



GVP Series Belt-Mounted Powered Air Purifying Respirator Assembly

User Instructions for 3M™ Belt-Mounted PAPR Assembly GVP-1, GVP-1U, GVP-CB, GVP-PSK2, GVP-614-SK and 3M™ PAPR Unit GVP-100

IMPORTANT: Before use, the wearer must read and understand these *User Instructions*. Keep these *User Instructions* for reference.



▲ WARNING

This product is part of a system that helps protect against certain airborne contaminants. Before use, the wearer must read and understand the *User Instructions* provided as a part of the product packaging. A written respiratory protection program must be implemented meeting all the requirements of OSHA 29 CFR 1910.134 including training, fit testing, and medical evaluation. In Canada, CSA standards Z94.4 requirements must be met and/or requirements of the applicable jurisdiction, as appropriate. **Misuse may result in sickness or death.**

FOREWORD

Contact Information

Read all instructions and warnings before using. Keep this *User Instructions* for reference. If you have questions regarding these products contact 3M Technical Service.

System Description

The 3M™ GVP Powered Air Purifying Respirator (PAPR) Assembly is designed to be used with certain 3M respiratory headgear, filter/cartridges, batteries and breathing tubes to form a complete NIOSH approved respiratory system. When used in accordance with its NIOSH approval, these systems help provide respiratory protection against certain airborne contaminants. See "NIOSH Approval" section of this *User Instructions* for additional information on approvals.

The GVP belt mounted assemblies consist of a blower unit, filter/cartridge, waist belt and either GVP-111 nickel cadmium, BP-15 nickel metal hydride battery pack or TR-630 lithium-ion battery. The TR-659 battery adapter and either the TR-656 or TR-657 holster are required when the TR-630 battery is used with the GVP PAPR assembly.

NOTE: The BC-210 charger, used to charge the BP-15 battery pack, was discontinued and is no longer available.

The GVP assembly used with the GVP-111 battery pack is an intrinsically safe system for the following: Division 1, Class I; Group D, Class II, Groups E, F, G and Class III. The GVP assembly used with the BP-15 or with the TR-630 battery pack is not an intrinsically safe system.

The motor/blower unit (i.e. turbo assembly) draws ambient air through the filter/cartridge and provides filtered air to the headgear via the breathing tube. The GVP-111, BP-15 and TR-659 adapter (when used with the TR-630 battery) have a visual alarm to alert the wearer to a low battery voltage state.

The 3M™ GVP Assembly is available with a variety of accessories and belt options. Consult the "Listing of Components, Accessories and Replacement Parts" in this *User Instructions* for additional information including a listing of 3M™ GVP PAPR part numbers. Refer to the enclosed 3M™ GVP NIOSH Approval Label for approved system configurations.

Use the 3M™ Spark Arrest Cover GVP-146 to help reduce exposure of the 3M™ Motor Blower GVP-100 and 3M™ GVP Cartridges or Filters to sparks and other hot materials, typically resulting from grinding, welding operations or other "hot work".

NOTE: The 3M™ Vinyl Belt GVP-117 should not be used for high heat or spark producing operations.

Listing of Warnings and Cautions within these *User Instructions*

▲ WARNING

- These respirators help protect against certain airborne contaminants. Before use, the wearer must read and understand the *User Instructions* provided as a part of the product packaging. A written respiratory protection program must be implemented meeting all the requirements of OSHA 29 CFR 1910.134 including training, fit testing, and medical evaluation. In Canada, CSA standards Z94.4 requirements must be met and/or requirements of the applicable jurisdiction, as appropriate. **Misuse may result in sickness or death.**
- Each person using this respirator assembly must read and understand the information in these *User Instructions* before use. Use of these respirators by untrained or unqualified persons, or use that is not in accordance with these *User Instructions*, **may adversely affect respirator performance and result in sickness or death.**
- Do not use with parts or accessories other than those manufactured by 3M as described in these *User Instructions* or on the NIOSH Approval Label for this respirator. Do not attempt to repair or modify any component of the system except as described in these *User Instructions*. Failure to do so **may adversely affect respirator performance and result in sickness or death.**
- Always correctly use and maintain the lithium-ion battery packs. **Failure to do so may cause fire or explosion or could adversely affect respirator performance and result in injury, sickness, or death.**
 - a. Do not charge batteries with unapproved chargers, in enclosed cabinets without ventilation, in hazardous locations, or near sources of high heat.
 - b. Do not immerse without the battery storage and cleaning cover installed.
 - c. Do not use, charge, or store batteries outside the recommended temperature limits.
 - d. Charge in an area free of combustible material and readily monitored.
- To reduce exposure to hazardous voltage:
 - a. Do not attempt to service the chargers. There are no user-serviceable parts inside.
 - b. Do not substitute, modify or add parts to the chargers.
 - c. Inspect the chargers and power cords before use. Replace if any parts are damaged.
 - d. Do not use the chargers outdoors or in wet environments.
- Be certain that the filter and/or cartridge that you are placing on the unit is appropriate for the contaminants to which you will be exposed. **Failure to do so may result in sickness or death.**
- Do not over-tighten filter/cartridge. Over-tightening may result in distortion or displacement of the seal and may allow contaminated air to enter the respirator headpiece and **may result in sickness or death.**
- Failure to pass a user performance check and complete all necessary repairs before use **may adversely affect respirator performance and result in sickness or death.**

▲ WARNING

- Before using a 3M™ GVP PAPR Assembly, each person must read and understand the information in these *User Instructions* and the *User Instructions* provided with the respirator headpiece to be used. Use of these respirator systems by untrained or unqualified persons, or use that is not in accordance with these instructions, may adversely affect respirator performance and **may result in sickness or death.**
- Use of this respirator in atmospheres for which it was not NIOSH certified and designed **may result in sickness or death.** Do not wear this respirator where:
 - a. Atmospheres are oxygen deficient.
 - b. Contaminant concentrations are unknown.
 - c. Contaminant concentrations are immediately dangerous to life or health (IDLH).
 - d. Contaminant concentrations exceed the maximum use concentration determined using the assigned protection factor (APF) recommended for the applicable headpiece or the APF mandated by specific government standards, whichever is lower. Refer to the *User Instructions* provided with the applicable headpiece.
- Do not enter a contaminated area until properly donning the respirator system. Do not remove the respirator before leaving the contaminated area. **Doing so may result in sickness or death.**
- Contaminants that are dangerous to your health include those that you may not be able to see or smell. Leave the contaminated area immediately if any of the following conditions occur. **Failure to do so may result in sickness or death.**
 - a. Airflow decreases or stops.
 - b. Any part of the system becomes damaged.
 - c. Airflow into the respirator decreases or stops.
 - d. Breathing becomes difficult.
 - e. You feel dizzy or your vision is impaired.
 - f. You taste or smell contaminants.
 - g. Your face, eyes, nose or mouth become(s) irritated.
 - h. You suspect that the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.
- Do not expose blower/filter assembly directly to sparks or molten metal spatter. Direct contact with sparks or molten metal spatter may damage the filter, allowing unfiltered air into the breathing zone and may cause the filter or blower assembly to ignite, **resulting in serious injury, sickness or death.**
- Never alter or modify this respirator. Repair or replace parts only with the 3M components approved for this assembly. Failure to do so **may adversely affect product performance and result in sickness or death.**
- Do not clean respirator with solvents. Cleaning with solvents may degrade some respirator components and reduce respirator effectiveness. Inspect all respirator components before each use to ensure proper operating conditions. **Failure to do so may result in sickness or death.**
- Never attempt to clean filters by knocking or blowing out accumulated material. This may result in damage to the filter membrane allowing hazardous particles to enter the breathing zone, **resulting in sickness or death.**
- **To reduce the risks associated with fire, explosion, and environmental contamination:**
Do not dispose of Li-ion batteries in a fire or send for incineration. Battery packs should be treated as special waste and in accordance with your local environmental regulations.

▲ CAUTION

- The 3M™ GVP when used with the BP-15 battery pack or the TR-630 and TR-659 battery/adapter combination **IS NOT an intrinsically safe system.**
- 3M™ Motor Blower GVP-100, 3M™ Power Cord GVP-110 and 3M™ Battery Pack GVP-111 combination has been tested and classified by UL for intrinsic safety for the following: Division 1, Class I; Group D, Class II, Groups E, F, G and Class III. If the GVP-111 battery case is compromised or cracked, or if the rubber switch boot is damaged or missing, the battery pack and system should no longer be considered intrinsically safe.
- To reduce the risks associated with hot surfaces:
 - Do not touch pins after battery has been charged.

LIMITATIONS OF USE

Do not wear this respirator system to enter areas where:

- Atmospheres are oxygen deficient.
- Contaminant concentrations are unknown.
- Contaminant concentrations are Immediately Dangerous to Life or Health (IDLH).
- Contaminant concentrations exceed the maximum use concentration (MUC) determined using the Assigned Protection Factor (APF) for the specific respirator system or the APF mandated by specific government standards, whichever is lower.

Refer to the *User Instructions* provided with the applicable headgear and the additional cautions and limitations under the "NIOSH Cautions and Limitations" in this *User Instructions*.

RESPIRATOR PROGRAM MANAGEMENT

Occupational use of respirators must be in compliance with applicable health and safety standards. By United States regulation employers must establish a written respirator protection program meeting the requirements of the Occupational Safety and Health Administration (OSHA) Respiratory Protection standard 29 CFR 1910.134 and any applicable OSHA substance specific standards. Consult an industrial hygienist or call 3M Technical Service with questions concerning applicability of these products to your job requirements.

APPROVAL, CAUTIONS & LIMITATIONS

NIOSH Approval

The GVP PAPR assembly is one component of a NIOSH approved respiratory system. Refer to the *User Instructions* and/or the NIOSH Approval Label provided with the GVP PAPR assembly for a listing of components that can be used to assemble a complete NIOSH approved respirator system or contact 3M Technical Service.

NIOSH 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 cartridge 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, canister 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.

