Firehawk™ Air Mask

Low/High Pressure

USERS MAINTENANCE INSTRUCTIONS

⚠ WARNING

THIS MANUAL MUST BE CAREFULLY READ AND FOLLOWED BY ALL PERSONS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THIS AIR MASK. This Air Mask will perform as designed only if used and serviced according to the instructions; OTHERWISE IT COULD FAIL TO PERFORM AS DESIGNED, AND PERSONS WHO RELY ON THE AIR MASK COULD SUSTAIN SERIOUS PERSONAL INJURY OR DEATH.

The warranties made by MSA with respect to the product are voided if the product is not installed, used and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions. Please read and observe the WARNINGS and CAUTIONS inside. For any additional information relative to use or repair, write or call 1-800-MSA-2222 during regular working hours.

MSA Safety Products Division • ISO 9001 CERTIFIED Quality System • MSA Instrument Division

For More Information: Call (1-800-MSA-2222) or Visit Our Website at (www.MSAnet.com)

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MINE SAFETY APPLIANCES COMPANY
PITTSBURGH, PENNSYLVANIA, U.S.A. 15230

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INTRODUCTION

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IMPORTANT NOTICE

Note: A thorough understanding of the operation of the air mask is essential before attempting to service or maintain this air mask. A user's instruction manual is supplied with each new air mask. Refer to the User's Instructions for specific user information, such as NIOSH Approval Information, donning and doffing, or cleaning and disinfecting.

1. This SCBA will perform as designed only if used and maintained according to the manufacturer's instructions. You must read and understand these instructions before trying to use or service this product. We encourage our customers to write or call for information on this product before using it.
2. If the SCBA does not perform as specified in this manual, it must not be used until it has been checked by authorized personnel.
3. Do not alter, modify, or substitute any components without the approval of the manufacturer. Such alterations will void the NIOSH approval.
4. Inspect the SCBA regularly and maintain it according to the manufacturer's instructions. Repairs must only be made by properly trained personnel. Any additional repairs NOT covered by this manual must be done only by certified personnel.

For more information on self-contained breathing apparatus use and performance standards, please consult the following publications: NFPA Standard 1500 (1987 Edition), Fire Department Occupational Safety and Health Programs (Chapter 5) and NFPA Standard 1981 (2002 Edition), SCBA Performance. Both publications are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 22269.

ANSI Standard Z88. 5, Practices for Respiratory Protection for the Fire Service; and, ANSI Standard Z88.2, Practices for Respiratory Protection. Both publications are available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

OSHA Safety and Health Standards (29 CFR 1910), (see specifically Part 1910.134), is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

MAINTENANCE AUTHORIZATION

The maintenance procedures authorized in this manual need no special training, although the user must have a thorough understanding of the apparatus. All maintenance procedures are for current designs, unless specified. Additional, advanced training is available. Contact your MSA representative for details.

⚠ WARNING

Do not attempt repairs beyond those specified in this manual. Only trained or certified personnel, authorized by MSA, are permitted to maintain and repair this apparatus. Breathing apparatus must not be repaired beyond the manufacturer's recommendations. 29 CFR Part 1910.134, makes these requirements clear: Replacement or repairs shall be done only by experienced persons with parts designed for the respirator. No attempt shall be made to replace components or to make adjustment or repairs beyond the manufacturer's recommendations. Regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair. Failure to follow these warnings can result in serious personal injury or death.

INTRODUCTION

⚠ WARNING

Do not inspect the apparatus before cleaning if there is a danger of contacting hazardous contaminants. Clean and sanitize first, then inspect. Failure to follow this warning can cause inhalation or skin absorption of the contaminant and result in serious personal injury or death.

Leak testing should be performed when the SCBA fails any of the inspection steps; following disassembly; or, as part of a regularly-scheduled maintenance procedure. The SCBA must hold system pressure without leaks to provide adequate protection. The component leak test procedure is the first step in trouble-shooting. These tests ensure that you do not have a leak. Leak testing quickly identifies components which need repair or replacement. Use P/N 600920 leak test solution or prepare a soapy water solution. Be sure to use enough soap to produce bubbles.

