consists of a waist-mounted batterydriven blower assembly device and two (2) cartridges. The blower assembly contains an electric motor driving an air fan. A rechargeable 12 volt (nominal) nickel-metal hydride (NiMH) or 14.4 volt (nominal) lithium ion (Li-Ion) battery pack is inserted onto the bottom of the blower assembly. The user of the respirator breathes ambient air after the air has passed through the cartridges. The cartridges include a mechanical filter to trap airborne particles and may also include a sorbent bed of activated carbon to adsorb various gases and vapors. The chemical cartridges are approved for specific gases/vapors as noted in this user's instruction manual.

The blower assembly assists breathing by drawing air through the cartridges and delivering the purified air through a breathing tube to the respirator inlet covering (i.e. facepiece, hood, etc).

The OptimAir TL PAPR is NIOSH approved for use with MSA hoods and tight fitting facepieces noted in this user's instruction manual. Refer to the separate NIOSH Approval Label (P/N 10078677) for a complete list of approved part numbers and limitations.

Contact MSA Customer Service for additional technical specifications (ie weights, materials of construction, etc).

2.2 Respirator Use Limitations

The respirator must not be worn in atmospheres which exceed any of the following limitations:

- Maximum use concentrations (whichever is lower):
  - Contaminant IDLH
  - 1000 times the exposure limit for the contaminants present. (Low Profile Hood 25 times)
  - 1000 ppm (parts per million) organic vapors (for organic vapor cartridges).
- The limitations outlined in the applicable NIOSH approval.
- Any applicable limitation contained in a standard established by a regulatory agency (such as OSHA) with jurisdiction over the wearer.
- This respirator can be used for protection against a mixture of contaminants that are present simultaneously or alternately against one contaminant then another (using the same cartridges or filters) if the mixture meets the following conditions:
  - The cartridge/canister/filter must be approved for all contaminants present.
  - Particulates (dusts, mists, fumes, asbestos, and radionuclides) can be mixed with any other particulate or any gas or vapor for which the cartridge/canister is approved.
  - Contaminants present simultaneously must be below IDLH levels for the specific contaminants. If any one contaminant in the mixture exceeds the IDLH concentration then the entire mixture must be treated as IDLH and the respirator cannot be used (except for escape from particulates with appropriate filter).

2.3 NIOSH Approval Information

2.3.1 Protection

HE – High Efficiency Particulate Air Filter for Powered, Air Purifying Respirators

Purifying Protection Code	Protects Against	
OV/CL/CD/HC/HS/SD/HE/HF	Organic Vapor	OV
	Chlorine	CL
	Chlorine Dioxide	CD
	Hydrogen Chloride	HC
	Hydrogen Sulfide	HS
	Sulfur Dioxide	SD
	Hydrogen Fluoride	HF
	Particulate, High Efficiency	HE
AM/CL/CD/FM/HC/HS/MA/SD/HE/HF	Ammonia	AM
	Chlorine	CL
	Chlorine Dioxide	CD
	Methylamine	MA
	Formaldehyde	FM
	Hydrogen Chloride	HC
	Hydrogen Sulfide	HS
	Sulfur Dioxide	SD
	Hydrogen Fluoride	HF
	Particulate, High Efficiency	HE
MV/OV/HE	Mercury Vapor	MV
	Organic Vapor	OV
	Particulate, High Efficiency	HE
HE	Particulate, High Efficiency	HE

2.4 Exposure Limits (References)

A listing of acceptable exposure limits from the following sources is provided in MSA's Response® Guide. Contact MSA at 1-800-MSA-2222 for information.

- American Conference of Governmental Industrial Hygienists (ACGIH)
- Occupational Safety and Health Administration (OSHA)
- National Institute for Occupational Safety and Health (NIOSH)
- American Industrial Hygiene Association (AIHA)

2.4.1 Exposure Limits for Mixtures

The American Conference of Governmental Industrial Hygienists (ACGIH) publishes the following information to determine the TLV of a mixture.

First determine the total concentration of the chemical mixture ($C_{Mixture}$) from the individual contaminant concentrations (C_1, C_2, C_3, . . .) using the following formula: $C_{Mixture}=C_1+C_2+ C_3+ \ldots$

The TLV of the mixture ($T_{Mixture}$) is found by using the following formula where T_1, T_2, T_3, . . . are the individual contaminant TLVs and C_1, C_2, C_3, . . . are the individual contaminant concentrations:

Only use these equations if the contaminants present are actually mixed. Some substances do not mix and may be present separately, for example, in pockets or at different levels. In that case, the lowest TLV of the substances present must be used to determine the appropriate respirator category for protection against all contaminants present.

See MSA's *Response® Respirator Guide* for additional information.

2.4.2 Technical Information

Airflow: When used with the MSA battery pack, the OptimAir TL PAPR provides a constant filtered airflow of a minimum of 170 lpm to the hood, and 115 lpm to the tight fitting facepiece.

2.4.3 Battery Pack

Rechargeable 12 volt (nominal) nickel-metal hydride (NiMH) battery pack. (Standard Battery) Rechargeable 14.4 volt (nominal) lithium ion (Li-Ion) battery pack. (Extended Life Battery)

2.4.4 Contents

The OptimAir TL PAPR kit is shipped with the components listed.

NOTE: Upon receipt of the PAPR kit, inspect the contents for shipping damage and ensure all components are present.

Loose Fitting Kit with Standard Battery

- OptimAir TL PAPR Blower Assembly
- Breathing Tube Assembly - Hood
- Decon Belt Assembly
- Standard Battery Pack
- Standard Battery Charger
- User's Instruction Manual

Loose Fitting Kit with Extended Life Battery

- OptimAir TL PAPR Blower Assembly
- Breathing Tube Assembly - Hood
- Decon Belt Assembly
- Extended Life Battery Pack
- Extended Life Battery Charger
- User's Instruction Manual

Loose Fitting Kit with Extended Life Battery, Hood, and Filter

- OptimAir TL PAPR Blower Assembly
- Breathing Tube Assembly - Hood
- Decon Belt Assembly (Side Release)
- Extended Life Battery Pack
- Extended Life Battery Charger
- Hood
- HE Filters
- User's Instruction Manual

Tight Fitting Kit with Standard Battery

- OptimAir TL PAPR Blower Assembly
- Breathing Tube Assembly - Facepiece

- Decon Belt Assembly
- Standard Battery Pack
- Standard Battery Charger
- User's Instruction Manual

Tight Fitting Kit with Extended Life Battery

- OptimAir TL PAPR Blower Assembly
- Breathing Tube Assembly - Facepiece
- Decon Belt Assembly
- Extended Life Battery Pack
- Extended Life Battery Charger
- User's Instruction Manual

NOTE: Unless otherwise noted cartridges, filters, hoods, and tight-fitting facepieces must be ordered separately. See the Accessories and Reordering Information.