Intrinsic Safety Approval

3M™ Motor Blower GVP-100, 3M™ Power Cord GVP-110 and 3M™ Battery Pack GVP-111 combination has been tested and classified by Underwriters Laboratory (UL) for intrinsic safety for the following: Division 1, Class I; Group D, Class II, Groups E, F, G and Class III.

⚠ WARNING

Each person using this respirator assembly must read and understand the information in these *User Instructions* before use. Use of these respirators by untrained or unqualified persons, or use that is not in accordance with these *User Instructions*, **may adversely affect respirator performance and result in sickness or death.**

Do not use with parts or accessories other than those manufactured by 3M as described in these *User Instructions* or on the NIOSH Approval Label for this respirator. Do not attempt to repair or modify any component of the system except as described in these *User Instructions*. Failure to do so **may adversely affect respirator performance and result in sickness or death.**

OPERATING INSTRUCTIONS

Unpacking

Inspect the package contents for shipping damage and ensure all components are present. The product should be inspected before each use following the procedures in the "Inspection" section of these *User Instructions*.

⚠ WARNING

Always correctly use and maintain the lithium-ion battery packs. **Failure to do so may cause fire or explosion or could adversely affect respirator performance and result in injury, sickness, or death.**

- a. Do not charge batteries with unapproved chargers, in enclosed cabinets without ventilation, in hazardous locations, or near sources of high heat.
- b. Do not immerse without the battery storage and cleaning cover installed.
- c. Do not use, charge, or store batteries outside the recommended temperature limits.
- d. Charge in an area free of combustible material and readily monitored.

To reduce exposure to hazardous voltage:

- a. Do not attempt to service the chargers. There are no user-serviceable parts inside.
- b. Do not substitute, modify or add parts to the chargers.
- c. Inspect the chargers and power cords before use. Replace if any parts are damaged.
- d. Do not use the chargers outdoors or in wet environments.

⚠ CAUTION

The 3M™ GVP when used with the BP-15 battery pack or the TR-630 and TR-659 battery/adaptor combination **IS NOT an intrinsically safe system.**

3M™ Motor Blower GVP-100, 3M™ Power Cord GVP-110 and 3M™ Battery Pack GVP-111 combination has been tested and classified by UL for intrinsic safety for the following: Division 1, Class I; Group D, Class II, Groups E, F, G and Class III. If the GVP-111 battery case is compromised or cracked, or if the rubber switch boot is damaged or missing, the battery pack and system should no longer be considered intrinsically safe.

To reduce the risks associated with hot surfaces:

- Do not touch pins after battery has been charged.

Assembly

Charge the battery pack:

1. Inspect the battery pack prior to each charge cycle. If the case is damaged do not charge the battery pack. Properly dispose of the battery pack and replace.
2. Charge the battery pack in a cool, well ventilated location free of airborne contamination.
3. Plug the charger lead into the battery pack or place battery pack on charging cradle.
 - **BP-15 battery pack:** Plug the charger power cord into an AC source (110-210 VAC). Refer to BC-210/BP-15 *User Instructions*. The BP-15 battery pack should be charged immediately upon receipt and stored on the charger between uses. If the BP-15 will be stored off the charger, it should be fully charged initially and then fully recharged once every three months if not used sooner. For long-term storage, 3M recommends the BP-15 be stored connected on an active charger. The BC-210 charger is used to charge the BP-15 battery pack. **NOTE:** The BC-210 charger is discontinued and no longer available.
 - **GVP-111 battery pack:** Plug the charger power cord into an AC source (110-120 VAC). Refer to GVP-111 *User Instructions*. **NOTE:** The GVP-111 should be charged for a minimum of 20 hours before initial use. The GVP-111 battery pack should not be left continuously connected to the charger for more than 1 week as over time this may damage the battery pack cells. The GVP-112 charger is used to charge the GVP-111 battery pack.

- **TR-630 battery pack:** Plug the charger power cord into an AC source (100-240 VAC). When using the lithium-ion battery refer to the *User Instructions* provided with the battery. Refer to NIOSH Approval Label to see list of approved headgear and filter/cartridges that can be used with this battery. The TR-630 should be charged immediately and fully upon receipt and may remain connected to the charger indefinitely. The 3M™ VersaFlo™ Single Station Battery Charger Kit TR-641N and 4-Station Battery Charger Kit TR-644N are used to charge the TR-630 battery pack.

Both the BP-15 and GVP-111 battery packs and the TR-659 battery adapter (used with the TR-630 battery) have a red warning light indicating the battery pack requires recharging. The red light is not a low air flow indicator. **Immediately exit the contaminated area when the visual alarm (LED indicator light) on the adapter activates.**

Users should also refer to 3M Technical Data Bulletin #178 – Maintenance and Care of 3M™ Powered Air Purifying Respirator (PAPR) Batteries and to 3M Technical Data Bulletin #223 on Battery Maintenance for 3M™ VersaFlo™ Respirator Systems for more information

Install the Battery Pack

- **BP-15 battery pack:** Plug the 3 prong plug end of the GVP-210 power cord into the top of the BP-15 battery pack.
- **GVP-111 battery pack:** Plug the single prong plug end of the GVP-110 power cord into the top of the GVP-111 battery pack.
- **TR-630 battery pack:** Please refer to guidance below for TR-630 battery, TR-659 battery adapter and holster assembly and installation.
- **For all battery packs:** Plug the socket end into the prong receptacle on the front of the GVP-100 motor blower. (See diagram in "Components, Accessories and Replacement Parts" in these *User Instructions*).

NOTE: Take care to prevent the power cord from being hooked on protruding objects.

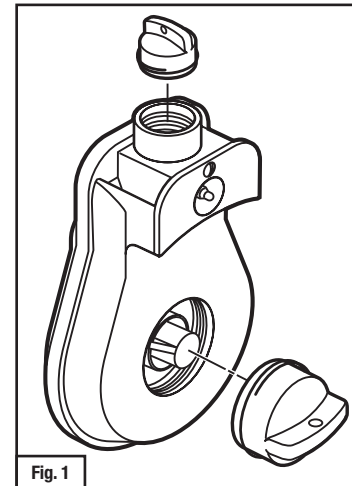
Filter/Cartridge Assembly

⚠ WARNING

Be certain that the filter and/or cartridge that you are placing on the unit is appropriate for the contaminants to which you will be exposed. **Failure to do so may result in sickness or death.**

Do not over-tighten filter/cartridge. Over-tightening may result in distortion or displacement of the seal and may allow contaminated air to enter the respirator headpiece and **may result in sickness or death.**

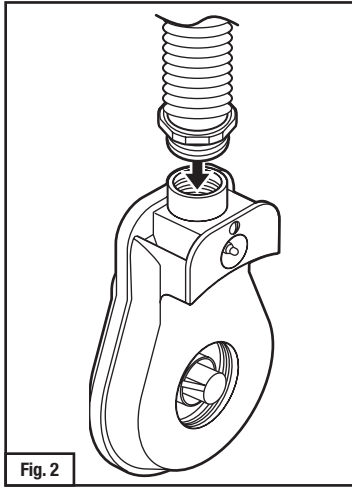
1. Remove the plastic caps from the cartridge/filter.
2. Inspect the cartridge/filter for damage to the threads, plastic body or filter media. Discard if damaged.
3. Remove inlet and outlet motor/blower plugs as shown. Retain the plugs for used during cleaning (Fig. 1).
4. Inspect the gaskets in the inlet and outlet ports for cracks or excessive wear. Replace if missing or damaged.
5. Secure the cartridge/filter into the inlet of the motor/blower unit by hand tightening. The spark arrestor should be used for welding and all situations where the GVP PAPR may be exposed to sparks, molten metal or other hot particulates.



Breathing Tube

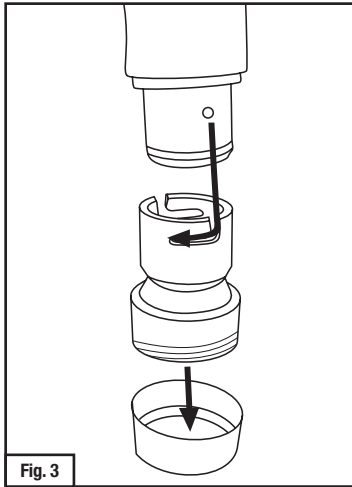
GVP-122, GVP-123, H-115, L-122 breathing tubes

Screw the threaded end into the GVP PAPR outlet port (Fig. 2).



BT-Series breathing tubes

1. Screw the 3M™ Adapter V-199 into the GVP PAPR outlet port.
2. Attach the BT breathing tube to the adapter by inserting the tube end with two prongs into the top of the adapter. Twist the end of the tube to lock it in place (Fig. 3).



Belt GVP-117, GVP-127 or TR-326 when used with the GVP-111 or BP-15 battery packs

If using the CB-1000 comfort belt refer to separate *User Instructions* for information on assembly.

1. Thread the belt through the belt slots on the back of PAPR motor blower.
2. Attach battery pack:
 - GVP-111: Thread the belt into the belt slot on the back of the battery pack. (Placing the GVP-111 battery pack onto the belt last will allow for easier removal for charging.)
 - BP-15: Battery pack can slide on and off or be clipped to the belt. Ensure that the bottom edge of the belt is in the bottom of the “J” portion of the clip.
3. Connect the power cord to the battery pack and the PAPR unit as described earlier.
4. Secure the belt to your waist and adjust for a snug fit. Feed any excess belt length through the belt loop or cut to the desired length.