⚠ WARNING

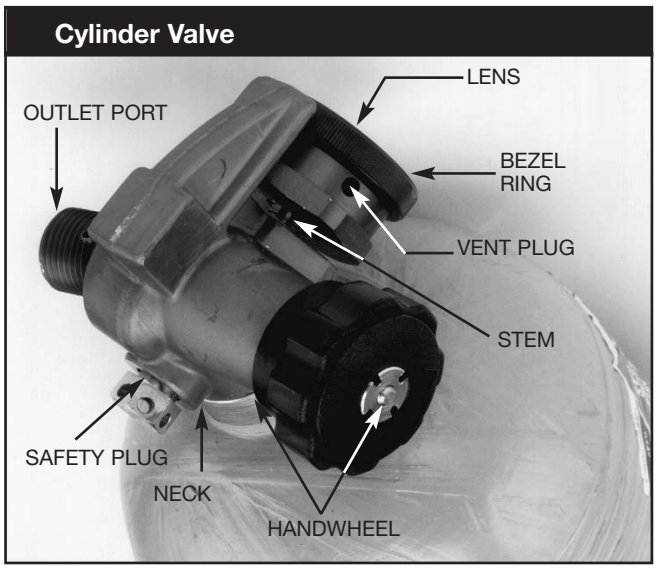
Do not tighten fittings or connectors when the system is pressurized. Close the cylinder valve. Be sure nothing blocks the regulator outlet. Relieve pressure from the system by slowly opening the bypass valve. Failure to follow this warning can cause fittings or connectors to rupture, resulting in serious personal injury or death.

NOTES

LEAK TESTING

CYLINDER VALVE

1. Outlet Port (Coupling Nut Connection)
   a. Be sure that the cylinder valve handwheel is completely closed.
   b. Draw a bubble of leak test solution across the outlet port and the two bleed holes on the thread(s).
   c. If the bubble expands, there is an air leak through the valve. The valve must be repaired by a certified repairperson.
2. Pressure Gauge
   a. Remove the rubber gauge guard. Apply leak test solution to the pressure gauge stem, cover, and bezel.
   b. If bubbles appear, the pressure gauge must be replaced.



Note: On high pressure gauges, apply leak test solution to the rubber vent plug or tape. If bubbles appear, the pressure gauge must be replaced.

3. Cylinder Neck
   a. Apply leak test solution to the cylinder neck.
   b. If bubbles appear, the cylinder must be taken out of service. The valve must be repaired by a certified repairperson.
4. Cylinder Handwheel and Safety Plug
   a. Apply leak test solution to the cylinder handwheel and safety plug.
   b. If bubbles appear, the valve must be repaired by a certified repairperson.

AUDI-LARM ASSEMBLY

Connect the alarm coupling nut to the cylinder and hand-tighten. Check that the bypass valve is completely closed on the MMR and that the slide button is pushed IN, then fully open the cylinder valve.

1. Relief Valve
   a. Check relief valve for damage.
   b. Check for missing or loose label.
   c. Check that relief valve ports are not showing or damaged. If damaged, remove air mask from service and return to a certified MSA Air Mask Service Center.
   d. Apply leak test solution to top and threads where the relief valve enters the URC Assembly.
   e. If bubbles appear, close cylinder valve and open the bypass valve to relieve pressure. Remove the air mask from service and return to a certified MSA Air Mask Service Center.
2. Coupling Nut
   a. Apply leak test solution to the front and back of the coupling nut.
   b. If bubbles appear, close the cylinder valve and open the bypass valve to relieve pressure. Further hand-tighten the coupling nut.
   c. Continuation of bubbles indicates a leak at the insert O-ring.
   d. Close the cylinder valve and relieve pressure from the system. Be sure nothing blocks the regulator outlet, then slowly open the bypass valve.
   e. To replace the insert O-ring, see Audi-Larm Assembly Repair.
3. Alarm Insert
   a. Apply leak test solution to the pipe threads where the insert enters the alarm. If bubbles appear, see Replacing the Coupling Nut.
4. High Pressure Hose
   a. Apply leak test solution to both hose and fittings at each joint. If bubbles appear, see the high pressure hose section.
5. Alarm Adjusting Screw
   a. Apply leak test solution to the adjusting screw and the pipe plugs. If bubbles appear, return the alarm to a Certified MSA Air Mask Service Center.

MMR FIRST STAGE REGULATOR

Note: No first stage repairs (other than those specified) are permitted in User's Maintenance. Return the regulator to a Certified MSA Air Mask Service Center if other maintenance is necessary.

1. Adjusting Nut
   a. Apply leak test solution to the adjusting nut.
   b. If bubbles appear, return to a Certified MSA Air Mask Service Center.
2. Plug
   a. Apply leak test solution to the plug.
   b. If bubbles appear, return to a Certified MSA Air Mask Service Center.
3. Cap
   a. Apply leak test solution between the body and cap.
   b. If bubbles appear, return to a Certified MSA Air Mask Service Center.

LEAK TESTING

4. Vent Holes
   a. Apply leak test solution across the vent holes in the body.
   b. If bubbles appear, return to a Certified MSA Air Mask Service Center.
5. Pressure Relief Valve
   a. Apply leak test solution to the pressure relief valve connection the first stage regulator.
   b. Apply leak test solution to the pressure relief valve seat.
   c. If bubbles appear, return to a Certified MSA Air Mask Service Center.