3 Preparing the OptimAir TL PAPR for Use

3.1 Checkpoints Before Use

1. Check that all parts of the respirator are complete and undamaged. See 6.2 Inspection for inspection procedures.
2. Check that the cartridge approval is appropriate and effective against the contaminant in the use environment. Always use two MSA cartridges of the same type.

3.2 Charging the Battery Pack

The battery pack must be fully charged before the respirator is first used. Use only MSA P/N 10076110 battery charger for the standard battery pack and P/N 10076017 battery charger for the extended life battery pack. Other chargers can damage the battery due to internal wiring differences or incorrect charging rates.

NOTE: Commercially available power strips may be used with the required battery chargers to charge multiple battery packs at one time.

The standard battery pack should be stored between -4˚F to 140˚F (-20˚C to 60˚C) and the extended life battery pack should be stored between -4˚F to 122˚F (-20˚C to 50˚C). Storage temperatures exceeding this range could result in permanent damage to the battery pack. If the battery pack has been stored fully charged for more than one week, the battery pack should be charged

until a full charge is indicated.

Charge the battery pack at 32°F to 104°F (0ºC to +40ºC). Charging at temperatures below this range will result in incomplete

charge. Charging above the range will result in reduced cycle life.

⚠ WARNING!

- DO NOT charge the battery pack where there are explosive concentrations of combustible gases, vapors, or mists. An explosion or fire can result. Replace the charger if the cord is damaged or worn, or if the case is cracked or distorted.
- DO NOT use a damaged charger.
- DO NOT touch the battery contacts.
- Never place the battery on a metal surface with the contacts facing down.
- DO NOT expose the battery to conditions that can result in electrostatic discharge. Electrostatic discharge may result in rapid reduction of the available charge on the battery and lead to a corresponding reduction in remaining service

time without an alarm. Conditions that can result in electrostatic discharge include, but are not limited to, touching the battery contacts or placing the battery on a metal surface with the contacts facing down.

Failure to follow these warnings can result in serious personal injury or death.

3.2.1 Standard Battery

1. Push the plug into the female connector.
2. Plug the charger into a 115-120 V, 50, 60 Hz (standard AC) outlet. The charger can be used internationally with the appropriate adapter up to 240 VAC.
3. Charge the battery pack until a full charge is indicated

Charger LED Indications	
Condition	**Indication**
Rapid Charge	Red
Charge Complete	Green
Charge Pending	Amber
Charge Failure	Red Flash
No AC or No Battery	OFF

When the battery is charging, the LED will be red.

If the battery is not at the proper voltage for a rapid charge the LED is amber. In this state the battery undergoes a trickle charge. Charging starts when the battery pack reaches the optimum charging voltage.

If the LED is flashing red, there is a failure. Disconnect battery pack, and unplug charger. Plug the charger back into outlet and reconnect battery pack to reset charger. If LED flashes red during any part of the charge, after it has been reset, remove the battery from service.

3.2.2 Extended Life Battery

1. Push the plug into the female connector.
2. Plug the charger into a 15-120 V, 50, 60 Hz (standard AC) outlet. The charger can be used internationally with the appropriate adapter up to 240 VAC.
3. Charge the battery pack until a full charge is indicated.

Charger LED Indications	
Condition	**Indication**
Rapid Charge	Flash 50/50
Charge Complete	Green
Charge Pending	Blink 10/90
Charge Failure	Fast Blink
No AC or No Battery	OFF

NOTE: (50/50) means the LED is on for 50% of the cycle time and off for 50% of the cycle time. (10/90) means the LED is on for 10% of the cycle time and off for 90% of the cycle time.

When the battery is charging, the LED blinks (50/50).

When the battery is fully charged, the LED is steady green. The battery can stay connected to the charger until needed.

If the battery is not at the proper voltage for a rapid charge the LED blinks (10/90). In this state, the battery undergoes a trickle charge. The charging will start when the battery pack reaches the optimum charging voltage.

If a fast blink of the LED occurs, there is a failure. Disconnect the battery pack, and unplug the charger. Plug the charger back into outlet and reconnect battery pack to reset charger.

NOTE: If a fast blink of the LED occurs during any part of the charger, after the charger has been reset, remove the battery from service.

NOTE: For optimal battery cycle life, follow the charging, storage and use conditions specified in this manual.

3.3 Installing the Battery Pack into the Battery Compartment of the Blower Assembly

⚠ WARNING!

- DO NOT use any battery which shows signs of damage, such as bulging, swelling, leaking fluid, or a cracked housing.
- DO NOT remove, replace, or install the battery pack where there are explosive concentrations of combustible gases, vapors, or mists. An explosion or file can result.

Failure to follow these warnings can result in serious personal injury or death.

1. The kidney shaped battery can only be properly installed in one orientation.



2. Slide the fixed tab end of the battery into the slot and push the contact end in until it snaps into place.

3. The OptimAir TL PAPR will not operate properly if the battery is not installed correctly.

3.4 Installing the Protective Cover

NOTE: For use with decon waist belts only. DO NOT use the protective cover with the comfort belt.

1. Slide the protective cover over breathing tube and motor blower unit. (It may be helpful to turn on the motor blower during this step.)
2. Push cover openings over cartridge receptacles.
3. Attach cartridges as instructed in 3.5 Installing the Cartridges.
4. Lift edges of protective cover openings over cartridge bases and seal with tape.

⚠ WARNING!

DO NOT allow the protective cover, or any object, to interfere with the cartridge o-ring and receptacle sealing surface or an airtight seal will not be achieved.

Failure to follow this warning can result in serious personal injury or death.

5. Cut protective cover tube to desired length and seal to breathing tube connector with tape.
6. Thread decon belt through the slits in the protective cover and the loops on the blower assembly.
7. Fold and tape bottom of cover.

3.5 Installing the Cartridges



Ensure the optional cartridge receptacle plugs are removed.

⚠ WARNING!

Two new MSA cartridges of the same type must be installed before each use. Refer to the NIOSH Approval Label for approval information.