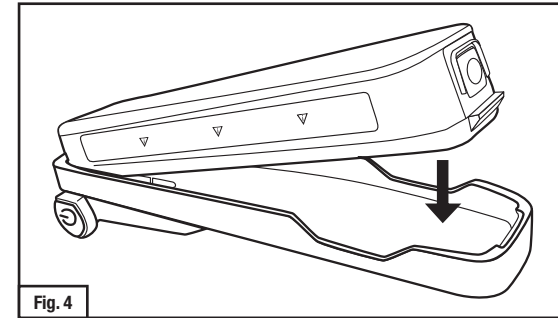
Belt GVP-117, GVP-127 or TR-326 when used with the TR-630 battery, TR-659 battery Adapter and holster

1. Thread the belt through the belt slots on the back of PAPR motor blower.

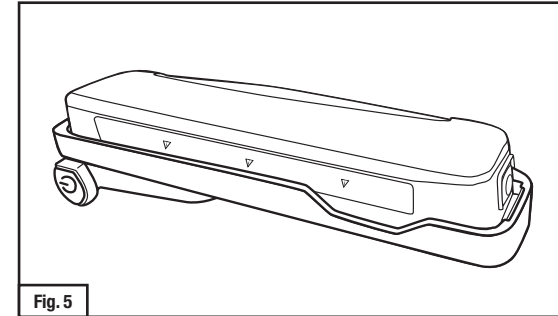
Assembly of the TR-630 battery, TR-659 battery adapter and holster

Attaching the TR-630 battery to the TR-659 battery adapter:

2. Insert the TR-630 battery pack into the TR-659 battery adapter by sliding the hinged side of the battery into the corresponding side of the adapter (side with power button) (Fig. 4).

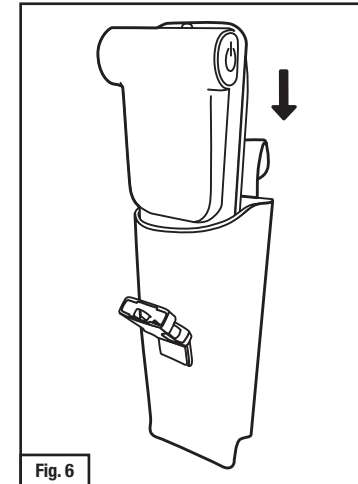


3. Push down the TR-630 battery so that it is fully seated in the adapter and the blue release tab on battery clicks into place (Fig. 5).



Inserting the TR-659 battery adapter with battery into TR-656 heavy duty holster

4. If not already done, unbutton the clip holding the top flap of TR-656 heavy duty holster in place. Fold top flap of the holster back so it is ready to accept the adapter and battery.
5. The heavy duty holster can be worn on either side of the waist belt. If choosing to wear the battery and holster on **right** side of waist belt, slide the TR-659 adapter with battery into the TR-656 heavy duty holster with battery side facing belt loop (back) of the holster (Fig. 6).



If choosing to wear the battery and holster on **left** side of waist belt, slide the TR-659 adapter with battery into the TR-656 heavy duty holster with adapter side facing the belt loop (back) of the holster (Fig. 7).

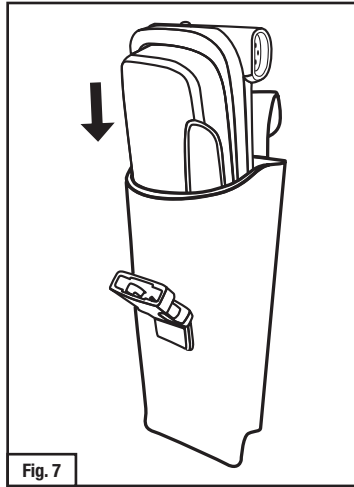


Fig. 7

6. With the adapter and battery fully inserted into lower portion of holster, snap the buckle connecting the upper flap and lower portion of the holster. Pull the leather strap located on the buckle to tighten top of holster for a snug fit (Fig. 8). Ensure that adapter indicator light can be seen through one of the two holes located on the strap of the holster (Fig. 9).

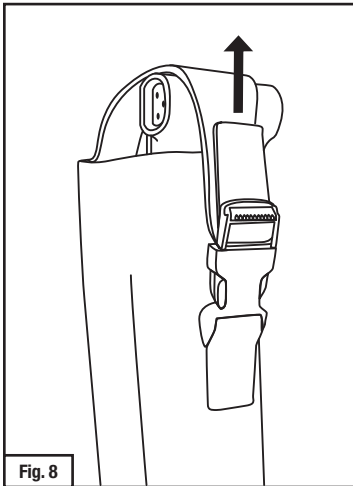


Fig. 8

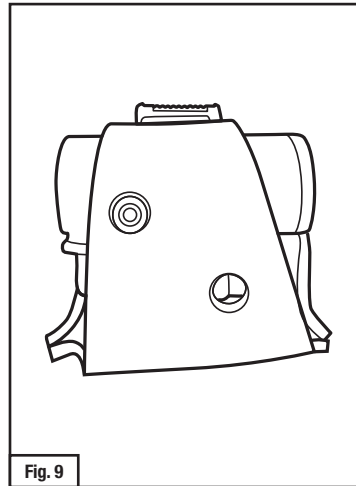


Fig. 9

Placing on waist belt and attaching the power cord

7. Thread the belt loop of the holster onto either the right or left side of the user's waist belt, depending on the orientation chosen.
8. Connect the GVP-610 power cord to the TR-659 adapter (Fig. 10). Plug socket end of the power cord into the prong receptacle on the front of the GVP-100 motor/blower. To power the motor/blower on, hold the power button on the adapter down for 1/2 second. When powered on, the indicator light on the TR-659 should blink for approximately one second and then turn off.

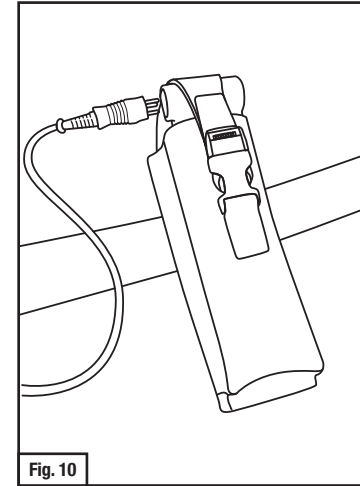


Fig. 10

9. Position the holster assembly close enough to the motor/blower as to not strain the power cord, at the same time ensuring that the holster assembly is placed in a location that allows the wearer to visually see the indicator light located on the top of the adapter.

To power the motor/blower off, hold the power button on the adapter down for 3 seconds. When there is approximately 15 minutes of charge left on the TR-630 battery pack, the LED indicator light on the battery adapter will begin blinking. **Immediately exit the contaminated area when the visual alarm (LED indicator light) on the adapter activates.**

To detach the TR-630 battery from the TR-659 battery adapter, engage the blue release tab on the battery and pull upward (Fig. 11).

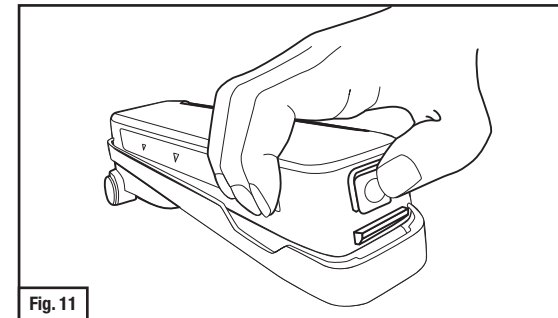


Fig. 11

The TR-657 easy clean holster which can be used in place of the TR-656 heavy duty holster. Please refer to the TR-659 battery adapter *User Instructions* for instructions on how to assemble using this holster.

Headgear (Respiratory Inlet Cover)

H-Series, L-Series, L-SG-Series and S-Series headgear

Refer to the specific headgear *User Instruction* for information on attaching the breathing tube, donning and limitations of the headgear to be used.

6000DIN and 7800S full facepiece

1. Screw the threaded end without the 90 degree elbow into the GVP PAPR outlet port.
2. Remove the 3M™ Gasket Valve Plug 7890 from the **center port** of the full facepiece respirator (Fig. 12 and 13).
3. Ensure side inhalation ports are closed:
 - **7800S Series facepiece:** Ensure 7890 plugs are in place **on each side port** of the respirator.
 - **6000DIN Series facepiece:** Ensure a 6876 breathing tube gasket is in the center port and a 6895 inhalation port gasket and 6880 bayonet cap are attached and secure **on each of the side bayonet ports**. Replace gaskets and caps if missing or damaged.

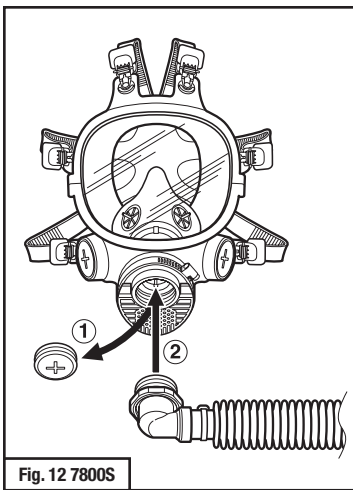


Fig. 12 7800S

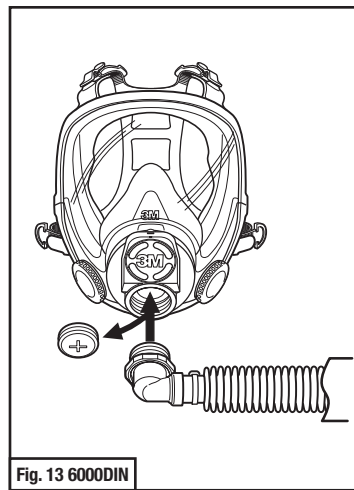


Fig. 13 6000DIN

4. Screw GVP-123 breathing tube elbow adapter into the center port of the facepiece inlet of the respirator (Fig. 12 and 13).
5. Follow user donning and seal check procedures described in the *User Instruction* provided with the facepiece.

Motor Blower On and Off

- GVP-111: Press the gray on/off button on the top of the battery pack.
- BP-15: Turn the on/off switch on the top of the battery pack.
- TR-630 battery with TR-659 battery adapter: Press black on/off switch on side of battery adapter for 1/2 second to power on and for three seconds to power off.