PR14 FIRST STAGE REGULATOR

Note: No first stage repairs (other than those specified) are permitted in User's Maintenance. Return the regulator to a Certified MSA Air Mask Service Center if other maintenance is necessary.

1. Cap and Seal Ring
   a. Apply leak test solution to the cap and seal ring perimeter.
   b. If bubbles appear, return to a Certified MSA Air Mask Service Center.
2. Pressure Relief Valve
   a. Apply a leak test solution to the pressure relief valve connection to the first stage regulator.
   b. Apply a leak test solution to the pressure relief valve vent holes.
   c. If bubbles appear, the leak must be corrected. Refer to First Stage Regulator Disassembly and Repair.

INTERMEDIATE PRESSURE HOSE

1. Apply leak test solution to the intermediate pressure hose connection to the first stage regulator.
2. If bubbles appear, the leak must be corrected. Refer to Intermediate Pressure Hose Disassembly and Repair.

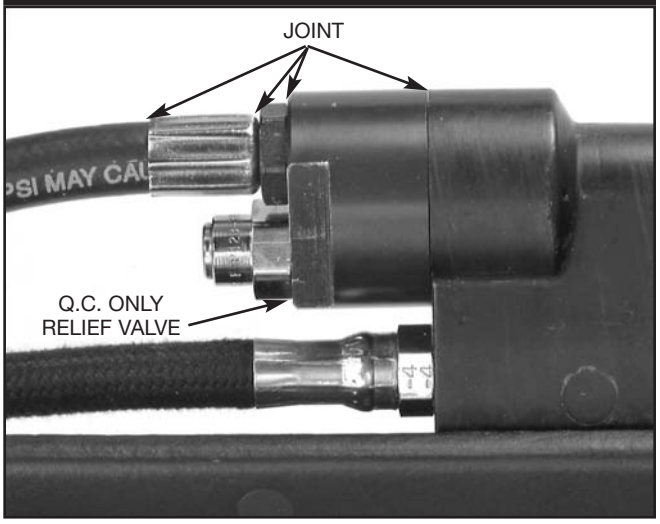
HIGH PRESSURE AUDI-LARM HOSE

1. Apply leak test solution to the Audi-Larm hose connection to the first stage regulator.
2. Apply leak test solution to the Audi-Larm hose connection to the Audi-Larm assembly.
3. If bubbles appear, the leak must be corrected. Refer to High Pressure Audi-Larm Hose Disassembly and Repair.

HIGH PRESSURE GAUGE HOSE

1. Apply leak test solution to the gauge hose connection to the first stage regulator.

Intermediate Pressure Hose



2. Apply leak test solution to the gauge hose connection to the pressure gauge, ICM, or NightFighter Transmitter.
3. Apply leak test solution to the pressure gauge connection or ICM connection to the NightFighter Transmitter.
4. Apply leak test solution around the pressure gauge lens and bezel.
5. If bubbles appear, the leak must be corrected. Refer to High Pressure Gauge Hose Disassembly and Repair.

QUICK-FILL SYSTEM

1. Apply leak test solution to the connection between the Quick-Fill coupling and adapter block.
2. Apply leak test solution across the Quick-Fill coupling outlet.
3. If bubbles appear, the leak must be corrected. Refer to Quick-Fill System Adapter Block Disassembly and Repair.

DUAL-PURPOSE SYSTEM

1. Apply leak test solution to the hose connections on the Dual-Purpose manifold.
2. Apply leak test solution the connection between the male airline coupling and Dual-Purpose manifold.
3. Apply leak test solution across the male airline coupling outlet.
4. If bubbles appear, the leak must be corrected.

After All Components are Leak Tested
Close the cylinder valve. Be sure that nothing blocks the regulator outlet. Relieve pressure from the system by cracking the bypass valve. Use a clean, lint-free cloth to wipe the components.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

GENERAL NOTES

The inspection and maintenance procedures authorized in this manual are classified User Maintenance. Additional, advanced training is available. Contact your MSA representative for details. Refer to the appropriate Illustrated Parts List.

IMPORTANT
You must read and understand the General Notes, Warnings, and Cautions below before performing Disassembly and Repair. General Notes is a collection of procedures common to many repairs.

⚠ CAUTION

Details for each procedure are listed below. Details are not repeated each time the procedure is done. Instead, a reference to the General Note appears in the text.

⚠ CAUTION

Do not attempt repairs beyond those specified in this manual. Breathing apparatus must not be repaired beyond the manufacturer's recommendations.

Note 1: Lubricate all designated O-rings with a very thin film of Christo-Lube lubricant (P/N 604070) before they are installed. Christo-Lube lubricant is compatible with brass and aluminum.