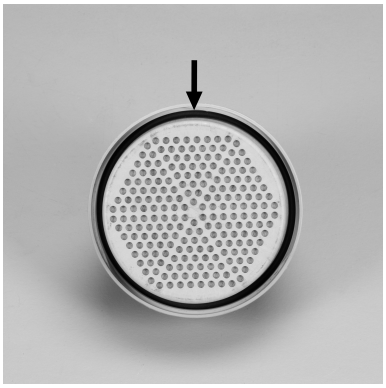
Failure to follow this warning can result in serious personal injury or death.

⚠ WARNING!

DO NOT reuse combination cartridges. Combination cartridges are intended for one time use only.

Failure to follow this warning can result in serious personal injury or death.

NOTE: Cartridges are considered to be in service when they are removed from their packaging.



NOTE: Black gaskets are assembled into each OptimAir TL cartridge. Ensure the gaskets are installed before using the cartridges. Do not attempt to remove gaskets from cartridges, this could tear or damage the gasket.

⚠ WARNING!

DO NOT use a OptimAir TL PAPR blower with one or both of the cartridges damaged or missing.

Failure to follow this warning can result in serious personal injury or death.

1. Remove both cartridges from their packaging.
2. Inspect the cartridges to be sure that they are not damaged and the gaskets are present.
3. To ensure proper attachment and prevent cross threading, carefully attach both cartridges by using the following procedure:



a. Place the unit on a flat surface with the cartridge receptacles facing up
b. Ensure the optional cartridge receptacle plugs are removed
c. Set the cartridge in place on top of the cartridge receptacle

d. Turn the cartridge counter-clockwise until it drops into position
e. Turn the filter clockwise until the cartridge is snug
f. Hand-tighten only

⚠ WARNING!

DO NOT cross-thread the cartridges.

Failure to follow this warning can result in serious personal injury or death.

3.6 Optional Accessory

3.6.1 Attaching the Spark Covers (Recommended for use in spark environments)

NOTE: The spark cover should only be used with the Extended Life Battery (P/N 10076109)

1. Remove the cartridges and spark covers from the packaging.
2. Attach the cartridges to the PAPR.



3. Once the cartridge is attached, align the feet of the spark cover with the inlet hole of the cartridge.



4. Grasp the outside of the cartridge, and twist and push on the spark cover. The spark cover will snap in place.

5. To remove the spark cover, gently squeeze the outside of the cover, twist, and pull the spark cover off.

6. Check the spark cover before each use to ensure no sparks have created holes or warped the part. If holes are created or the part is warped, replace the spark cover with a new one.

3.6.2 Attaching the Protective Breathing Tube Cover

⚠ WARNING!

- Inspect the Protective Breathing Tube Cover (P/N 10246322) before each use.
- DO NOT use a Protective Breathing Tube Cover which shows signs of damage including bleached or discolored areas.
- Replace the Protective Breathing Tube Cover every 6 months or when discoloration has occurred.

Failure to follow these warnings can result in serious personal injury or death.

1. With facepiece or hood disconnected from the breathing tube, or with the breathing tube disconnected from motor blower, slide the protective cover over breathing tube.
2. Secure the protective cover by tightening the hook and loop strap at each end of the breathing tube.

3.7 Installing the Waistbelt and Optional Shoulder Strap

3.7.1 Decon Belt with Cam Buckle

Thread the belt through the two belt loops on the back of the blower assembly.

3.7.2 Decon Belt with Side Release Buckle

1. Note the lacing path of the belt through the male buckle.
2. Remove the male buckle and keeper loop from the end of the belt.
3. Thread the belt through the two belt loops on the back of the blower assembly.
4. Replace the keeper loop and lace the male buckle back onto the belt.

3.7.3 Comfort Belt

NOTE: Adjust the belt for proper fit prior to installation.

1. Thread the belt through the belt loop on the back of the blower assembly.
2. Thread the belt through the loop on the back of the comfort belt.
3. Thread the belt through the second belt loop on the back of the blower assembly.
4. Thread the belt through the slide on the comfort belt.

3.7.4 Optional Shoulder Strap (use only with Comfort Belt)

1. Flip the back of the buckle to open the clip.
2. Clip one end of the shoulder strap near the back of the belt on the right side.
3. Clip the other end of the shoulder strap near the front of the belt on the left side.
4. Adjust the length so the waistbelt is positioned properly on the lower back.

3.8 Installing the Breathing Tube

3.8.1 Attaching the Breathing Tube Assembly to the Blower



1. Inspect the o-ring in the breathing tube inlet. If the o-ring is damaged, missing, or the breathing tube is difficult to install, replace the o-ring. Reorder PN 10085084 (Pack of 10).



2. Attach the breathing tube inlet to the blower outlet connection by aligning the marks on the bayonet fitting and turning the breathing tube to align the arrow on the unit to the second mark on the breathing tube.



3. Ensure that the bayonet flange is positioned properly.

3.8.2 Attaching the Breathing Tube Assembly to the Full Coverage Hoods

There are two methods (locking clamp, threaded connector) of attaching the breathing tube assembly to Full Coverage material hoods. Breathing tube assembly (P/N 10049631 and 10082281) may be used with the hoods. P/N 10082281 is approximately 4” longer than P/N 10049631.

NOTE: Ensure the hood and components are not torn or damaged.

Using the Locking Clamp Method



1. Note the smooth, gray section at the end of the breathing tube. This is the part of the breathing tube that the locking clamp will be attached to.



2. Slide the breathing tube into the hose inlet on the back of the hood approximately 3 ½ inches from the hose end.

⚠ WARNING!

Failure to place the breathing tube far enough into the hood inlet may result in reduced airflow which can result in serious personal injury or death.

Failure to follow this warning can result in serious personal injury or death.

3. Once the breathing tube is in position, place the locking clamp around the hood and breathing tube.
4. Determine where the smooth, gray section of the breathing tube is, and tighten the locking clamp in this location.
5. Squeeze the locking clamp until it cannot be tightened further.

Using the Threaded Connector Method



1. Remove the gray locking nut (shown above) that is screwed onto the end of the hose. It will not be needed for use with loose fitting hoods. This nut is used for attaching the hose to the Low Profile Hood.