INSPECTION

Before each entry into a contaminated area, the following inspection must be performed to help ensure proper function of the respirator system. Refer to the specific "Assembly" subsection of this *User Instructions* for proper assembly procedures.

NOTE: There are no user serviceable parts inside the GVP PAPR assembly. The motor/blower unit must not be opened to attempt repairs.

Visual inspection

1. PAPR system: Visually inspect the entire PAPR system including the motor/blower, power cord, filter, breathing tube, battery pack, belt and headgear. If parts are missing or damaged, replace them only with 3M™ GVP PAPR replacement parts before proceeding.
2. Battery pack: Confirm the battery pack is fully charged and the charge is sufficient for the duration of the work period. The PAPR assembly power cord must be securely connected to the battery pack and motor blower. Inspect the battery pack for cracks or signs of deterioration. Replace battery pack if damaged.
3. Power cord: Inspect the power cord ensuring that both the socket and prong ends are clean and free of signs of wear and corrosion. Replace power cord if damaged.
4. Battery adapter: If using the TR-630 battery pack, ensure that the TR-630 battery is securely connected to the TR-659 battery adapter before use. Ensure that the TR-659 battery adapter is in good condition and free of cracks, holes or signs of deterioration. Examine battery connection pins and power cord receptacle for signs of wear or corrosion. Replace battery adapter if damaged.
5. Holsters: If using the TR-630 battery pack with TR-659 battery adapter, ensure that the battery pack and battery adapter combination are securely seated in the holster. Examine the outside of the TR-656 heavy duty and/or the TR-657 easy clean holster for holes, ripped seams or any other signs of wear. Replace holster if damaged.
6. Inlet and outlet port gaskets: Inspect the inlet and outlet port gaskets for cracks or excessive wear. If needed replace with new gaskets.
7. Filter/cartridge: The filter/cartridge should be properly installed and screwed in finger tight. If sparks or other hot particles are present, **the spark arrester must be in place over the filter and GVP PAPR. Failure to use the spark arrester may allow the filter to be damaged with subsequent user exposure to contaminated air.**
8. Breathing tube: Examine the entire breathing tube for tears, holes or cracks. Bend the tube to verify it is flexible. The breathing tube should connect firmly to the GVP motor blower. If damage is noted, replace with the appropriate breathing tube to match the respiratory headgear.
9. Examine the headgear per the recommendations in the headgear specific *User Instructions*.
10. Conduct an air flow check.

Airflow Check

This process should be followed prior to each use. Check the label on the air flow indicator to determine which test circle to use for the airflow check.

1. Ensure the ball in the GVP-113 flow check indicator moves freely in its tube. Rinsing with clean water may help free a stuck ball. Allow the tube and ball to dry prior to using.
2. Ensure that the filter selected is secured to the PAPR before testing airflow.
3. Attach the appropriate breathing tube to the PAPR outlet. **Exceptions:**
 - L-122 breathing tube: The 3M™ Adapter L-181 must be used instead of the breathing tube to check the airflow. The GVP-113 flow meter will not fit into the end of the L-122 breathing tube.
 - BT series breathing tube: The V-199 adapter must be used instead of the breathing tube to check the air flow. The GVP-113 flow meter will not fit into the end of the BT series breathing tube.
4. Turn the PAPR motor blower on.
5. Insert the tapered end of the airflow meter:
 - a. L-181 adapter: Insert into the vinyl connector (Fig. 14) and hold vertically.
 - b. GVP-122, GVP-123 or H-115: Insert into the end of the breathing tube (Fig. 15) and hold vertically.

c. V-199: Insert into the end of the adapter (Fig. 16) and hold vertically using the thumb and forefinger to cover the two breathing tube locking slots in the connector (Fig. 17).

6. Locate the position of the ball in the airflow meter.

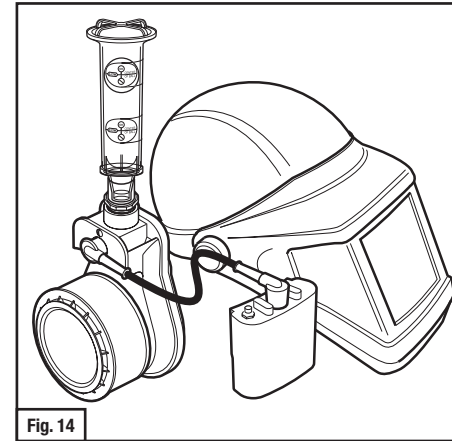


Fig. 14

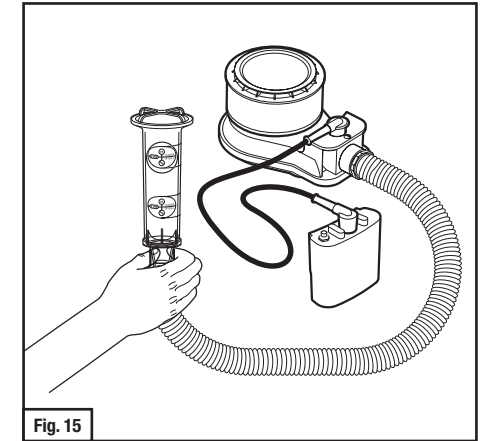


Fig. 15

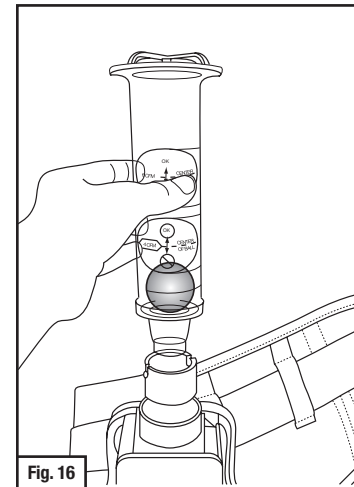


Fig. 16

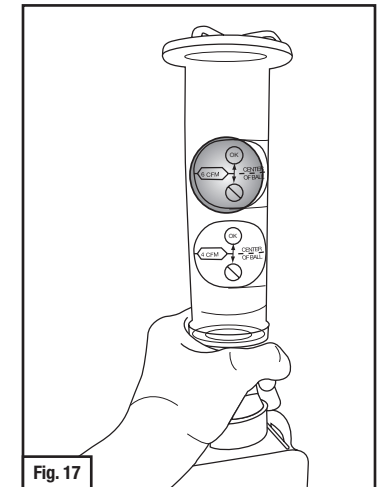


Fig. 17

7. Tight fitting facepieces: The ball should be located in or above the lower (4 cfm) tight fitting flow test circle.
8. Loose fitting headgear: The ball should be located in or above the higher (6 cfm) helmet and hood flow test circle (Fig. 17).
9. If the ball fails to move fully inside or above the flow test circle, insufficient airflow is being provided. Refer to "Troubleshooting" section of *User Instructions*.

⚠ WARNING

Failure to pass a user performance check and complete all necessary repairs before use **may adversely affect respirator performance and result in sickness or death.**

Before using a 3M™ GVP Respirator System, each person must read and understand the information in these *User Instructions* and the *User Instructions* provided with the respirator headpiece to be used. Use of these respirator systems by untrained or unqualified persons, or use that is not in accordance with these instructions, **may adversely affect respirator performance and may result in sickness or death.**

ENTERING AND EXITING THE CONTAMINATED AREA

The following instructions are intended to serve as a guideline for the use of the 3M™ GVP PAPR. It is not to be considered all-inclusive, nor is it intended to replace the policy and procedures for each facility.

Prior to entering the contaminated area, complete the inspection procedures listed in these *User Instructions*.

1. Turn the motor blower on.
2. Don the GVP assembly and headgear. Enter the work area.

3. Leave the contaminated area if any of the following conditions occur:
 - a. Any part of the system becomes damaged.
 - b. Airflow to the respirator decreases or stops.
 - c. You feel dizzy or your vision becomes impaired.
 - d. You taste or smell contaminants.
 - e. Your face, eyes, nose, or mouth becomes irritated.
 - f. You suspect the concentration of contaminants may have reached levels at which this respirator system may no longer provide adequate protection.
4. Do not remove the respirator or reach your hand into the headgear in areas where the air is contaminated.
5. Follow you specific exiting and decontamination procedures for turning off the motor blower and removing the respirator system.

▲ WARNING

- Use of this respirator in atmospheres for which it was not NIOSH certified and designed **may result in sickness or death**. Do not wear this respirator where:
 - a. Atmospheres are oxygen deficient.
 - b. Contaminant concentrations are unknown.
 - c. Contaminant concentrations are immediately dangerous to life or health (IDLH).
 - d. Contaminant concentrations exceed the maximum use concentration determined using the assigned protection factor (APF) recommended for the applicable headpiece or the APF mandated by specific government standards, whichever is lower. Refer to the *User Instructions* provided with the applicable headpiece.
- Do not enter a contaminated area until properly donning the respirator system. Do not remove the respirator before leaving the contaminated area. **Doing so may result in sickness or death.**
- Contaminants that are dangerous to your health include those that you may not be able to see or smell. Leave the contaminated area immediately if any of the following conditions occur. **Failure to do so may result in sickness or death.**
 - a. Airflow decreases or stops.
 - b. Any part of the system becomes damaged.
 - c. Airflow into the respirator decreases or stops.
 - d. Breathing becomes difficult.
 - e. You feel dizzy or your vision is impaired.
 - f. You taste or smell contaminants.
 - g. Your face, eyes, nose or mouth become(s) irritated.
 - h. You suspect that the concentration of contaminants may have reached levels at which this respirator may no longer provide adequate protection.
- Do not expose blower/filter assembly directly to sparks or molten metal spatter. Direct contact with sparks or molten metal spatter may damage the filter, allowing unfiltered air into the breathing zone and may cause the filter or blower assembly to ignite, **resulting in serious injury, sickness or death.**

CLEANING, STORAGE AND DISPOSAL

▲ WARNING

- Never alter or modify this respirator. Repair or replace parts only with the 3M components approved for this assembly. Failure to do so **may adversely affect product performance and result in sickness or death.**
- Do not clean respirator with solvents. Cleaning with solvents may degrade some respirator components and reduce respirator effectiveness. Inspect all respirator components before each use to ensure proper operating conditions. **Failure to do so may result in sickness or death.**
- Never attempt to clean filters by knocking or blowing out accumulated material. This may result in damage to the filter membrane allowing hazardous particles to enter the breathing zone, **resulting in sickness or death.**

Detach the battery pack, breathing tube and headgear from the belt. Inspect all parts for damage or other signs of excessive wear. Replace all damaged parts prior to storage or next use.

