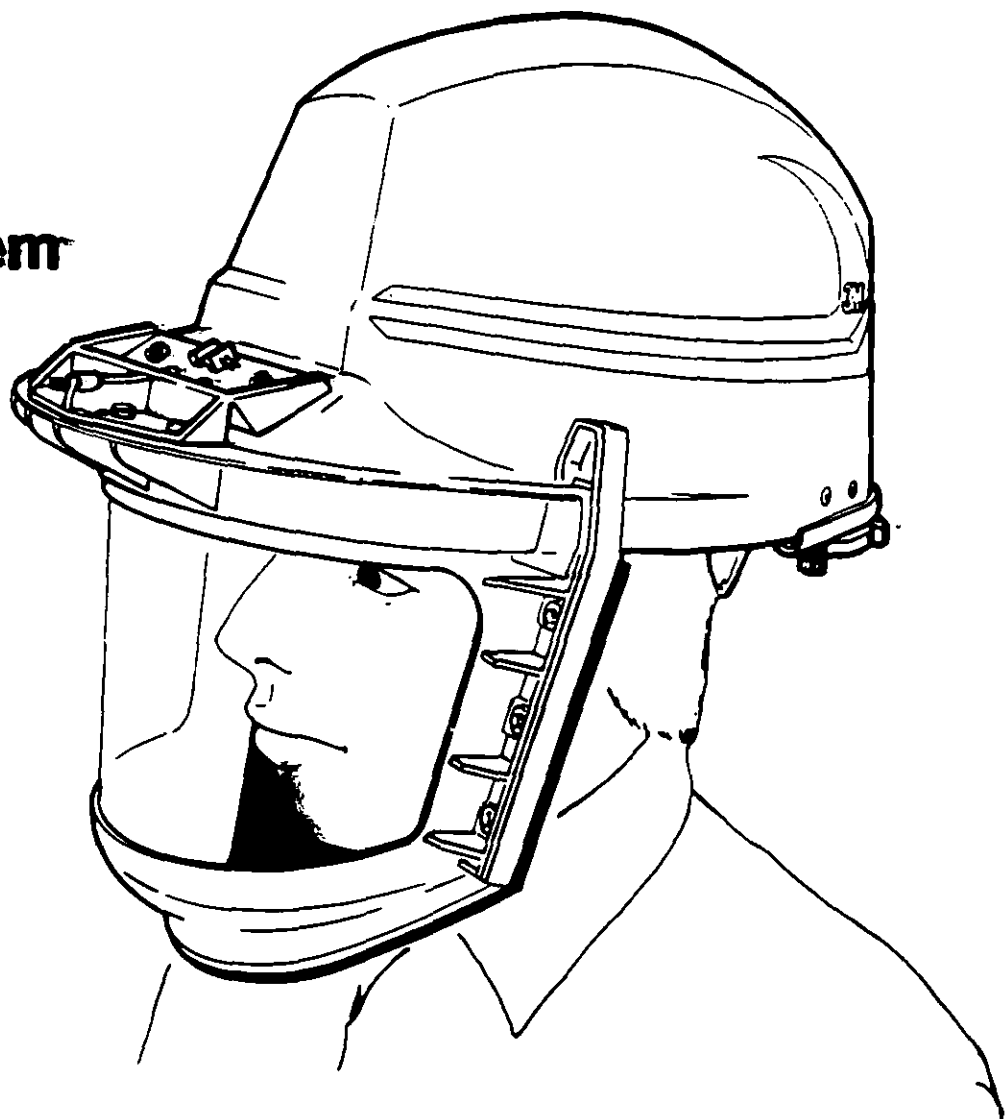


Operating and Maintenance Instructions

Product Part Number 78-8025-5154-5

**3M Brand
Airhat System
W-316**



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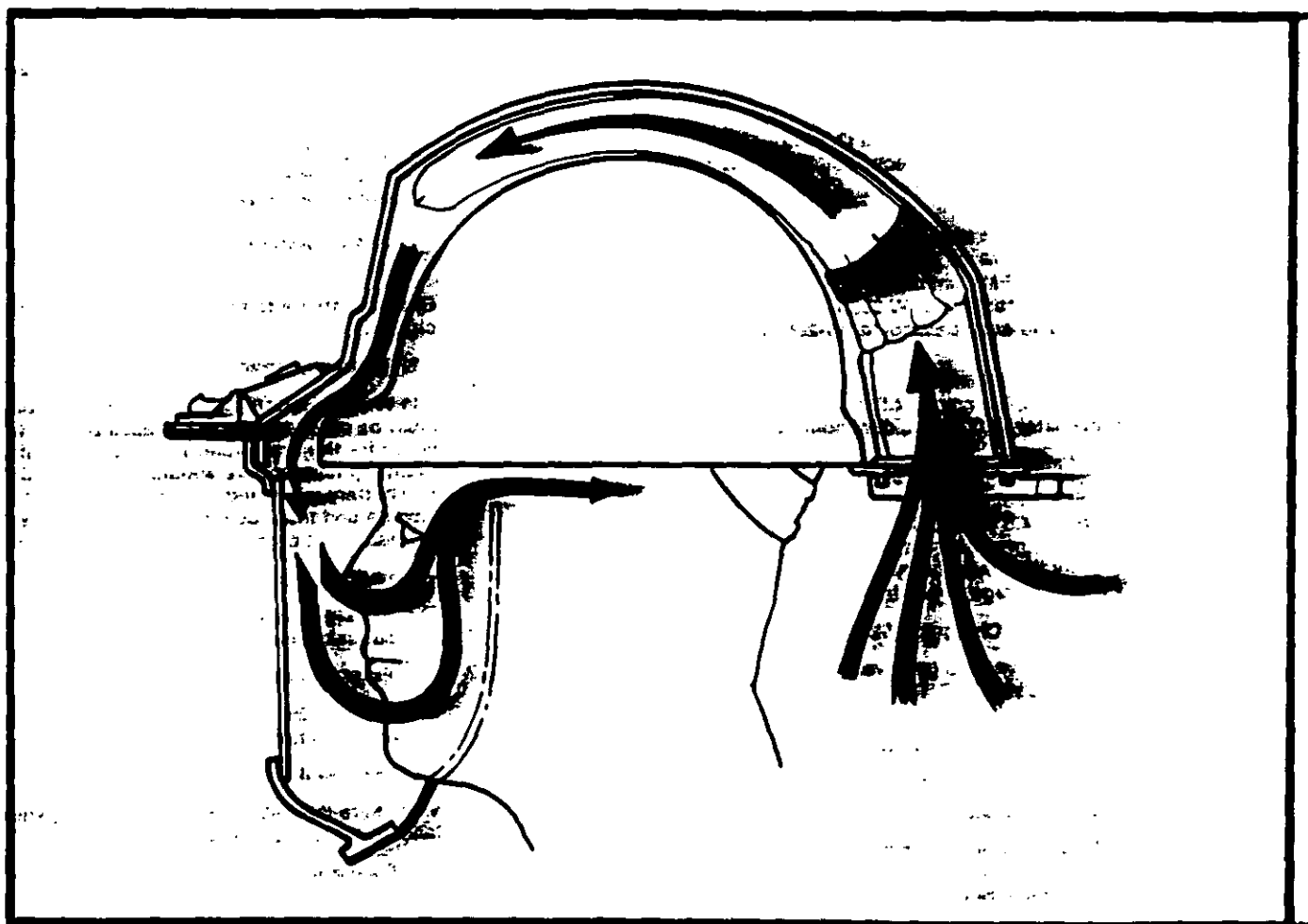


Figure 1-1.

Section 1 Introduction

1-1. Warning-

The 3M W-316 Airhat System should be used only by qualified persons properly trained in its use and maintenance, in accordance with these operating and maintenance instructions. Each person who will be using the Airhat should read and understand this entire operating and maintenance instruction manual first. Use of the Airhat by untrained or unqualified persons, or use not in accordance with these instructions, can be dangerous.

1-2. General Description-

The 3M W-316 Airhat System provides head, eye, and respiratory protection in one comfortable, light weight, easy-to-use package. The Airhat allows total mobility. There are no cumbersome air hoses or backpacks to get in the way. The Airhat eliminates the need to wear individual hardhats, safety goggles, and respirators.