2. Install the flat gray rubber washer provided onto the threaded end of the breathing tube.





3. Connect the breathing tube to the hood by threading the breathing tube into the threaded hood connector. Tighten the connection by turning the threaded hood connector nut with a ratcheting motion, releasing the threaded connector after each turn, until the connection is hand tight. Avoid twisting or kinking the hood by releasing the nut after each turn.



4. The threaded hood connection is designed to swivel. Adjust the orientation of the breathing tube so that it will not twist or kink the hood during use.

3.8.3 Attaching the Breathing Tube to the Low Profile Hood



1. Remove the gray locking nut from the threaded end of the hose.



2. Insert the hose into the air inlet hole in the back of the low profile hood.

3. Reach inside the low profile hood and secure the gray locking nut to the threaded end of the hose.

3.9 Installing the Optional Hood Lens Cover

1. Peel protective backing stickers from the ends of the hood lens cover.
2. Ensure the hood lens is in the curved position.
3. Insert one hand into the hood behind the lens.
4. Press the hood lens cover onto the lens.

4 Donning and Use

4.1 Donning

⚠ WARNING!

Donning and doffing must be done in an area known to be free of contaminants. The user must have practiced this procedure before attempting to use the respirator for respiratory protection.

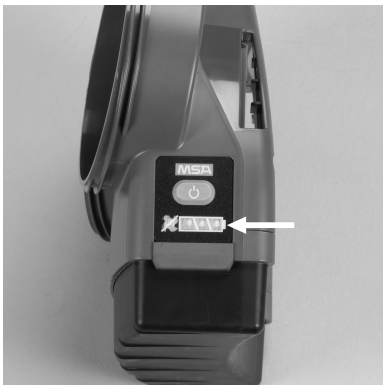
Failure to follow this warning can result in serious personal injury or death.

Audible and Visible Alarms

The OptimAir TL PAPR is equipped with audible and visible alarms that indicate low battery voltage and improper air flow.

Battery Indicator

The battery indicator will display the general state of the charge of the battery.



When the battery voltage drops below minimum allowable voltage, the OptimAir TL will notify the user with audible (double continuous beep) and visible warnings. The unit will continue to alarm for approximately 15 minutes or until it is shut off. After 15 minutes the unit will shut off to avoid over discharging and damage to the battery.

⚠ WARNING!

DO NOT expose the battery to conditions that can result in electrostatic discharge. Electrostatic discharge may result in rapid reduction of the available charge on the battery and lead to a corresponding reduction in remaining service time without an alarm. Conditions that can result in electrostatic discharge include, but are not limited to, touching the battery contacts or placing the battery on a metal surface with the contacts facing down.

Failure to follow this warning can result in serious personal injury or death.

Flow Indicator

The OptimAir TL PAPR continuously monitors the RPM of the motor. RPM is indicative of the airflow generated by the blower. If the RPM is too low or too high the user is warned by an audible (single continuous beep) and visible alarm. The unit will continue to alarm until the issue is addressed or the unit is shut off.

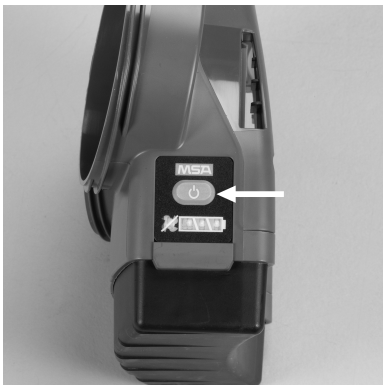


The flow alarm may be triggered by a restriction in the flow path of the respirator system. Restrictions can be due to clogged filters, blockage of the cartridge inlets, or a restriction in the air inlet of a loose fitting hood. A flow alarm can also be caused by a hose connection that is not fully engaged or one that is installed incorrectly.

4.1.1 Donning the Blower Assembly

Follow the instructions that correspond with the hood being used when donning the PAPR hood.

1. Examine the breathing tube assembly to verify that it is properly tightened to the hood or facepiece and the blower assembly.
2. Examine the cartridges to verify that they are properly installed to the blower assembly.



3. Turn the unit ON to confirm that the battery is properly installed and the blower assembly is working. Do this by pressing the ON/OFF button and holding for one to two seconds.
4. Turn the unit off by pressing and holding the ON/OFF button for 3-4 seconds.
5. Don the waistbelt and the blower assembly with the OptimAir TL PAPR blower outlet located at the top of the unit. The unit may be worn on the hip or the small of the back.
6. Fasten the buckle and adjust the waistbelt.



NOTE: Ensure the belt is properly tightened so that the OptimAir TL PAPR blower does not fall off or slide down the body during use.

NOTE: Protective clothing, the V-Gard Cap or the OptimAir TL suspension, if used, must be arranged so that it does not interfere with the fit of the hood or restrict airflow to the cartridges.

4.1.2 Donning the PAPR Hood

1. Turn on the PAPR blower motor. Let air flow through the unit for a few seconds.



2. Using both hands spread the opening of the hood apart.

3. Pull the hood over the head.



4. As the hood is pulled down, ensure the suspension sits on the head, if the hood with suspension is being worn.

NOTE: MSA recommends use of a buddy system to check for proper hood donning.

5. When using a single bib hood, the knit collar must contact the wearer's skin. When using a double bib hood, ensure the inner bib is tucked in completely. If necessary, use the buddy method to ensure proper donning.



6. Once the hood is donned, use a buddy to check the hood inlet to make sure it is straight and not twisted. There should be no kinks in the hood inlet when the breathing tube is connected.

⚠ WARNING!

Kinks in the hood inlet fabric may result in reduced airflow.

Failure to follow this warning can result in serious personal injury or death.

4.1.3 Adjusting the Hood Suspension (when applicable)

If the hood suspension sits too high or too low on your head, the crown strap must be adjusted.



1. Remove the suspension from the hood by taking apart the Velcro material at the three attachment points.

2. Adjust the crown strap by undoing the Velcro material on the strap and reconnecting it either tighter or looser. Try on the suspension.



3. If it still does not fit properly, repeat step 2.

4.1.4 Adjusting the Headband



1. To loosen the headband, squeeze the 1Touch® buckle and slide the headband apart.



2. To tighten the headband, squeeze the two tabs together to slide the headband together.

3. Once the headband is adjusted to the proper size, replace in the hood.

4.1.5 Installing the Suspension (when applicable)



1. Spread the neckseal opening apart and put the suspension back into the hood.

2. Line up the center suspension connector with the seam in the center of the hood. If necessary, look through the lens to align the parts.