Note 2: Pipe-sealing tape is used on fittings with tapered threads. Wrap 1 to 1-1/2 turns of tape in a clockwise direction (looking into the threaded end of the fitting). Start at the second thread. Do not put tape on the first thread. Pieces of tape can break off and reduce air flow. Apply a thin film of Christo-Lube lubricant to the outer surface of the tape before threading the part into another component.

⚠ CAUTION

Do not over-tighten parts or you may damage the part or the fitting threads.

Note: All repair procedures assume that the Audi-Larm Assembly is disconnected from the apparatus cylinder.

1. Be sure the cylinder valve is completely closed.
2. Be sure that nothing blocks the regulator outlet. Open the bypass valve to relieve pressure in the system.
3. Close the bypass valve fully.

⚠ WARNING

Do not disconnect the Audi-Larm Assembly coupling nut when pressure is shown on the harness gauge. Always be sure that you have released all pressure from the regulator. Removing the coupling nut with the regulator pressurized can result in serious personal injury or death.

1. Unscrew the URC Assembly coupling nut from the cylinder valve.

REGULATOR COVER, SPRING, AND SPRING RETAINER

Removing Regulator Cover, Spring, and Spring Retainer

1. Press housing buttons IN. While holding the buttons in, also press IN on the retaining latches of the regulator housing.

2. Pull firmly on the regulator cover, removing the cover, spring, and spring retainer from the regulator housing.

⚠ CAUTION

Do not stretch the spring.

Removing Spring and Spring Retainer

1. Push in the outside center (rubber) of regulator cover.

⚠ CAUTION

Do not pull spring to remove spring retainer.

2. Lift up on spring retainer and remove spring retainer from regulator cover.

Removing Spring from Spring Retainer
1. Twist spring (clockwise) out of spring retainer.

⚠ CAUTION

Do not stretch the spring.

Reassembly - Regulator Cover
1. Insert spring into spring retainer by attaching last coil of spring over the retainer's hooks.
2. Push spring retainer over the center stem of regulator cover.
3. Double check proper engagement by lifting on spring retainer. Ensure that the retainer is engaged.
4. Push regulator cover, spring, and spring retainer onto regulator housing.

⚠ WARNING

Double check proper engagement by pulling on regulator cover to ensure that the regulator cover is securely attached to the regulator housing. Failure to follow this warning can result in serious personal injury or death.

CBRN SHIELD

Note: The following section is for CBRN approved Firehawk Regulators only.

Removing the CBRN Shield

⚠ CAUTION

Care should be taken when handling the CBRN Shield. Handle the shield by the solid plastic ring when removing or installing. The CBRN Shield must be replaced on a periodic basis. Refer to the overhaul requirements in the Firehawk Operation and Instruction Manual P/N 10023638.

1. Hold the shield by the outer plastic ring when removing or installing.

2. Lift the CBRN Shield Assembly and spring cap off the diaphragm assembly.

3. Lift spring cap off the CBRN Shield Assembly.

Installing the CBRN Shield
1. Check the CBRN Shield to ensure the shield is not damaged.
2. Inspect the shield for damage by holding up to a light and checking the film surface for holes prior to installing.
3. Push the shut-off buttons IN for the OFF position. While installing the shield, the valve fork must be in the UP position.
4. Apply a thin coating of Christo-Lube lubricant to the bottom of the shield assembly.
5. Place the CBRN Shield over the diaphragm assembly.

6. Using finger, tap slightly on the top of CBRN Shield to remove trapped air.

DIAPHRAGM ASSEMBLY

Removing the Diaphragm Assembly
1. Roll diaphragm edges out of regulator housing groove.
2. Slide diaphragm away from red bypass handwheel and slide the diaphragm off the valve fork.

Installing the Diaphragm Assembly

1. For only CBRN approved Firehawk, apply a thin film of Christo-Lube lubricant to the top rim of the regulator housing.
2. For both CBRN and Non-CBRN Firehawk, slide the diaphragm's knob into the valve fork's slot toward the red bypass handwheel.

3. For both CBRN and Non-CBRN Firehawk, roll the diaphragm edges into the regulator housing groove.

REGULATOR HOUSING O-RING

Note: The following procedures are for all Firehawk Second Stage Regulators.

Removing the Regulator Housing O-Ring

1. Remove O-ring from regulator housing outlet. Be careful not to scratch the O-ring groove.

Removing the Regulator Housing O-Ring

1. Apply a light film of Christo-Lube lubricant to the new O-ring.
2. Roll the new O-ring (P/N 10031192) over the end of the regulator housing outlet and seat it into the O-ring groove. If the O-ring is not seated, it could allow an air leak.

BYPASS AND HOSE W/SWIVEL

Removing the Bypass and Hose w/Swivel

1. Remove regulator cover, spring, and spring retainer assembly as a whole unit.

Note: Do not remove the diaphragm (option).