The 3M W-316 Airhat System consists of an inner helmet shell and an outer helmet shell. Between the two helmet shells is mounted an axial fan and filter assembly. A hinged face shield is attached to the outer helmet shell and can be latched in the up or down position. A soft, flexible face seal on the face shield frame provides a good fit to the wearer's face when the face shield is latched in the down position.

The fan motor is powered by a small, lightweight nickel-cadmium battery pack worn on a belt around the waist. When fully charged, the battery pack provides enough power for at least ten hours use. The battery pack is recharged with the charger provided. A full charge requires at least fourteen hours. The battery pack cannot be overcharged. No harm is done to the battery pack if it is connected to the charger continuously.

1-3. Principle of Operation (See Figure 1-1)

Air is drawn through the pre-filter at the back of the helmet. The pre-filter stops the larger particles, helping to protect the fan and motor and prolonging the life of the main filter. Air from the fan then passes through the main filter, is channeled between the inner and outer helmet shells, and flows down over the face, creating a comfortable, cooling effect. The air exits around the temple area between the inner shell and the wearer's head.

Again, it is extremely important that each and every Airhat user read and understand this entire manual first. Use of this product other than specified within this manual could be dangerous to the life and health of the user.

3-6. Head Suspension Adjustment

3-6-1 General: The head suspension system has not been installed in your helmet since each suspension system requires a different adjustment to suit the wearer. This will also make it easier for you to learn about and make the simple adjustments to provide proper fit and wearing comfort before you insert the head suspension into the helmet shell.

The adjustments provided are as follows:

1. Head size — headband adjusts to fit sizes of 6-1/4 to 8.
2. Crown Height and Balance

3-6-4 Head Size Adjustment (See Figure 3-1)

1. Hold suspension system with size adjustment out.
2. Slide headband in or out to desired size and insert size adjustment button in proper hold.
3. Put headband on head. Readjust if necessary.