3. Push the suspension firmly into the hood to connect the Velcro attachments.



4. Once the center suspension connector is in position, attach each side connection the same way. Push the suspension firmly into the hood to connect the Velcro attachments.

4.1.6 Donning the Hood with V-Gard® Cap (when applicable)

NOTE: The V-Gard Cap may be used as the suspension for PAPR hoods that require a suspension. The V-Gard Cap must be used with the OptimAir TL Hood with two V-Gard Fastener Kits (P/N 10089665)

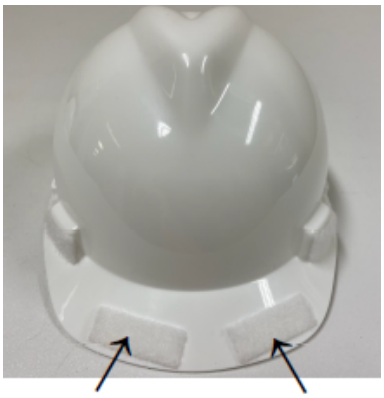
1. Remove the standard suspension from the PAPR hood and set aside.



2. Locate the two flanges on the front of the V-Gard cap.

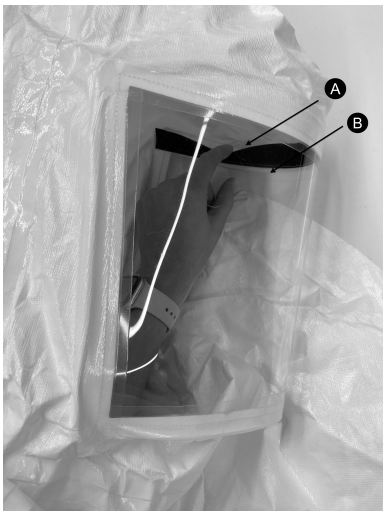


3. Remove the backing from the adhesive loop fastener.
    a. Place the fastener on the flange, lining up the fastener with the front and bottom edges of the flange.
    b. Repeat this step for both sides of the V-Gard cap.



4. Locate the bill of the V-Gard cap.
    a. Remove the backing from the adhesive loop fasteners.
    b. Place two fasteners on the bill in the locations shown.

5. Place the V-Gard cap inside the PAPR hood.
    a. Line up the center of the bill of the V-Gard cap with the seam in the center of the hood.



A Not Sewn **B** Sewn

NOTE: The top edge of the hook and loop fastener is not sewn to the PAPR hood.

6. Fold the hook and loop fastener away from the top edge of the lens.
7. Push the hook and loop fastener down to connect with the adhesive loop fasteners on the bill of the V-Gard cap.

NOTE: Repeat this step for both sides of the V-Gard cap.

8. Line up the back ends of the loop fastener strip on the V-Gard cap with the end of the hook fastener on the inside of the hood. Press firmly to fasten the V-Gard cap to the V-Gard hood.
9. Don the hood and ensure that the V-Gard is fitted properly inside the hood. If fitted improperly, remove the hood and repeat steps 5-8.
10. Once the hood is donned, use a buddy to check the hood inlet to make sure it is straight and not twisted. There should be no kinks in the hood inlet when the breathing tube is connected.

NOTE: When properly installed, the PAPR hood with the V-Gard cap will function similarly to the PAPR hood with standard suspension.

4.1.7 Donning the Low Profile PAPR Hood





1. Turn on the PAPR blower motor. Let air flow through the unit for a few seconds.
2. Place the hood over the head, ensuring the visor is in front of the face and the comfort band is approximately above the eyebrows.
3. Ensure the elastic seal runs above the ear and under then chin. It must be ensured that the hood fits snugly against the skin, particularly down the sides of the face adjacent to the ears.
4. Ensure the hose inlet is seated at the base of the user's skull.
5. Ensure the top of the hood is fully inflated and air is flowing over the user's head.

NOTE: MSA recommends use of a buddy system to check for proper hood donning.

4.1.8 Donning the Tight-fitting Facepiece

Refer to the facepiece user instructions for facepiece donning and negative pressure seal test instructions.

Facepiece	User Instruction Part Number
Advantage® 3100 Facepiece	10028994
Advantage 4100 Facepiece	10073772
Ultra Elite® Facepiece	10050775
G1®Facepiece	10158743

4.2 Using the OptimAir TL PAPR

1. Turn the blower on by depressing and holding the ON/ OFF button for 1-2 seconds.
2. Once a full charge is indicated on the battery charger and the unit is initially turned on, listen for a series of beeps and observe that the three LED lights on the unit illuminate. If the unit does not beep or the three LED lights fail to illuminate during initial start-up, the unit should be checked by authorized personnel prior to use.
3. Follow the instructions and properly don the hood or facepiece.
4. Wait four minutes to ensure that the unit has calibrated itself properly.
5. The work zone may now be entered.

NOTE: If the hood lens cover is contaminated, peel the outermost layer away by pulling on the outermost tab and tearing it at the perforated edges.

⚠ WARNING!

- Immediately leave the contaminated area if the airborne contaminant is detected by odor, taste, eye irritation, or if any discomfort is felt during use.
- If air flow is noticeably decreased or stops completely, leave the contaminated area immediately.
- If the battery compartment becomes hot to the touch, leave the contaminated area and turn the unit off immediately, decontaminate if necessary, and check the respirator.
- The low battery alarm sounds and/or flashes when there are approximately 15 minutes of service time remaining. Leave the contaminated area immediately if the low battery alarm activates.
- DO NOT expose the battery to conditions that can result in electrostatic discharge. Electrostatic discharge may result in rapid reduction of the available charge on the battery and lead to a corresponding reduction in remaining service time without an alarm. Conditions that can result in electrostatic discharge include, but are not limited to, touching the battery contacts or placing the battery on a metal surface with the contacts facing down.
- A decontamination procedure for the user and the protective equipment must be developed and implemented.
- Once the user leaves the contaminated area, he or she must enter the decontamination area and follow the set decontamination procedure.
- Once the user and the protective equipment have been decontaminated, properly dispose of affected equipment as required by federal, state and/or local laws.
- Leave the motor blower on. Do not breathe through the respirator for long periods of time with the motor-blower shut off. With the blower off, carbon dioxide can concentrate in the hood

Failure to follow these warnings can result in serious personal injury or death.

5 Removing the Respirator

Turn the unit OFF by holding the ON/OFF button down for three to four seconds.

5.1 Decontamination

⚠ WARNING!