2. Use a small flat-blade screwdriver to remove the U-clip from the regulator housing.

3. Remove the bypass and hose assembly from regulator housing.
4. Remove the O-ring from the first groove in the bypass body. Be careful not to scratch the O-ring groove.
5. Remove red bypass handwheel, slide handwheel back off the bypass body to reveal the U-clip in the bypass body.

6. Remove U-clip from the bypass body with a small screwdriver.

7. Remove hose assembly by pulling hose out of the bypass body.

8. Remove hose assembly O-ring. Be careful not to scratch the O-ring groove.

9. Inspect the screen inside bypass body.
10. All dirt and any foreign matter must be removed

before reusing screen. However, if screen is damaged, replace screen as follows:

a. Insert a small screwdriver into the small hole side of bypass body and push the screen out the large hole side of bypass body.

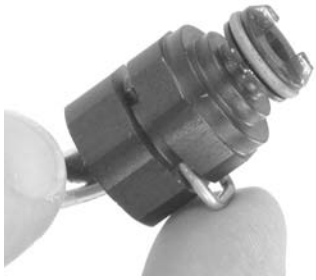
Installing the Bypass and Hose Assembly

1. Apply a light film of Christo-Lube lubricant to all O-rings.
2. Roll a new O-ring (P/N 634669) into the first groove of the bypass body.
3. (If removed) Insert the new screen. Insert screen into the large hole (hose swivel) side of bypass body. Be careful not to damage the screen and make sure the screen is flat inside the body.

4. Hose Assembly: Roll a new O-ring (P/N 634669) into the first groove of the hose swivel.

5. Insert swivel into the bypass body.

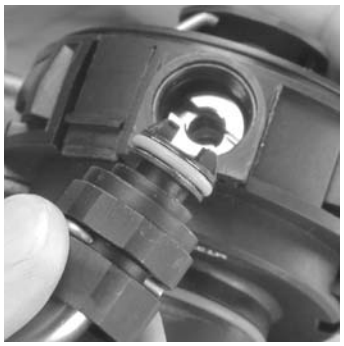
6. Slide U-clip through the bypass body, the U-clip should slide through the bypass body freely.



7. Slide red bypass handwheel over the bypass body, the hex of handwheel will align with the hex of the bypass body.

8. Ensure the hose with swivel moves freely.

9. Insert bypass body and hose assembly into the regulator housing. Align the bypass body tabs with slots in bypass insert.



10. Slide the U-clip through the regulator housing. The U-clip should slide through the regulator housing freely.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

VALVE ASSEMBLY

Removing the Valve Assembly

1. Remove regulator cover, spring, and spring retainer.
2. Remove diaphragm.
3. Remove U-clip from regulator housing.

Note: Use bypass body as a tool to remove bypass insert.

4. Insert bypass body into bypass port in regulator housing.

5. Unthread bypass insert from valve assembly by turning counter-clockwise.

6. Turn regulator housing until bypass insert drops out of regulator housing.

7. Valve assembly can be removed by turning regulator housing upside down or by lifting valve assembly out of regulator housing.

8. Wrap the threads of the bypass insert with clear tape.
9. Apply a thin film of Christo-Lube lubricant to the O-ring.
10. Roll the bypass insert O-ring (P/N 697453) over the tape.
11. Remove the tape.

Installing the Valve Assembly

1. Insert valve assembly into regulator housing with valve fork slot facing up and away from bypass port.
2. Push valve assembly into regulator housing.

3. Insert bypass insert into bypass port with slot facing out.

4. Thread bypass insert into valve assembly by using the bypass body. Hand-tighten.

Note: If the bypass insert does not thread into valve assembly easily, the valve assembly is not aligned into the regulator housing properly. Ensure valve assembly is fully seated in regulator housing.

5. Insert hose assembly and bypass body into regulator housing.

6. Insert U-clip into regulator housing.

7. Replace diaphragm.
8. Replace the spring retainer, spring, and regulator cover.
9. Flow test the air mask.
10. If the air mask is out of calibration, the valve assembly must be replaced.

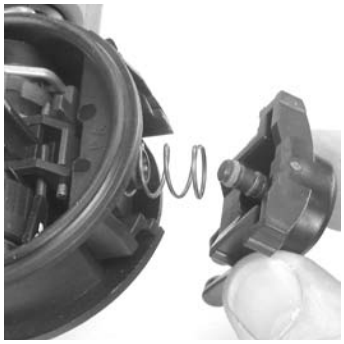
REGULATOR HOUSING QUICK-CONNECT BUTTON AND SLIDE BUTTON

Removing the Regulator Housing Quick-Connect Button and Slide Button

1. Remove the valve assembly from the regulator housing.
2. Press the buttons into the regulator housing.
3. With the buttons pressed in, remove the old O-rings.

Note: Be careful not to damage the O-ring sealing area.