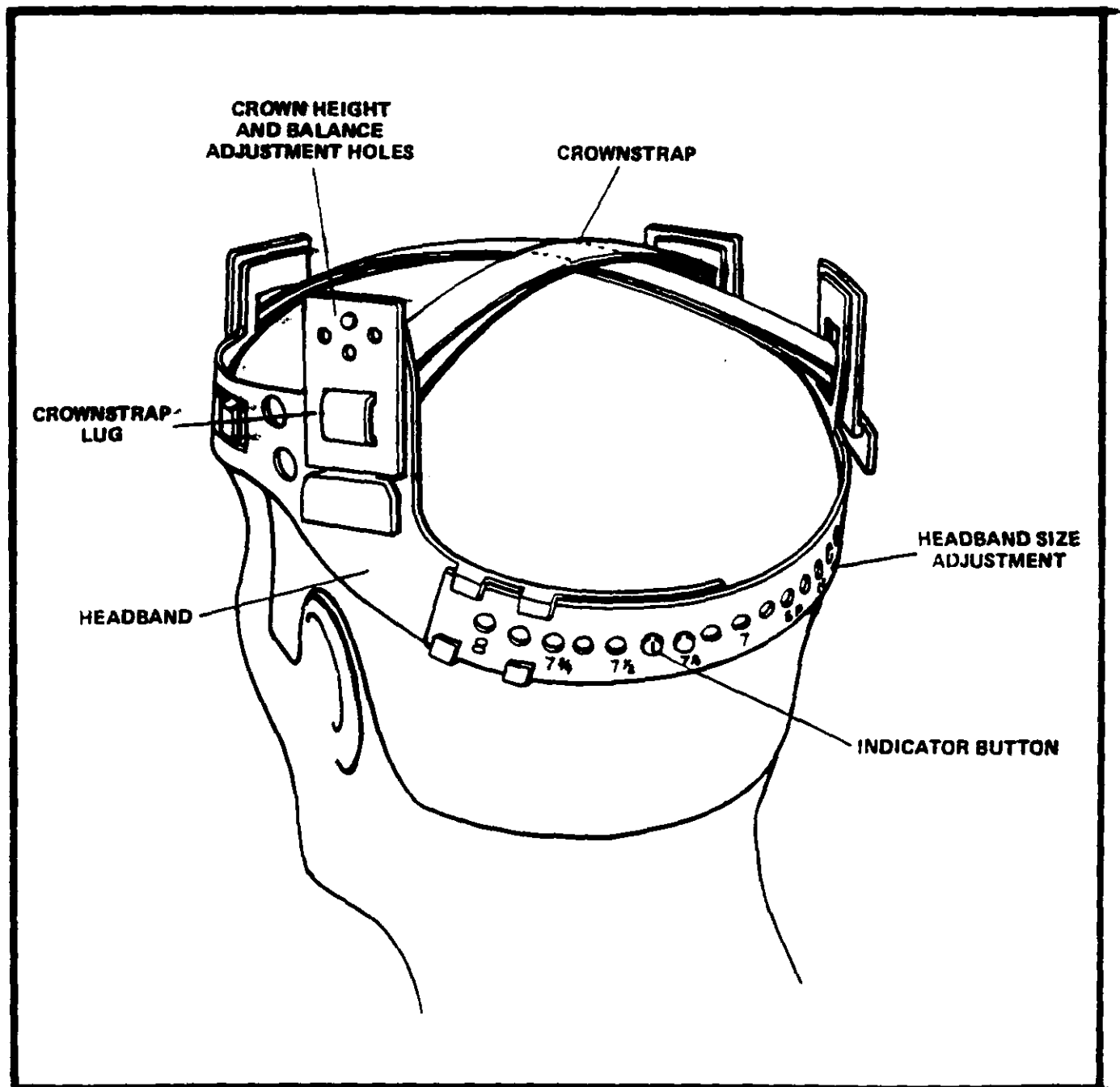


Figure 3-1. Head Suspension System

Section 4 Use and Limitations

4.1. To Use

1. Adjust the waist belt to fit as necessary. Put on the waist belt and battery pack.
2. Place the properly fitted Airhat on your head with the face shield latched in the up position and with the chin strap comfortably under your chin.
3. Start the Airhat by simply connecting the Airhat cord to the battery pack cord. To stop the Airhat, simply grasp the cord connectors and pull apart. Do not pull directly on the cords.
4. Before entering the work area, lower the face shield until it latches firmly in the down position.

4.2. Warning

Not for use by unqualified persons or by persons not properly trained in the Airhat's use and maintenance.

Not for use in any way other than in accordance with the use and maintenance instructions in this manual.

Do not use with any part missing or damaged.

Do not use with parts or accessories other than those manufactured by 3M as specified in this manual.

4.3. Respiratory Protection

The 3M W-316 Airhat System IS NIOSH approved for respiratory protection against:

- a) Dusts (1) having a Permissible Exposure Limit (time weighted average) not less than 0.05 milligrams per cubic meter of air, including, but not limited to, coal, cadmium, chromium, lead, and manganese; or (2) dusts having a Threshold Limit Value (time weighted average) not less than 2 million particles per cubic foot, including, but not limited to, aluminum, flour, iron ore, and free silica.
- b) Mists of materials having a Permissible Exposure Limit (time weighted average) not less than 0.05 milligrams per cubic meter or 2 million particles per cubic foot, e.g., mists produced by spray coating with vitreous enamel, chromic acid mist produced during chromium plating, and other mists of materials whose liquid vehicle does not produce harmful gases or vapors.
- c) Asbestos-containing dusts and mists.

Warning:

1. This powered air purifying helmet does not supply oxygen.
2. Use only in adequately ventilated areas containing at least 19.5% oxygen.
3. Do not use for respiratory protection against gases or vapors.
4. Do not use for respiratory protection when atmospheric concentrations of contaminants are unknown or immediately dangerous to life or health.
5. This powered air purifying helmet does not provide any respiratory or face protection with the face shield other than in the latched down position.
6. Leave work area immediately if:
 - a) Helmet becomes damaged.
 - b) Air flow into helmet stops.
 - c) Breathing becomes difficult.

d) Dizziness or other distress occurs; or

e) You taste or smell contaminants or an irritation occurs.

7. Never alter or modify this helmet.

8. Only for use by trained qualified personnel in accordance with a respirator program as outlined in ANSI Z88.2-1988.

9. Use strictly in accordance with the instructions, labels, and limitations pertaining to this helmet. If you have any doubt about the applicability of the 3M W-316 Airhat System powered air purifying helmet to your job situation, it is recommended you consult an industrial hygienist or call 3M OH&E Technical Service toll free on 1-800-328-1308.