Cleaning

1. Motor/blower: Screw the blower plug and filter plug into the motor blower unit (Fig. 1). With the plugs in place the unit can be rinsed with a mild, pH neutral cleaning solution or it can be placed in an equipment washer. Do not expose to cleaning or drying temperatures greater than 120°F (49°C). Do not use solvents to clean the motor/blower unit. Liquid solvents may chemically weaken the plastics.
2. Battery pack: Clean the outer surface of the battery pack with a soft cloth dampened in a solution of water and mild, pH neutral detergent. Ensure electrical contacts are clean and dry before use. Do not immerse the BP-15 or GVP-111 battery pack in water. Keep moisture out of the GVP-111 and BP-15 battery pack cord receptacle. Do not use solvents to clean the battery pack case.

NOTE: The TR-630 battery is sealed and designed for temporary immersion for cleaning when the cleaning and storage strap is installed (included in the TR-653 cleaning and storage kit). The TR-630 battery in a solution of water and mild, pH neutral detergent is rated to IP67 under the Ingress Protection Standard (IEC 60529). Please see 3M™ Versaflo™ Battery and Charger TR-600 *User Instruction* and Technical Data Bulletin #223 Battery Maintenance for 3M™ Versaflo™ Respirator Systems for further instruction.
3. Power cord: The power cord may be wiped down with a mild cleaning solution, taking care to avoid the socket and prong ends. Clean the socket and prong ends of the power cord with a clean dry cloth.
4. Battery adapter: The TR-659 may be wiped down with a mild cleaning or disinfecting solution taking care to avoid the battery connection pins and power cord connection contacts. Clean battery connection pins and power cord connection area with a clean dry cloth. Do not immerse the TR-659 battery adapter.
5. Holsters: A soft bristle brush or damp cloth may be used to clean the TR-656 heavy duty holster. The TR-657 easy clean holster can be wiped down with a mild cleaning solution.
6. Breathing tube: Clean the connection sites on the breathing tube with water and detergent solution. The breathing tubes can be immersed in water for cleaning. The inside of the tube must be completely dried prior to use or storage. Air dry, or dry by connecting to the motor/blower unit and use it to force air through the tube until dry. Optional breathing tube covers can also be used to facilitate cleaning.
7. Filter/cartridge: The filters and cartridges can not be cleaned and must be replaced. Do not use compressed air or vacuum systems to attempt to clean the filters. Dispose of the filter/cartridge according to applicable regulations.

Storage

Motor Blower Storage

Store your respirator at room temperature in a dry area that is protected from exposure to hazardous contaminants.

Battery Pack Storage

Refer to the *User Instructions* for the GVP-111 and the *User Instructions* for the BP-15 battery packs for specific maintenance and storage recommendations.

Refer to Technical Data Bulletin #178 Maintenance and Care of 3M™ Powered Air Purifying Respirator (PAPR) Battery Packs for general recommendations on storage and maintenance of NiCd and NiMH battery packs.

Refer to the *User Instructions* for 3M™ Versaflo™ TR-600 Battery and Chargers and Technical Data Bulletin #223 on Battery Maintenance for 3M™ Versaflo™ Respirator Systems.

Disposal

▲ WARNING

To reduce the risks associated with fire, explosion, and environmental contamination: Do not dispose of Li-Ion batteries in a fire or send for incineration. Battery packs should be treated as special waste and in accordance with your local environmental regulations.

In the United States and Canada, 3M participates in the Call2Recycle program which provides for 3M PAPR batteries to be dropped off (free of charge) at participating recycling collection sites. Please dispose of batteries according to federal, state, provincial and local regulations.

Used filter/cartridges should be disposed of based on the contaminants collected on it and according to local environmental regulations.

Dispose of holsters in accordance with local and government regulations for the contaminant to which they have been exposed.

The battery chargers and battery adapter contain electronic components. Dispose of according to local and government regulations.

SPECIFICATIONS

Air flow:

Battery Packs:

GVP-111:

- Chemistry: Nickel Cadmium (NiCd)
- Run Time: Approximately 8 hours¹
- Recharge Time: 14-16 hours
- Max Time on Charger: 1 week
- Operating Temperature: 10°F to 120°F (-12°C to 49°C)
- Recharging Temperature: 41°F to 77°F (5°C to 25°C)
- Voltage: 4.8 Volts DC
- Battery Pack Life: Approx. 500-1000 charge cycles²
- Charge Indicator: Indicates recharging required

BP-15:

- Chemistry: Nickel Metal Hydride (NiMH)
- Run Time: Approximately 8 hours¹
- Recharge Time: 2 hours to 90%; 4 hours to 100%
- Max Time on Charger: Store on charger when not in use
- Operating Temperature: 10°F to 120°F (-12°C to 49°C)
- Recharging Temperature: 50°F to 90°F (10°C to 32°C)
- Voltage: 6.25 Volts DC
- Battery Pack Life: Approx. 400 charge cycles²
- Charge Indicator: Recharge required. Battery pack will shut down in 15 minutes

TR-630:

- Chemistry: Lithium Ion
- Run Time: Approximately 9 hours (when used with TR-659 battery adapter)¹
- Recharge Time: Typically less than 3.5 hours
- Max Time on Charger: Battery pack may be stored indefinitely on the charger
- Operating Temperature when used with the GVP PAPR: 10°F to 120°F (-12°C to 49°C)
- Recharge Temperature: Internal battery pack temperature must be between 32°F (0°C) to 104°F (40°C) when charging
- Voltage:
 - TR-630 battery pack: nominal 11.1 Volts DC
 - TR-630 battery pack with TR-659 battery adapter: 6.0 Volts DC
- Battery pack life: 250 full capacity charge/discharge cycles while maintaining 80% of the original charge capacity over the course of the first year of service when used under recommended conditions²
- Charge Indicator: Recharge required. Battery pack will shut down in 15 minutes.

¹ Clean filter and new, fully charged battery pack.

² Will vary depending on conditions of use, recharging and storage.

<p>Chargers:</p> <ol style="list-style-type: none"> GVP-112: <ul style="list-style-type: none"> Input: 110-120 Volts AC Output: 7.5 VDC; 0.75 A BC-210: <ul style="list-style-type: none"> Input: 100-220 VAC Output: 12 VDC; 4 A TR-641N (TR-941N Power Supply): <ul style="list-style-type: none"> Input: 100-240V; 50-60 Hz; 1.5A Output: 19V; 2.37A TR-644N (TR-944N Power Supply): <ul style="list-style-type: none"> Input: 100-240V; 50-60 Hz; 2A Output: 19V; 7.89A
<p>Approximate Weights:</p> <ol style="list-style-type: none"> GVP PAPR: 1.1 lbs (0.5 kg) GVP PAPR with HE filter: 1.6 lbs (0.72 kg) GVP PAPR with OV cartridge: 2.6 lb (1.2 kg) GVP PAPR with AG cartridge: 2.9 lbs (1.3 kg) GVP PAPR with OV/HE cartridge: 3.1 lbs (1.4 kg) GVP PAPR with AG/HE cartridge: 3.4 lbs (1.5 kg) GVP PAPR with OV/AG cartridge: 2.6 lbs (1.2 kg) GVP PAPR with OV/AG/HE cartridge: 3.1 lbs (1.4 kg) GVP-111 battery pack: 2.5 lbs (1.1 kg) BP-15 battery pack: 1.8 lbs (0.83 kg) TR-630 battery pack with TR-659 adapter: 1.3 lb (0.6 kg)
<p>PAPR System:</p> <ol style="list-style-type: none"> Noise Level (excluding exterior noise): Less than 80 dBA Operating Temperature: 10°F to 120°F (-12°C to 49°C) Estimated Motor Life: 2000 hours dependent on use conditions
<p>Intrinsic Safety:</p> <ul style="list-style-type: none"> GVP PAPR Assembly with GVP-111 battery pack is tested and classified intrinsically safe by UL for Division 1, Class I; Group D, Class II, Groups E, F, G and Class III. If the GVP-111 battery pack case is compromised or cracked, or if the rubber switch boot is damaged or missing, the battery pack should no longer be considered intrinsically safe. GVP PAPR Assembly with BP-15 battery pack is NOT intrinsically safe GVP PAPR Assembly with TR-630 battery pack is NOT intrinsically safe

Assigned Protection Factors (APF)

Refer to the *User Instructions* for the specific headgear to be used to determine the assigned protection factor for the GVP PAPR system. Consult 3M Technical Data Bulletin #175 for further information on APFs and supporting test data.

HE Filter Service Life

The HE filter must be changed when the air flow as shown by the air flow indicator falls below 6 cfm or the HE filter becomes excessively dirty, damaged, or wet.

Chemical Cartridge Service Life

Service life for chemical cartridges will vary depending on the contaminant, concentration and environmental conditions (temperature, humidity). The 3M Service Life Software can help estimate service life for chemical cartridges.