DO NOT remove respirator until respirator and protective clothing are decontaminated; otherwise, exposure to contaminants may result. Follow decontamination and disposal procedures established by appropriate authorities.

Failure to follow this warning can result in serious personal injury or death.

Once the protective equipment has been decontaminated, proper disposal of affected equipment must be performed. Disposal is to be performed as required by federal, state, and/or local laws.

When conditions are safe to remove and handle the respirator, the hood or facepiece may be removed and the unit can be turned off. Accessories/components (belt, cartridges, etc.) can be removed at that time.

⚠ WARNING!

DO NOT reuse the cartridges. Cartridges are considered to be in service when they are removed from their packaging. Cartridges are intended for one time use only and must be disposed of upon termination of use.

Failure to follow this warning can result in serious personal injury or death.

5.2 Removing the Battery

⚠ WARNING!

DO NOT remove, replace or install the battery pack where there are explosive concentrations of combustible gases, vapors, or mists. An explosion or fire can result.

Failure to follow this warning can result in serious personal injury or death.



1. Press the lock button on the side of the battery and lift the battery out of its slot.

2. Rechargeable batteries can be recharged according to the instructions on the battery label and in 3.2 Charging the Battery Pack of these user instructions.

⚠ WARNING!



The standard rechargeable battery can be charged by MSA battery charger P/N 10076110 ONLY. Extended life batteries can be charged by MSA battery charger P/N 10076107 ONLY.

Failure to follow this warning can result in serious personal injury or death.

⚠ CAUTION!

DO NOT dispose of batteries as ordinary trash. Follow the instructions included in 8 Cartridge and Battery Disposal.

Failure to follow this caution can result in minor or moderate injury.

6 Cleaning and Inspection

6.1 Cleaning and Disinfecting

All components must be thoroughly cleaned after each use. Clean the OptimAir TL with Confidence Plus® Cleaner (P/N 10009971) from MSA. Refer to the label for use instructions. A solution as effective as Confidence Plus Cleaning Solution and compatible with MSA respirator components may be substituted.

⚠ WARNING!

DO NOT inhale or touch the contaminant when handling the respirator or its parts. Use equipment designed to protect you from the specific contaminant. If necessary, dispose of equipment to protect yourself from the contaminant.

Failure to follow this warning can result in serious personal injury or death.

NOTE: The used cartridges must be removed from the respirator and disposed of as directed in 8.1 Cartridge Disposal

1. Preparing the cleaner:
   a. Follow the instructions with the Confidence Plus Cleaning Solution.
   b. If the Confidence Plus Cleaning Solution is not used, prepare in accordance with the instructions provided with cleaning products.
2. Disconnect the breathing tube from the hood or facepiece.
3. Clean and disinfect the hood or facepiece.
   a. Use a damp cloth or sponge saturated with Confidence Plus or equivalent cleaning solution to wipe the hood or facepiece material clean.

NOTE: Refer to the facepiece instructions for detailed facepiece decontamination instructions.

4. Separate the motor-blower, breathing tube, waist belt, and cartridges.
5. Inspect the equipment for damaged threads, cracked plastic or rubber components, worn or frayed belts, or other damaged components.
6. Inspect the hose for tears or holes.
7. Use a damp cloth or sponge saturated with Confidence Plus or equivalent cleaning solution to wipe the breathing tube and motor-blower clean.



NOTE: Cartridge receptacle plugs are available as an accessory to help protect the motor blower assembly during cleaning (PN 10081414).

8. Carefully clean the breathing tube connection and cartridge ports to remove deposits that could prevent an airtight seal.

⚠ WARNING!

DO NOT submerge the blower assembly.

Failure to follow this warning can result in serious personal injury or death.

9. Thoroughly wash and rinse the waist belt in the Confidence Plus or equivalent cleaning solution. A soft brush or sponge may be used.

NOTE: The comfort belt and shoulder strap are machine washable.

10. Reassemble the respirator so that it will be ready for use.

6.2 Inspection

1. Inspect all hardware to ensure proper condition of threads, bayonet tabs, and buckles. Inspect the equipment for damaged threads, cracked plastic or rubber parts, worn or frayed belts, or other damaged components.
2. Inspect all gaskets and seals and ensure that they are present and in good condition.
3. Inspect the blower assembly and breathing tube assembly for damage or cracks. Ensure that there are no loose objects rattling inside the blower assembly.
4. Inspect the hood material for tears or holes. Inspect the suspension. Replacement sweatbands may be ordered in packages of 10 (P/N 10083618).
5. Inspect the hose for tears or holes.
6. Inspect accessories for signs of wear, damage or discoloration.
7. Correct any deficiencies immediately or tag the respirator as in need of repair and remove it from service.
8. Ensure that the unit is working properly before storage.

7 Storage

⚠ CAUTION!

- Ensure that the unit is working properly before storage by temporarily installing a battery as instructed in 3.1 Checkpoints Before Use. Remove the battery after testing.
- DO NOT store the unit with the battery installed. Always remove the battery from the blower assembly for storage. Store the battery and the blower assembly away from sunlight, heat, or moisture.

Failure to follow these cautions can result in minor or moderate injury.

7.1 Storing the Respirator

- Store only undamaged respirators and breathing tubes for further use. When not in use, store the respirator in cool, dry, and clean ambient air.



- The cartridge receptacles may be plugged with MSA's cartridge receptacle plugs (optional).

NOTE: Tape can be placed over the hose ends to keep out contaminants during storage.

7.2 Storing the Batteries

The standard battery pack should be stored fully charged at temperatures between -4˚F to 140˚F (-20˚C to 60˚C). Extended life batteries should be stored at temperatures between -4˚F to 122˚F (-20˚C to 50˚C). Storage temperatures exceeding this range could result in permanent damage to the battery pack. If the battery pack has been stored fully charged for more than one week, recharge the battery pack until a full charge is indicated.

8 Cartridge and Battery Disposal

8.1 Cartridge Disposal

Remove the used cartridges and dispose of them properly. Dispose of the cartridges in accordance with federal, state, and local regulations.

⚠ WARNING!

Handle used cartridges with care. Used cartridges may contain contaminant and must be handled as contaminated or potentially contaminated objects.

Failure to follow this warning can result in serious personal injury or death.

8.2 Battery Disposal

⚠ WARNING!

DO NOT dispose of the battery in fire. It may explode.

Failure to follow this warning can result in serious personal injury or death.