4.4. Head Protection

The 3M W-2940 Airhat powered air purifying helmet passes impact and penetration tests as specified by ANSI Standard Z89.1-1968.

Warning:

1. The W-2940 Airhat does not meet electrical requirements of Z89.1-1988.

2. If helmet is subjected to a severe impact, THE ENTIRE HELMET MUST BE REPLACED, AND THE DAMAGED HELMET MUST BE DESTROYED. The helmet is designed to absorb the shock of an impact through damage or destruction of the outer shell, inner shell, and head suspension. The helmet must be replaced even though any damage may not be readily apparent.

4.5 Eye and Face Protection

The 3M W-2940 Airhat powered air purifying helmet passes eye protection tests as specified by ANSI Standard Z87.1-1968.

Warning:

1. The face shield, face shield frame, and face shield hinge must be inspected for damage before each use. If any cracks, gouges, or other damage is found, the damaged parts must be replaced before using the helmet. Failure to do so could result in serious eye and/or face injury in the event of an accident.
 2. This powered air purifying helmet does not provide any respiratory or face protection with the face shield other than in the latched down position.
 3. The helmet's face shield must not be altered or modified in any way.
 4. Do not use with parts or accessories other than those manufactured by 3M as specified in this manual.
- ### 4.6 Electrical (Intrinsic Safety)
- The W-316 Airhat System has been approved by MSHA (Approval No. 2G-3243) for use in gassy mines and tunnels. The 3M W-2940 Airhat is UL listed as intrinsically safe for use in Class I, Group D and Class II, Groups E, F and G hazardous locations when used with the W-2954 battery pack.

Warning:

The Battery Pack must be charged in fresh air with no combustible vapors present.

Section 8 Battery

8-1. Battery Characteristics

The W-2954 Battery Pack supplied with the Airhat is a nickel-cadmium type and has the following characteristics:

1. Long Operating Life
2. Continuous Overcharge Capability
3. Operation in Any Position
4. Maintenance-Free
5. Long Storage Life
6. Rugged Construction
7. Nearly Constant Discharge Voltage
8. Intrinsically Safe

Long Operating Life

The life expectancy of this battery is dependent on the charge/discharge conditions. It will provide up to 1000 charge/discharge cycles at usage temperatures below 25°C (77°F). Above 25°C, life will be proportionately reduced.

Continuous Overcharge Capability

The W-2954 Battery Pack is designed to accept extended charge periods with no appreciable effect on performance when the 3M W-2933 Charger is used. The normal time to full charge is 14-16 hours. If the battery is left on the charger for extended time periods, a slight decrease in the battery's capacity will occur if the room temperature is greater than 25°C (77°F).

Operation in Any Position

Since the cells are sealed, there is no danger of the electrolyte from spilling out, and consequently, the Battery Pack may be used in any position.

Maintenance-Free

Any gases that may be generated during the charging cycle are recombined within the cell rather than vented, meaning there is no loss of active material or electrolyte.

Long Storage Life

The battery can be stored indefinitely.

Rugged Construction

Due to the design and construction, this battery can tolerate a great amount of shock and vibration which makes it ideal for applications where rough handling and difficult environments are encountered.

Nearly-Constant Discharge Voltage

Since the battery is a nickel-cadmium type, it exhibits a very flat voltage/time curve. This means that the air flow to the user will depend primarily on the degree to which the filter is clogged.

Intrinsically Safe

The W-2954 Battery Pack is designed to be intrinsically safe for use in gassy mines and tunnels in accordance with MSHA and for use in hazardous locations in accordance with the National Electric Code: Class I, Group D, Class II, Groups E, F, and G; and Class III. Intrinsically safe means that the apparatus under normal or abnormal conditions is incapable of releasing sufficient electrical or thermal energy to cause ignition of the atmosphere in the specified hazardous locations.

8-2. Battery Charging

The W-2954 Battery Pack is sent out in a discharged mode and must be charged with the 3M W-2933 Battery Charger for 20 hours for the first cycle and then 14-16 hours thereafter, preferably at a temperature between 5°C and 25°C (41°F and 77°F). The battery will self-discharge over a lengthy period of storage and must be recharged before use. The battery is not harmed if left on continuous charge, but service life may be reduced if charging takes place above 25°C (77°F).