COMPONENTS, ACCESSORIES AND REPLACEMENT PARTS

GVP-1: Includes GVP-100 motor/blower, GVP-111 battery, GVP-112 charger, GVP-127 web belt, GVP-113 flow meter, GVP-181 L-Series flow adapter, GVP-110 power cord and GVP-115 plugs

GVP-1U: GVP-1 with GVP-117 urethane belt

GVP-CB: GVP-1 with CB-1000 comfort belt

GVP-1 Intrinsically Safe System

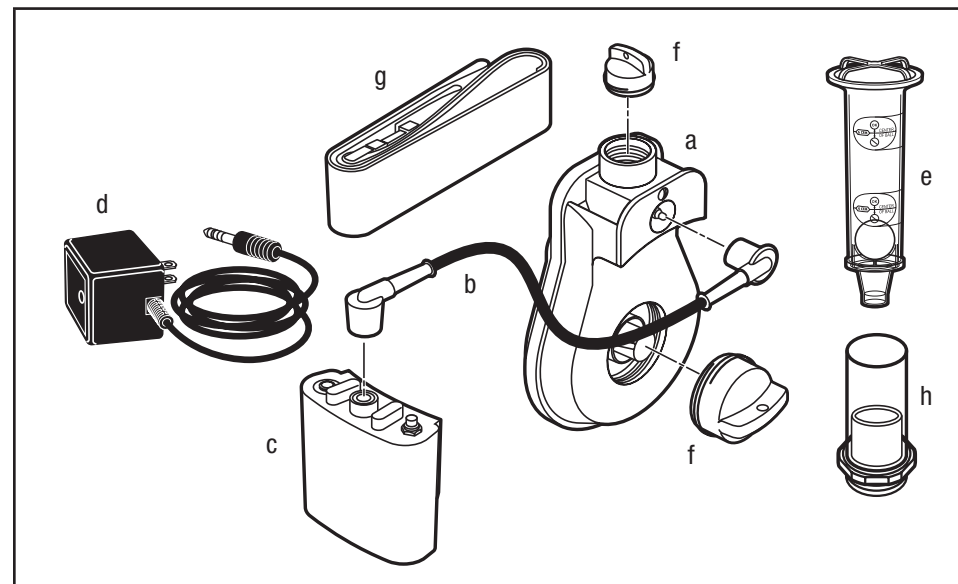
- PAPR Unit (Motor/Blower) GVP-100
- Power Cord GVP-110
- Battery Pack GVP-111
- Charger GVP-112
- Flow Meter GVP-113
- Blower Plugs GVP-115 (inlet and outlet)
- Web Belt GVP-127
- Flow Meter Adapter L-181

GVP Series Assemblies Not Shown:

GVP-1U: GVP-1 with Urethane Waist Belt GVP-117
GVP-CB: GVP-1 with Comfort Belt CB-1000

GVP optional parts not shown:

- Urethane Waist Belt GVP-117
- Urethane Shoulder Strap GVP-118
- Web Shoulder Strap GVP-128
- Comfort Belt CB-1000
- Spark Arrest Cover GVP-146
- Adapter V-199 for approved BT series breathing tubes



Filters/Cartridges

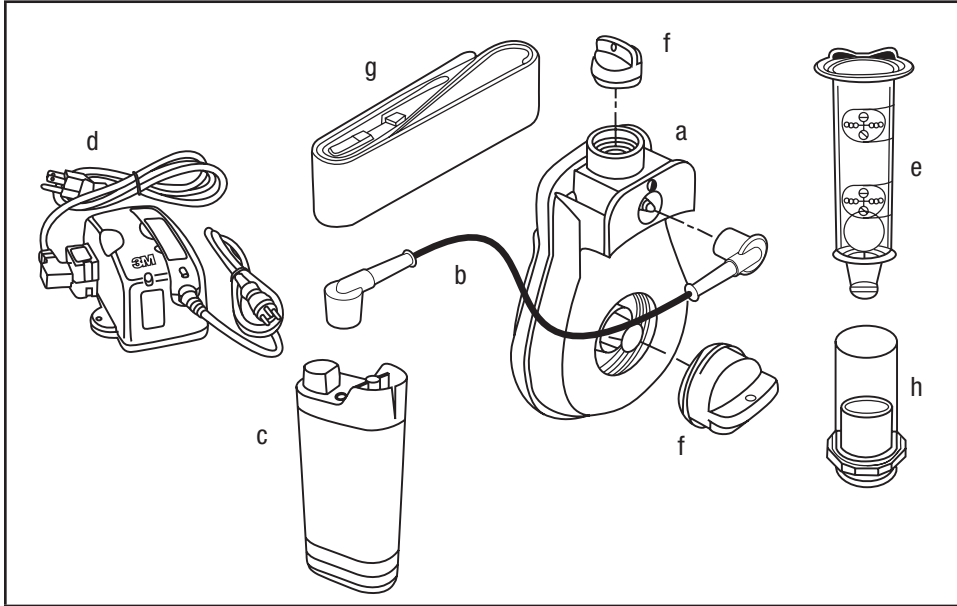
- | | |
|---------|---|
| GVP-441 | Organic Vapor/HE (OV/HE) |
| GVP-442 | Acid Gas/HE (HC/CL/SD/CD/HF/HE) |
| GVP-443 | Organic Vapor/Acid Gas/HE (OV/HC/CL/CD/SD/HF/HS/HE) |
| GVP-444 | Ammonia/Methylamine/HE (AM/MA/HE) |
| GVP-445 | Formaldehyde/HE (FM/HE) |
| GVP-440 | High Efficiency (HE) |

GVP-1 with NiMH Non Intrinsicly Safe System

- PAPR Unit (Motor/Blower) GVP-100
- Power Cord GVP-210
- Battery Pack BP-15
- Charger BC-210 (Discontinued)
- Flow Meter GVP-113
- Blower Plugs GVP-115 (inlet and outlet)
- Web Belt GVP-127
- Flow Meter Adapter L-181

GVP optional parts not shown:

- Urethane Waist Belt GVP-117
- Urethane Shoulder Strap GVP-118
- Web Shoulder Strap GVP-128
- Comfort Belt CB-1000
- Spark Arrest Cover GVP-146
- Adapter V-199 for approved BT series breathing tubes



Filters/Cartridges

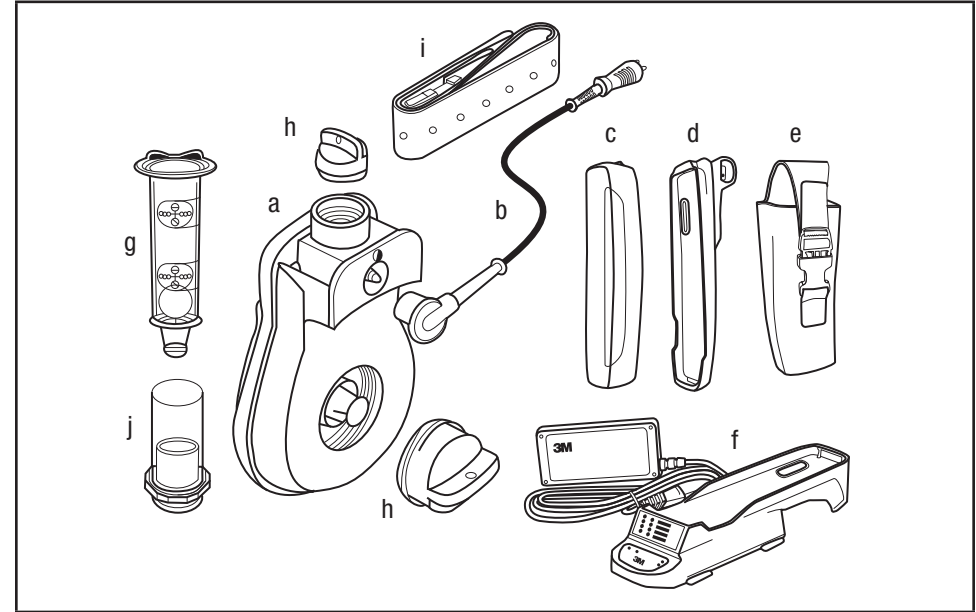
- | | |
|---------|---|
| GVP-441 | Organic Vapor/HE (OV/HE) |
| GVP-442 | Acid Gas/HE (HC/CL/SD/CD/HF/HE) |
| GVP-443 | Organic Vapor/Acid Gas/HE (OV/HC/CL/CD/SD/HF/HS/HE) |
| GVP-444 | Ammonia/Methylamine/HE (AM/MA/HE) |
| GVP-445 | Formaldehyde/HE (FM/HE) |
| GVP-440 | High Efficiency (HE) |

GVP Assembly with Li-Ion Battery: Non Intrinsicly System

- PAPR Unit (Motor/Blower) GVP-100
- Power Cord GVP-610
- Battery Pack TR-630
- Battery Adapter TR-659
- Heavy Duty Holster TR-656
- Charger TR-641N
- Flow Meter GVP-113
- Blower Plugs GVP-115 (inlet and outlet)
- High Durability Belt TR-326
- Flow Meter Adapter L-181

GVP optional parts not shown:

- Spark Arrest Cover GVP-146
- Adapter V-199 for approved BT series breathing tubes
- Easy Clean Holster TR-657
- Urethane Waist Belt GVP-117
- Web Belt GVP-127
- Comfort Belt CB-1000



Filters/Cartridges

- | | |
|---------|---|
| GVP-441 | Organic Vapor/HE (OV/HE) |
| GVP-442 | Acid Gas/HE (HC/CL/SD/CD/HF/HE) |
| GVP-443 | Organic Vapor/Acid Gas/HE (OV/HC/CL/CD/SD/HF/HS/HE) |
| GVP-444 | Ammonia/Methylamine/HE (AM/MA/HE) |
| GVP-445 | Formaldehyde/HE (FM/HE) |
| GVP-440 | High Efficiency (HE) |

TROUBLESHOOTING

Use the table below to help identify possible causes and corrective action for problems you may experience.