8.2.1 Disposing of the Standard Battery

NOTE: NiMH cells contained in the MSA Standard battery pack are classified by the federal government as a nonhazardous waste and are safe for disposal as municipal waste.

1. Apply a piece of non-conductive insulating tape across the contact pads and charging port and dispose of the battery pack.
2. NiMH cells contained in the MSA battery pack contain recyclable materials. Dispose of or recycle batteries in accordance with all applicable federal, state, and local regulations.

8.2.2 Disposing of Extended Life Battery

Dispose of or recycle batteries in accordance with all applicable federal, state, and local regulations.

9 Accessories and Reorder Information

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
OptimAir TL PAPR Kit Loose Fitting, Standard Battery (Blower, Battery Standard, Charger Standard, Hood Hose, Decon Belt With Cam Buckle, Instruction Manual) Cartridges not included	10081116	1	4.1 lbs.	
OptimAir TL PAPR Kit Loose Fitting, Extended Life Battery (Blower, Battery Extended Life, Charger Extended Life, Hood Hose, Decon Belt With Cam Buckle, Instruction Manual)	10081117	1	4.1 lbs.	
OptimAir TL PAPR Kit Tight Fitting, Standard Battery (Blower, Battery Standard, Charger Standard, Facepiece Hose, Decon Belt With Cam Buckle, Instruction Manual)	10081114	1	4.1 lbs.	
OptimAir TL PAPR Kit Tight Fitting, Extended Life Battery (Blower, Battery Extended Life, Charger Extended Life, Facepiece Hose, Decon Belt With Cam Buckle, Instruction Manual)	10081115	1	4.1 lbs.	
Loose Fitting Kit with Extended Life Battery, Yellow Low Profile Hood, HE Filters	10214804	1	5.75 lbs.	
Loose Fitting Kit with Extended Life Battery, White Low Profile Hood, HE Filters	10214805	1	5.75 lbs.	
Loose Fitting Kit with Extended Life Battery, Full Hood, HE Filters	10214891	1	5.8 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
OptimAir TL Blower Only	10088150	1	1.3 lbs.	
OptiFilter (TL) OV/AG/HE/HF	10080454	6	6.3 lbs.	
OptiFilter (TL) AM/FM/AG/HE/HF	10080456	6	7.7 lbs.	
OptiFilter (TL) HE	10080455	6	3.0 lbs.	
OptiFilter (TL) OV/MV	10224473	6	7.4 lbs.	
Hood, Tychem Material SL, Single Bib, Locking Clamp	10083385	4	3.8 lbs.	
Hood, Tychem Material SL, Single Bib, Threaded Hose Connection	10083381	4	4.7 lbs.	 

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
Hood, Tychem Material SL, Double Bib, Locking Clamp	10083386	4	4.2 lbs.	
Hood, Tychem Material SL, Double Bib, Threaded Hose Connection	10083382	4	3.8 lbs.	 
Hood, Single Bib, Locking Clamp	10083383	4	3.7 lbs.	

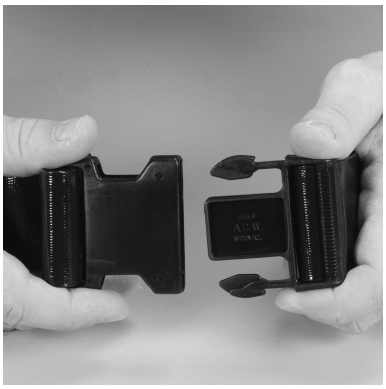
Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
Hood, Single Bib, Threaded Hose Connection	10083329	4	4.4 lbs.	 
Hood, Double Bib, Locking Clamp	10083384	4	3.8 lbs.	
Hood, Double Bib, Threaded Hose Connection	10083330	4	4.4 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
				
Hood,Double Bib, Threaded Hose Connection, Yellow	10086925	4	4.4 lbs.	
Hood,Single Bib, Threaded Hose Connection, Yellow	10086926	4	4.4 lbs.	
Hood, Single Bib, w/o Suspension, Threaded Connector	10083387	4	4.4 lbs.	
Hood, Single Bib, w/o Suspension, Locking Clamp	10083391	4	3.7 lbs.	
Hood, Single Bib, Yellow, w/o Suspension, Threaded Connector	10094878	4	4.4 lbs.	
Hood, Double Bib, w/o Suspension, Threaded Connector	10083388	4	4.4 lbs.	
Hood, Double Bib, w/o Suspension, Locking Clamp	10083392	4	4.2 lbs.	
Hood, Double Bib, Yellow, w/o Suspension, Threaded Connector	10094879	4	4.4 lbs.	
Hood, Single Bib, Tychem SL, w/o Suspension, Threaded Connector	10083389	4	4.7 lbs.	
Hood, Single Bib, Tychem SL, w/o Suspension, Locking Clamp	10083393	4	3.8 lbs.	
Hood, Double Bib, Tychem SL w/o Suspension, Threaded Connector	10083390	4	4.8	
Hood, Double Bib, Tychem SL w/o Suspension, Locking Clamp	10083394	4	4.2 lbs.	
Fastener Kit, OptimAir TL Hood with V-Gard	10089665	1	0.2 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
Hood, Low Profile, Yellow	10215117	4	0.2 lbs.	
Hood, Low Profile, White	10215118	4	0.2 lbs.	
Facepiece, Advantage 3100, Rubber Harness	Sm: 10028999 Md: 10028998 Lg: 10029000	1	1.6 lbs.	
Spark Cover	10068152	1	1.5 oz.	
Facepiece, Advantage 3100, Advantage Harness	Sm: 10031343 Md: 10031342 Lg: 10031344	1	1.6 lbs.	
Facepiece, Advantage 4100, (requires RD40 Inlet Assembly), Silicone, cloth head	Sm: 10083796	1	1.6 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
harness	Md: 10083792 Lg: 10083800			
Facepiece, Advantage 4100 (requires RD40 Inlet Assembly), Hycar, cloth head harness	Sm: 10083797 Md: 10083793 Lg: 10083801	1	1.1 lbs.	
Facepiece, Advantage 4100 (requires RD40 Inlet Assembly), Silicone, rubber head harness	Sm: 10083798 Md: 10083794 Lg: 10083802			
Facepiece, Advantage 4100 (requires RD40 Inlet Assembly), Hycar, rubber head harness	Sm: 10083799 Md: 10083795 Lg: 10083803			
RD40 Inlet Assembly	10065330	1	0.2 lbs.	
Facepiece, Ultra Elite, Black Silicone	Sm: 493072 Md: 493028 Lg: 493116	1	1.9 lbs.	
Facepiece, Ultra Elite, Black Hycar Rubber	Sm: 493064 Md: 493020 Lg: 493108	1	1.9 lbs.	
G1 Facepiece: Industrial (requires G1 Filter Adapter Assy) Hycar rubber head harness	Sm: A-G1FP-L-S-1-S-R-0-1 Md: A-G1FP-L-M-1-M-R-0-1 Lg: A-G1FP-L-L-1-M-R-0-1	1	1.5 lbs.	
G1 Filter Adapter Assy	10144231-SP	1	0.2 lbs.	
Facepiece, Hose	10049630	1	0.6 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
Hood Hose	10049631	1	0.5 lbs.	
Hood Hose, Extended Length Breathing Tube Assembly Faceshield or Hood	10082281	1	1.1 lbs.	
Breathing Tube Assembly Faceshield or Hood	10082281	1	1.1 lbs.	
Battery, Standard	10076108	1	1.1 lbs.	
Battery Charger, Standard	10076110	1	0.4 lbs.	
Battery, Extended Life	10076109	1	1.2 lbs.	
Charger, Extended Life	10076107	1	0.4 lbs.	
Comfort Belt	10049623	1	0.5 lbs.	
Shoulder Strap	10059112	1	1.3 oz.	
Hood Lens Cover	10082441	10	0.6 lbs.	
Protective Cover for blower and hose	10075779	5	0.9 lbs.	
Protective Cover for blower and hose, yellow	10087152	5	0.9 lbs.	
Protective Cover for blower and hose, yellow HD	10091958	5	1.0 lbs.	
Decon Belt with Cam Buckle	10074725	1	0.4 lbs.	