4. Slowly release the buttons and remove them from the regulator housing. Be careful not to lose the spring.



Installing the Regulator Housing Quick-Connect Button and Slide Buttons

1. Apply a light film of Christo-Lube lubricant to the new O-rings.
2. Insert the springs and buttons into the regulator housing.

Note: With the red bypass handwheel facing you and the cap facing up, the slide button is to the left and the housing button is to the right.

3. Press the buttons into the regulator housing.
4. Install new O-rings on the button posts.
5. Double check proper engagement by pulling on the buttons to ensure that they are securely attached to the regulator housing.

AUDI-LARM ASSEMBLY

⚠ WARNING

Relieve all pressure from the system. Close the cylinder valve fully. Be sure that nothing blocks the regulator outlet. Open the bypass valve fully to release any trapped air. Failure to follow this warning can result in serious personal injury or death.

Replacing the Audi-Larm Inlet O-ring

1. Insert your fingernail or the O-ring removal tool under the O-ring and remove it. Be careful not to scratch the alarm O-ring groove.
2. Apply lubricant to new O-ring. See General Note 1.
3. Roll the new O-ring over the end of the insert and seat it into the O-ring groove. If the O-ring is not seated, air may leak.

Removing the Audi-Larm Bell Screws and Lock-Washers

1. Use a flat-blade screwdriver to unthread (counter-clockwise) the screws and lock-washers holding the bell to the Audi-Larm housing.

2. Discard the screws and washers.

⚠ WARNING

Do not remove the bell from the alarm housing unless the bell is damaged. If the bell is damaged replace it with a new bell. Failure to follow this warning can result in serious personal injury or death.

Installing the Audi-Larm Bell Screws and Lock-Washers

1. Ensure that the bell is aligned with the raised boss (mounting pad) on the alarm housing. The rim of the bell must not touch the alarm housing at any point.
2. Ensure that each screw hole is cleared of old Loctite.

3. Apply one drop of Loctite 271 into each screw hole of boss.

4. Use a flat-blade screwdriver to thread (clockwise) screws and lock-washers into the Audi-Larm body and tighten.

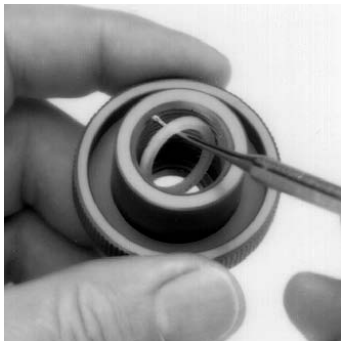
5. Check the bell to ensure that it is tight. You must not be able to rotate or tilt the bell by hand.

Note: If the bell rotates or tilts, contact MSA Customer Service toll free at 1-800-MSA-2222.

Removing the Coupling Nut and Insert

1. Place a wrench on the Audi-Larm body flats to secure the body. Place a socket wrench over the end of the fitting.

2. Unthread (counter-clockwise) the insert from the Audi-Larm body.
3. Check the Audi-Larm body threads to be sure they contain no pipe-sealing tape residue.
4. Slide the coupling nut off the threaded end of the insert.
5. Remove the washer from inside the coupling nut.



Installing the Coupling Nut and Insert

1. Apply lubricant to both sides of new washer. See General Note 1.
2. Slide new washer onto the threaded end of the insert.
3. Slide the coupling nut onto the threaded end of the insert.
4. Apply pipe-sealing tape to the insert threads. See General Note 2.
5. Thread (clockwise) the insert with coupling nut into the Audi-Larm body and tighten.

⚠ CAUTION

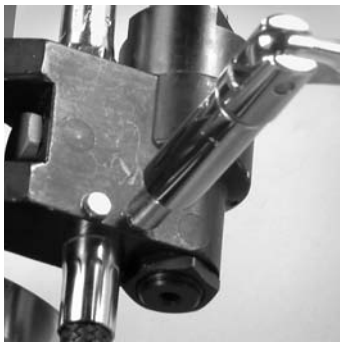
Do not over-tighten parts or you may damage the Audi-Larm Assembly body or the insert threads.

Note: The Audi-Larm must be leak tested following any disassembly. Refer to the Leak Testing section of this manual for procedures to check all connections.

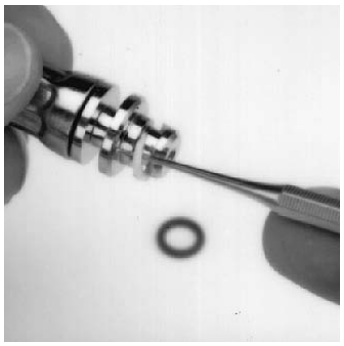
HIGH PRESSURE AUDI-LARM HOSE

Removing the High Pressure Audi-Larm Hose from the MMR First Stage Regulator

1. Use 1/4” socket to unthread (counter-clockwise) the screw pins from the regulator body.



2. Pull firmly on the Audi-Larm hose to remove it from the regulator body.
3. Use O-ring removal tool to remove O-ring and back-up ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring and back-up ring.