Problem	Possible Cause	Corrective Action
You smell or taste contaminants or an irritation occurs	Misuse, improper assembly or malfunction of equipment.	Leave work area immediately and contact your supervisor. Do not use the PAPR until the cause is identified and corrected.
Dizziness occurs	Gases or vapors broke through the chemical cartridge. The gas and vapor cartridge being used is incorrect for your workplace contaminants. Airflow too low. Inlet and outlet gaskets are in poor condition.	Leave work area immediately. Change gas and vapor cartridge. Refer to respirator decision logic such as ANSI Z88.2-1992 or 3M respirator selection guide or consult an industrial hygienist. Perform an airflow check and troubleshoot if PAPR fails airflow test. Replace gaskets.
GVP-111 battery pack recharge light remains "on"	The charger has malfunctioned. The battery has a dead cell(s).	Replace charger and charge battery. Replace battery pack.
Blower does not run when switch is depressed	Battery is discharged. Power cord disconnected. Faulty power switch. Faulty power cord. Faulty motor.	Leave work area immediately. Recharge battery. Secure the power cord to the motor blower and battery. Replace battery pack. Replace power cord. Replace motor blower.
PAPR fails airflow test	Clogged filter. Battery pack needs charging. Inlet and/or outlet gaskets are worn/damaged or missing. Motor blower malfunction. Breathing tube restricted.	Replace filter. Charge battery. Inspect and replace if necessary (GVP-101). Replace motor blower unit (GVP-100). Remove restriction.
BP-15 battery pack does not work after charging	Low voltage detection circuit has not reset.	Recharge for short period of time.
BC-200 or BC-210 does not work, charge adapter indicator is steady yellow	BP-15 battery pack is too hot or too cold for charging. Incorrect battery pack is connected to the charger.	Allow battery pack and charger temperatures to moderate to between 50°F (10°C) and 90°F (32°C). Select the correct charger for the battery.
BC-200 or BC-210 does not work, power base indicator is steady yellow	Too many chargers are chained together. The maximum number allowed is ten (10).	Remove excess chargers.
BC-200 or BC-210 does not work, no lights illuminated on power base or charge adapter	Fuse on power base has blown.	Determine cause of the blown fuse and replace with like fuse.
BC-200 or BC-210 does not work, the charge adapter indicator is red or is not illuminated	Incorrect battery pack is connected to the charger. The BC-210 is only to be used with the BP-15 battery pack.	Select the correct charger for the battery pack.

For troubleshooting of the TR-630 Battery and available chargers please refer to Refer to the *User Instructions* for 3M™ Versaflo™ Battery and Chargers TR-600 and Technical Data Bulletin #223 on Battery Maintenance for 3M™ Versaflo™ Respirator Systems.

For troubleshooting of the TR-659 battery adapter please refer to the TR-659 battery adapter *User Instructions*.

IMPORTANT NOTICE

WARRANTY: In the event any 3M™ PSD Product is found to be defective in material, workmanship, or not in conformance with any express warranty for a specific purpose, 3M's only obligation and your exclusive remedy shall be, at 3M's option, to repair, replace or refund the purchase price of such parts or products upon timely notification thereof and substantiation that the product has been stored, maintained and used in accordance with 3M's written instructions.

EXCLUSIONS TO WARRANTY: THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHER WARRANTY OR CONDITION OF QUALITY, EXCEPT OF TITLE AND AGAINST PATENT INFRINGEMENT.

Limitation of Liability: Except as provided above, 3M shall not be liable or responsible for any loss or damage, whether direct, indirect, incidental, special or consequential, arising out of sale, use or misuse of 3M PSD products, or the user's inability to use such products. THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

3M BC-210 and BP-15

Smart Battery Charger BC-210 and Battery Pack BP-15

User Instructions

IMPORTANT: *Keep these User Instructions for reference*



WARNING

This product is part of a respiratory protection system that helps protect against the contaminants. **Misuse may result in sickness or death.**

IMPORTANT SAFETY INSTRUCTIONS

When using electrical products, basic precautions should always be practiced including the following:

1. READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
2. Read and follow all instructions that are on the product or provided with the product.
3. For a cord-connected or direct plug-in power unit, do not use an extension cord.
4. For a cord-connected or direct plug-in power unit, do not install or use within 10 feet of a swimming pool.
5. For a cord-connected or direct plug-in unit, do not use in a bathroom.

SAVE THESE INSTRUCTIONS – This manual contains important safety and operating instructions for power units.

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Requester: Farrel Allen Creator: deZinnia File Name: 34870234761.indd Structure #: SS-13998 Date: 4/13/09	Printed Colors – Back:
	Match Colors:
Scale:	This artwork has been created as requested by 3M. 3M is responsible for the artwork AS APPROVED and assumes full responsibility for its correctness.

Intended Use

The 3M™ Smart Battery Charger BC-210 is intended to charge the 3M™ Battery Pack BP-15 for use with the 3M™ Breathe Easy™ Belt-Mounted Turbo or 3M™ GVP PAPR Unit.

List of Warnings and Cautions within these User Instructions

WARNING

This product is part of a respiratory protection system that helps protect against certain airborne contaminants. **Misuse may result in sickness or death.**

If the red light on the 3M™ Battery Pack BP-15 comes on, immediately leave the work area and recharge the battery.

Charge battery only in clean, well-ventilated, non-hazardous locations.

Charge 3M™ Battery Pack BP-15 only with 3M™ Smart Battery Charger BC-210. Battery should be connected to the 3M™ Smart Battery Charger BC-210 when not in use.

For infrequently used batteries, or batteries for long-term storage (longer than 3 months), the recommended method of storage is to leave the battery connected to the charger.

If stored off the charger, fully charge battery prior to storing and recharge once every three months if not used sooner.

Battery should not be left in a discharged state. Recharge battery immediately after use.

Do not allow water to enter battery case.

Sealed unit-do not disassemble.

Must be recycled or disposed of properly. Do not incinerate.

Do not open or permit water to enter this case.

No field serviceable parts inside case.

Charge battery only in clean, well-ventilated, non-hazardous locations.

For indoor use only.

Replace defective cords immediately.

There are no field-serviceable parts inside the smart battery charger. Do not attempt to open the charger case or expose the charger to moisture. **Doing so may result in serious bodily injury or death due to electrical shock.**

Failure to follow these *User Instructions* may cause electric shock, fire or explosion and result in injury or death. Do not couple more than 10 charger units at one time.

Do not clean with solvents. Cleaning with solvents may degrade some components and reduce effectiveness. Inspect all components before each use to ensure proper operating conditions. **Failure to do so may result in sickness or death.**

Failure to conduct an inspection and complete all necessary repairs before use may adversely affect performance and result in sickness or death.

Failure to comply with the above instructions may cause electric shock, fire or explosion or could adversely affect respirator performance and result in personal injury, sickness or death.

Important

Before use, the wearer must read and understand these *User Instructions*, the *User Instructions* for the intended Powered Air Purifying Respirator (PAPR) and the *User Instructions* for the intended headgear. Keep these *User Instructions* for reference.

Definitions of Product Icons

- Attention, consult ACCOMPANYING DOCUMENTS
- Dangerous voltage
- "Attention, consult ACCOMPANYING DOCUMENTS"
- "On" symbol – Turn system ON
- "Standby" symbol – Place system in Standby
- Charge Status of Battery
- Do not throw in trash. Dispose of product as directed by local, regional and national waste regulations.

Specifications

Weight	BC-210 Smart Battery Charger (BC-100 and BC-210A CAM Module): Approximately 1.7 lb (771 g) Battery pack (NiMH): Approximately 1.8 lb (830 g)
Battery Charging Temperature	50°F to 90°F (10°C to 32°C)
Storage Temperatures	Battery Pack The recommended dry storage conditions (less than 85% relative humidity) for the battery is -4°F to 115°F (-20°C to 45°C). Storage of the battery outside this range will shorten the usable life of the battery. Avoid prolonged storage at temperatures above 120°F (49°C).

- 3M™ Battery Pack BP-15 provides up to 400 charge/discharge cycles. At 5 charge/discharge cycles per week (1 per shift), this equals an estimated life expectancy of approximately two (2) years. However, the life of 3M batteries will be significantly reduced when they are exposed to high heat over an extended period of time. Contact 3M Technical Service for additional guidance. To maximize battery life, these guidelines should be followed:
 - 3M™ Battery Pack BP-15 may be charged any time during the discharge cycle. Battery memory (also known as voltage depression) is not a significant factor in PAPR applications.
 - The 3M™ Battery Pack BP-15 may remain connected to the BC-210 charger for an extended period of time. The 3M™ Smart Battery Charger BC-210 will trickle charge the BP-15 battery to overcome normal charge loss. This is the recommended storage method for maximum battery performance.
 - Do not allow water to enter the battery housing, as this will damage the battery assembly.
 - Always charge 3M™ Battery Pack BP-15 at a temperature between 50°F (10°C) and 90°F (32°C). Beyond this range, the battery may not accept a full charge. If a battery feels hot, let it cool for 1/2 hour before charging. Do not stack batteries together or on top of charger during charging. Do not charge in an enclosed cabinet. Heat from chargers and batteries must be allowed to dissipate. If you try to charge a battery that is too hot, the charge adapter will indicate yellow and charging will not begin until the battery has cooled.
 - 3M™ Battery Pack BP-15 stored at room temperature loses approximately 2% of its charge per day after charging. The rate of self-discharge will increase as storage temperature increases. For infrequently used batteries or batteries in storage, 3M recommends they be fully charged immediately upon receipt and then stored connected to the charger. Batteries stored off the charger should be fully charged, initially, then fully charged once every three months of non-use to maintain charge. Batteries should not be subjected to prolonged storage without regular charge/discharge cycling. Prolonged storage with out regular charge/discharge cycling may damage the battery cells.
 - You can check battery capacity by running the PAPR motor/blower unit with the airflow indicator installed and recording the time until the airflow falls below six cfm. See the "User Performance Check" section in the appropriate 3M™ PAPR assembly *User Instructions* for details. Two or three charge/run-down cycles may restore battery capacity for batteries that have been in prolonged storage.

Cleaning, Inspection, and Storage

Follow the hygiene practices established by your employer for the specific contaminants to which you have been exposed.