To charge the battery pack:

1. Plug the W-2933 Battery Charger into any convenient 115 Volt AC, 60 Hz socket.
2. Connect W-2954 Battery Pack to the charger.

Warnings

The Battery Pack must be charged in fresh air with no combustible vapors present.

8-3. Battery Service Time

When the W-2954 Battery is charged with the W-2933 Charger for the recommended time of 14-16 hours, service time of the battery before recharge should be at least 10 hours of continuous use.

DO NOT DISCHARGE BY SHORTING THE BATTERY.

8-4. Battery Storage

The Battery Pack can be stored indefinitely at temperatures between -60°C and +50°C (-58°F and 122°F) with no significant degradation in performance, but will require a full recharge before use.

11. Place the motor/filter assembly back into the outer shell.
12. Place the inner shell into the outer shell, hooking the inner shell's front brim into the hook in the outer shell. Make sure both inner and outer shells are properly located in the grooves of the motor/filter assembly.

13. Place a new W-2954 Pre-Filter over the intake opening.

14. Replace the intake cover and screws.

9-3. Face Seal (W-2934)

The face seal should be fastened to the face shield frame throughout its entire length and should have no tears or holes.

To replace face seal, proceed as follows:

1. Remove the old face seal and discard.
2. Make sure no old adhesive is left on the face shield frame. To remove old adhesive, roll it off with your thumb or carefully scrape it off. **DO NOT USE SOLVENTS.**
3. Remove backing from adhesive on new face seal.
4. Carefully place a new face seal on face shield frame, making sure the outer edge of the face seal is flush with the outer edge of the face shield frame. Also, make sure there are no gaps or wrinkles.

9-4. Face Shield (W-2945)

To replace the face shield, proceed as follows:

1. Latch the face shield in the up position.
2. With the helmet upside down, push in on the upper corners of the face shield to disengage from stops and slide it up and out of the face shield frame.
3. Carefully slide new face shield into the frame until it snaps into place. Make sure no gaps are visible between face shield and frame.

9-5. Face Shield Frame Assembly (W-3010)

To replace the face shield frame, proceed as follows:

1. Remove the four nuts and screws holding the frame to the hinge.
2. Remove and discard the old frame.
3. Fasten the new frame to the hinge with the four nuts and screws, but do not tighten.
4. Latch face shield frame in the "down" position to properly align the frame.
5. Tighten screws with face shield frame in the down position.

9-6. Face Shield Hinge (W-2969)

To replace face shield hinge, proceed as follows:

1. Remove inner shell and motor/filter assembly as described in Section 9-2.

2. Remove the four nuts and screws holding the hinge, hinge plate, and shell hook to the outer shell.

3. Remove the face shield frame from the hinge as described in Section 9-5.

4. Reassemble with new hinge by following steps 1 through 3 in reverse order.

9-7. Outer Helmet Shell Assembly (W-2968)

To replace the outer helmet shell, proceed as follows:

1. Remove inner shell and motor/filter assembly as described in Section 9-2.

2. Remove hinge and face shield as described in Section 9-6.

3. Reassemble with new outer shell by following steps 1 and 2 in reverse order.

9-8. Inner Shell (W-2964)

To replace the inner shell, see Section 9-2.

9-9. Blower Assembly (W-2973)

To replace the blower assembly, carefully follow the instructions in the W-2973 Blower Replacement Kit.

Section 10

Cleaning

10-1. Warning:

1. **DO NOT USE SOLVENTS** to clean any part of the Airhat. Solvents may damage or destroy some parts.
2. **DO NOT ATTEMPT TO CLEAN AND REUSE FILTERS.** The filter is designed to be disposable. Any attempt to clean it for reuse will render it ineffective and unsafe for use.

10-2. Cleaning Methods:

The following Airhat parts can be cleaned by immersing or sponging with warm soapy water:

Outer Shell
Inner Shell
Head Suspension
Face Shield
Intake Cover

DO NOT USE ABRASIVE PADS.

The face seal should be sponged clean with warm soapy water and dried completely before use.

The motor/filter assembly should be cleaned with a vacuum cleaner. **DO NOT SPONGE OR IMMERSE.**

If these cleaning methods are not effective for your situation, call OH&SP Technical Service, 1-800-328-1300, for assistance.