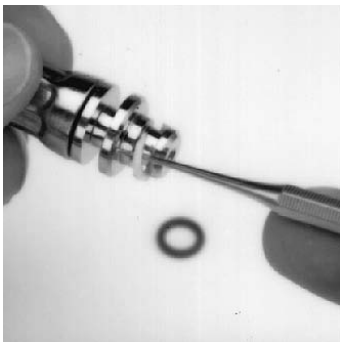
Installing the High Pressure Audi-Larm Hose on the MMR First Stage Regulator

1. Install new back-up ring on the hose fitting.
2. Apply lubricant to new O-ring. See General Note 1.
3. Install new O-ring on the hose fitting.
4. Install Audi-Larm hose into the regulator body.
5. Thread (clockwise) new screw pins into the regulator body.
6. Use socket and torque wrench to tighten screw pins to a torque of 10-15 in.lbs.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

Removing the High Pressure Audi-Larm Hose and Filter from the PR14 First Stage Regulator

1. Remove first stage regulator from the mounting bracket and remove U-clip. Refer to First Stage Regulator Disassembly and Repair.
2. Pull firmly on the Audi-Larm hose to remove it from the regulator body.
3. Use O-ring removal tool to remove O-ring and back-up ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring and back-up ring.



4. Use O-ring removal tool to remove filter O-ring. Discard O-ring.

5. Orient the filter port down to drop the filter out of the regulator body. Discard filter.

Installing the High Pressure Audi-Larm Hose and Filter on the PR14 First Stage Regulator

1. Install filter into high pressure supply port. The high pressure supply port is labeled “HP IN”. Ensure that filter cone points towards the regulator; the cone point should not be visible when properly installed. Note: The cone point should not be visible when properly installed.
2. Install filter O-ring into port until it bottoms out against filter. Do not lubricate the filter O-ring.
3. Install new back-up ring on the hose fitting.
4. Apply lubricant to high pressure hose O-ring. See General Note 1.
5. Install new O-ring on the hose fitting.
6. Install high pressure Audi-Larm hose into high pressure supply port. The high pressure supply port is labeled “HP IN”.
7. Install U-clip and replace first stage regulator onto mounting bracket. Refer to First Stage Regulator Disassembly and Repair.

Removing the High Pressure Audi-Larm Hose from the Audi-Larm Assembly

1. Clamp the Audi-Larm body in a vise.

⚠ CAUTION

Be careful that you do not damage the bell or the body with the vise. Use shields on the vise jaws.

2. Use a wrench to unthread (counter-clockwise) the hose fitting from the Audi-Larm body.
3. Use O-ring removal tool to remove O-ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring.

Installing the High Pressure Audi-Larm Hose on the Audi-Larm Assembly

1. Use transparent tape to cover the hose fitting threads.
2. Apply lubricant to new O-ring. See General Note 1.
3. Install new O-ring on the hose fitting.

4. Remove tape from hose fitting.
5. Clamp the Audi-Larm body in a vise. See CAUTION above.
6. Thread (clockwise) the hose fitting into the Audi-Larm body.
7. Use a crowsfoot wrench to tighten Audi-Larm hose to a torque of 100-140 in.lbs.

HIGH PRESSURE GAUGE HOSE

Removing the High Pressure Gauge Hose from the MMR First Stage Regulator

1. Remove first stage regulator from the backplate. Refer to First Stage Regulator Disassembly and Repair.
2. Use wrench to unthread (counter-clockwise) gauge hose from regulator body.

3. Use O-ring removal tool to remove O-ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring.
4. Remove the gauge hose from the shoulder strap.

Installing the High Pressure Gauge Hose on the MMR First Stage Regulator

1. Insert the gauge hose through the right shoulder strap.
2. Use transparent tape to cover the hose fitting threads.
3. Apply lubricant to the new O-ring. See General Note 1.
4. Install new O-ring on the hose fitting.

5. Remove tape from hose fitting.
6. Thread (clockwise) gauge hose fitting into regulator body.
7. Use torque wrench to tighten gauge hose to a torque of 100-140 in.lbs.
8. Replace first stage regulator on the backplate. Refer to First Stage Regulator Disassembly and Repair.

Removing the High Pressure Gauge Hose from the PR14 First Stage Regulator

1. Remove first stage regulator from the mounting bracket and remove U-clip. Refer to First Stage Regulator Disassembly and Repair.
2. Pull firmly on gauge hose to remove it from regulator body.

3. Use O-ring removal tool to remove O-ring and backup-ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring and backup-ring.