Item	Reorder Part Number	Quantity	Ship Weight (estimated)	Photo
Decon Belt with Side - Release Buckle	10078201	1	0.4 lbs.	
Spark Cover	10068152	1	1.5 lbs.	
Hood Suspension	10078469	1	2.0 oz.	
Hood Sweatbands	10083618	10	1.4 oz.	
Hood Hose Clamps	10083843	6	1.0 oz.	
Hose o-ring (Blower end of hose	10085084	10	0.2 oz.	
Cartridge Receptacle Plugs (2 recommended)	10081414	1	0.7 oz.	
Protective Cover, Breathing Tube	10246322	1	2.8 lbs.	
Instruction Manual	10077289	1	0.3 lbs.	

10 Troubleshooting

Audible alarm – If an alarm sounds, look at the visible battery and flow indicator to determine the potential cause of the alarm. If the fan LED is flashing red continue troubleshooting in the flow alarm section. If the battery LED is flashing red continue troubleshooting in the battery alarm section in this manual. It is also possible to differentiate between the two types of alarms by listening to the frequency of the buzzer. A flow alarm will be a single repeating beep; a battery alarm will beep twice and repeat.

Flow alarm – A flow alarm is indicated by a single beep that is repeated along with a light illuminating the fan pictogram near the on/off switch. Potential causes of a flow alarm:

- If cartridges have been in service too long they may be restricted or clogged causing a low flow alarm.
- Check for any potential obstructions that could be blocking the inlet holes of the cartridges (i.e. loose clothing worn by the user or something in the work area itself.)
- If wearing a hood, inspect the hose-to-hood interface for twisting or kinking of the hood which can restrict air flow. Readjust the hose connection to eliminate any kinking. Refer to the hood section of this manual for further instructions.
- Inspect the hose to ensure the bayonet connection is fully and properly engaged in the blower housing. A hose that is partially removed or one that is installed incorrectly will trigger a flow alarm.

Battery alarm - A battery alarm is indicated by a repeating double beep and a flashing red LED on the battery indicator. Potential causes for a battery alarm are:

- The battery could be drained from normal use and needs to be recharged
- If the battery is draining more quickly than usual it may be old and in need of replacement
- Contaminated contacts on the blower or battery. Inspect pins and pads and clean appropriately

NOTE: Use caution when cleaning the battery contact pads so as not to short circuit the battery.

Difficulty installing the hose in the blower – If it is difficult to install the bayonet end of the hose into the blower unit, replace the o-ring (reorder P/N 10085084, pack of 10).

Blower unit will not turn on – If the unit does not operate:

- Ensure the battery is fully charged and the contact pins and pads are free from contaminants. The battery charge can be checked by removing it from the unit and connecting it to the battery charger.
- Press the on/off switch and hold for 1 – 2 seconds.

11 Warranty

Mine Safety Appliances Company

General Express Warranty and Terms of Sale

1. **Express Warranty** - MSA warrants that the product furnished under this order is free from mechanical defects or faulty workmanship for a period of one (1) year from date of shipment, provided it is maintained and used in accordance with MSA's instructions and/or recommendations. This warranty does not apply to expendable or consumable parts whose normal life expectancy is less than one (1) year such as cartridges. Replacement parts and repairs are warranted for ninety (90) days from the date of repair of the product or sale of the replacement part, whichever occurs first. MSA shall be released from all obligations under this warranty in the event repairs or modifications are made by persons other than its own or authorized service personnel or if the warranty claim results from misuse of the product. No agent, employee or representative of MSA may bind MSA to any affirmation, representation or modification of the warranty concerning the goods sold under this contract. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AND IS STRICTLY LIMITED TO THE TERMS HEREOF: MSA SPECIFICALLY DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.
2. **Exclusive Remedy** - It is expressly agreed that the Purchaser's sole and exclusive remedy for breach of the above warranty, for any tortious conduct of MSA, or for any other cause of action, shall be the repair and/or replacement, at MSA's option, of any equipment or parts thereof, that after examination by MSA are proven to be defective. Replacement equipment and/or parts will be provided at no cost to the purchaser, F.O.B. MSA's plant. Failure of MSA to successfully repair any non-conforming product shall not cause the remedy established hereby to fail of its essential purpose.
3. **Exclusion of Consequential Damages** - Purchaser specifically understands and agrees that under no circumstances will MSA be liable to Purchaser for economic, special, incidental or consequential damages or losses of any kind whatsoever, including but not limited to, loss of anticipated profits and any other loss caused by reason of the nonoperation of the goods. This exclusion is applicable to claims for breach of warranty, tortious conduct or any other cause of action against MSA.