WARNING

Do not clean with solvents. Cleaning with solvents may degrade some components and reduce effectiveness. Inspect all components before each use to ensure proper operating conditions. **Failure to do so may result in sickness or death.**

Cleaning

Solvents should not be used to clean the battery pack or smart battery charger. Liquid solvents may chemically weaken the plastic. Use the following suggested procedures for cleaning:

1. Wipe the battery pack and smart battery charger with a mild cleaning solution.
2. Do not immerse the battery pack or smart battery charger into any type of liquid.
3. If the adapter module is removed to clean the power base unit, only compressed air dusters should be used. Aggressive cleaning of the power base or adapter module may damage electrical contacts and cause the charger to malfunction.

Inspection

WARNING

Failure to conduct an inspection and complete all necessary repairs before use may adversely affect performance and result in sickness or death.

1. Inspect the power base and adapter module for cracks or other damage.
2. Inspect the power cord and charging lead for frayed wires or other damage. Replace if necessary.
3. Inspect the 3 pins on the charging lead. The slot in each pin should be of uniform width from top to bottom. If the pin slots show signs of narrowing, unplug the charger from its power source. A small, thin tool such as a feeler gauge can be used to gently reopen the slots to a uniform width.

Storage

Store your batteries and chargers at room temperature in a dry area that is protected from exposure to hazardous contaminants.

Fuse Replacement

CAUTION – FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE WITH THE SAME TYPE AND RATING OF FUSE, 250VAC, 8A. DISCONNECT POWER BEFORE REPLACING FUSE.

To replace the fuse in the smart battery charger, disconnect any batteries attached to the charger and the power cord from the power base. Locate the fuse cover on the power base where the power cord is attached and pry the fuse cover out with a blunt object. Remove the fuse from the plastic clip and replace with the spare located in the cover. Snap the fuse cover back in place and reconnect the power cord. For additional replacement fuses, contact the 3M Service Center.

WARNING

Not for use in environments requiring intrinsic safety.

If the red light on the 3M™ Battery Pack BP-15 comes on, immediately leave the work area and recharge the battery.

Charge battery only in clean, well-ventilated, non-hazardous locations.

Charge 3M™ Battery Pack BP-15 only with 3M™ Smart Battery Charger BC-210. Battery should be connected to the BC-210 charger when not in use.

For infrequently used batteries, or batteries for long-term storage (longer than 3 months), the recommended method of storage is to leave the battery connected to the charger.

If stored off the charger, fully charge battery prior to storing and recharge once every 3 months if not used sooner.

Battery should not be left in a discharged state. Recharge battery immediately after use.

Do not allow water to enter battery case.

Sealed unit-do not disassemble.

Must be recycled or disposed of properly. Do not incinerate.

Failure to comply with the above instructions may cause fire or explosion or could adversely affect respirator performance and result in personal injury, sickness or death.

Use of the Battery Pack:

The 3M™ Battery Pack BP-15 should be placed on the 3M™ Smart Battery Charger BC-210, and fully charged immediately upon receipt. It may take up to 3 charge/discharge cycles for new batteries to reach full capacity. The battery can be discharged by connecting to the motor-blower and running until air flow starts to diminish. Do not short circuit the battery to discharge it.

- The 3M™ Battery Pack BP-15 has a red indicator light, located on the top of the battery by the switch. The red light indicates that the battery has reached a point that it must be recharged. The battery has a low-voltage detection circuit that will engage shortly after the red light comes on. When it engages, the battery will shut down and the turbo will stop running. **Therefore, when the red light comes on, immediately leave the work area and recharge the battery.** **Note:** If the battery has been run down enough to engage the low voltage detection circuit, the red light will no longer function until the battery has been recharged.
- Charge the 3M™ Battery Pack BP-15 only with the 3M™ Smart Battery Charger BC-210.
- Operational time of battery will be reduced as the operating temperature goes down.
- To properly dispose of the 3M™ Battery Pack BP-15, follow local solid waste disposal regulations.

Charging the Battery Pack:

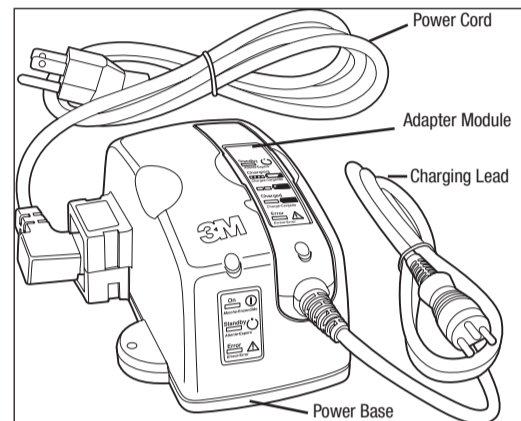


Fig. 1 3M™ Smart Battery Charger BC-210

NOTE: Because 3M™ Smart Battery Charger BC-210 may produce radio frequency energy, 3M is providing the following information pursuant to FCC regulations.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two 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.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Troubleshooting

Use the table below to help identify possible causes and corrective actions for problems you may experience.

Problem	Probable Cause	Corrective Action
Battery does not work after charging.	Low voltage detection circuit has not reset.	Recharge for short period of time.
BC-210 does not work, charge adapter indicator is steady yellow.	Battery is too hot or too cold for charging. Incorrect battery is connected to the charger.	Allow battery and charger temperatures to moderate to between 50°F (10°C) and 90°F (32°C). Select the correct charger for the battery.
BC-210 does not work, power base indicator is steady yellow.	Too many chargers are chained together. The maximum number allowed is ten (10).	Remove excess chargers.
BC-210 does not work, no lights illuminated on power base or charge adapter.	Fuse on power base has blown.	Determine cause of the blown fuse and replace with like fuse.
BC-210 does not work, the charge adapter indicator is red or is not illuminated.	Incorrect battery is connected to the charger. The BC-210 is only to be used with the BP-15 battery. Slots in charging lead pins have narrowed.	Select the correct charger for the battery. Use feeler gauge or similar flat, thin tool to gently respread pin slots.
Intermittent operation of the PAPR.	Slots in pins on charging lead are narrowed.	Gently reopen the slots with a feeler gauge or similar tool.
Frequent incomplete charging or battery pack does not reach full charge (solid green light does not come on).	Slots in pins on charging lead are narrowed.	Gently reopen the slots with a feeler gauge or similar tool.
Use of 520-01-61, 520-01-61SGL, 520-01-61FV, 520-03-72, 520-03-73 or 521-01-43 battery charger does not work, but is not defective.	Incorrect battery is connected to the charger. These chargers are to be used only with the 520 01 15, 520-01-17 and BP 171S batteries.	Select the correct charger for the battery.

WARNING

Do not open or permit water to enter this case.

No field serviceable parts inside case.

Charge battery only in clean, well-ventilated, non-hazardous locations.

For indoor use only.

Replace defective cords immediately.

Failure to comply with the above instructions may cause electric shock, fire or explosion and result in sickness or death.

- Before use of a new 3M™ Smart Battery Charger BC-210, the plastic protective cover must be removed from between the power base and the adapter module. Verify that the smart battery charger is unplugged from any wall outlet. Remove the plastic protective cover by pulling the adapter module straight up out of the power base and removing the plastic protective cover. Replace the adapter module in the power base by pushing it straight down into the power base, aligning the guide slots. The adapter module should not be routinely removed. Repeated removal may damage the electrical contacts in the power base.
- Plug the receptacle end of the charger power cord into the side of the 3M™ Smart Battery Charger BC-210 and the prong end of the power cord into an appropriate electrical outlet (Fig. 1). The charger will automatically detect and self-adjust to input voltages of 100 to 240 volts and frequencies of 50 to 60 Hz.
- Check the LED on the power base (on the left) to determine the status of the charger. See the "Troubleshooting" section.

Power Base Status	LED Status
Power is ok, ready to start charging	Steady green
Excess current, not ready to charge	Steady yellow
Too hot	Steady red

- Insert the charging lead into the charging socket on the top of the 3M Battery Pack BP-15. The LED indicator on the adapter module (on the right) shows the status of the charging process.

Charger Status	LED Status
Power ON	Momentary (single) flash green
Standby; Waiting to charge	Steady yellow
Rapid charging	Rapid flashing green
Top-off charge	Slow flashing green
Charge complete; Ready mode	Steady green
Battery fault	Steady red*

*NOTE: If a charger indicates a battery fault error, unplug and wait 5 minutes before plugging the charger into another battery or the same battery.

WARNING

There are no field-serviceable parts inside the smart battery charger. Do not attempt to open the charger case or expose the charger to moisture. **Doing so may result in serious bodily injury or death due to electrical shock.**

- The 3M™ Smart Battery Charger BC-210 can be connected (up to ten chargers) to produce a multi-station charger. To connect, first make sure that the charger power cord is unplugged from the electrical outlet. Remove the socket cover from the BC-210 and save for later use. From the bottom of the BC-210 in the semi-circle area remove the screw. Slide male connection on the left of the charger into the female connection on the right side of the other charger. Insert and tighten the screw in the hole from which it was removed. This should now make an assembly of the BC-210s. Add additional 3M™ Smart Battery Charger BC-210 in the same manner up to a maximum of ten (10) chargers total. **When ten (10) chargers are assembled the maximum rated current draw is 6.0 amps. The maximum current rating for a single charger is 0.60 amps.**
- The 3M™ Smart Battery Charger BC-210 adapter module unit should not be regularly removed from the power base. Frequent removal of the adapter module may damage electrical contacts in the power base and cause the charger to malfunction.
- The 3M™ Smart Battery Charger BC-210 should be used in a clean atmosphere free of particulates or other contamination. Particles deposited in between the adapter module and the power base may interfere with proper function of the charger. If the adapter module is removed to clean the power base unit, only compressed air dusters should be used. Aggressive cleaning of the power base or adapter module may damage electrical contacts and cause the charger to malfunction.

WARNING

Failure to follow these *User Instructions* may cause electric shock, fire or explosion and result in injury or death. Do not couple more than 10 charger units at one time.