4. Unthread the gauge hose from the shoulder strap.

Installing the High Pressure Gauge Hose on the PR14 First Stage Regulator

1. Install new back-up ring.
2. Apply lubricant to new O-ring. See General Note 1.
3. Install new O-ring.
4. Install high pressure gauge hose into high pressure gauge port. The high pressure gauge port is not labeled.
5. Install U-clip and replace first stage regulator onto mounting bracket. Refer to First Stage Regulator Disassembly and Repair.

Removing the Redundant Alarm

1. Pull the gauge guard off the back of the gauge and slide it down the hose until it clears the jam nut and hose swivel.
2. Using an open-end wrench on the jam nut and an open-end wrench on the gauge hex, loosen the jam nut on the gauge.
3. Remove and replace the O-ring (P/N 638167) and back-up ring (P/N 635277). Be careful not to damage the O-ring seat area. Note that the O-ring must be closest to the end of the hose with the back-up ring behind it.

Installing the Redundant Alarm

1. Insert the hose fitting into the alarm hand-tight, then back off 1/4" turn. Using a torque wrench with a crowsfoot, tighten the redundant alarm jam nut on the hose fitting to 150-200 in.lbs.

Note: Make sure the redundant alarm and hose end can swivel after tightening.

2. Leak test all connections in harness gauge and hose.
3. Slip the gauge guard back over the gauge.

QUICK-FILL SYSTEM ADAPTER BLOCK

⚠ WARNING

Do not disconnect the alarm coupling nut when pressure is shown on the harness gauge. Always be sure that all pressure is released from the regulator. Removing the coupling nut with the regulator pressurized can result in serious personal injury or death.

Note: All repair procedures assume that the Audi-Larm assembly is disconnected from the apparatus cylinder.

1. Be sure the cylinder valve is completely closed.
2. Be sure that nothing blocks the regulator outlet. Slowly open the bypass valve until any pressure is relieved.
3. Close the bypass valve.
4. Disconnect the Audi-Larm assembly from the apparatus cylinder.

Removing the Quick-Fill Coupling Nut from the Adapter Block

1. Place the adapter in a vise. Use protective sleeves to keep from damaging the block.
2. Use a 1" deep-well socket and breaker bar to loosen the coupling by turning it counter-clockwise.
3. Remove the O-ring using the O-ring removal tool. Be careful not to scratch the O-ring sealing surface.

Installing the Quick-Fill Coupling in the Adapter Block

1. Place the adapter block in a vise. Use protective sleeves to keep from damaging the block.
2. Wrap the coupling threads with transparent tape to prevent damage to the O-ring.
3. Apply a thin film of Christo-Lube lubricant to the P/N 635068 coupling O-ring (P/N 635068).
4. Slide the new O-ring over the coupling threads.

5. Remove the tape.
6. Thread the coupling into the block by hand and tighten to 70–75 ft.lbs. using a 1" deep-well socket.

Removing the Quick-Fill System Adapter Block from the Harness Gauge Hose

1. Using an open-end wrench, loosen the jam nut on the harness gauge hose while holding the adapter block with another open-end wrench.
2. Remove the O-ring and back-up ring from the end of the harness gauge hose. Be careful not to damage the O-ring seating surface.

Installing the Quick-Fill System Adapter Block on the Harness Gauge Hose

1. Apply a thin film of Christo-Lube lubricant to a new back-up ring (P/N 635277).
2. Place the back-up ring in the groove on the end of the hose fitting.
3. Apply a thin film of Christo-Lube lubricant to a new O-ring (P/N 638166).

4. Place the O-ring in the groove on the end of the hose fitting.
5. Insert the hose fitting into the Quick-Fill System adapter block.
6. Using a torque wrench with a crowsfoot, torque the adapter to 100-125 in.lbs. while holding the adapter block with an open-end wrench.

Removing the ICM Unit or Redundant Alarm from the Quick-Fill System Adapter Block

1. Use a wrench to hold the Quick-Fill System adapter block or place the Quick-Fill System adapter block in a vise using protective sleeves to keep from damaging the block.
2. Use an open-end wrench to loosen the jam nut by turning counter-clockwise
3. Unthread the ICM Unit or Redundant Alarm from the Quick-Fill System adapter block.
4. Remove and discard the jam nut.

⚠ WARNING

Do not reuse the jam nut. Failure to follow this warning can result in serious personal injury or death.

Cleaning and Inspection

1. Apply alcohol to a Q-tip applicator.
   a. Wipe the threads on the ICM Unit or Redundant Alarm and the new jam nut (dull surface finish).
   b. Wipe threads of ICM Unit port or Redundant Alarm and Quick-Fill System adapter block.
2. Let alcohol dry for 15 seconds.
3. Inspect the threads of the ICM Unit or Redundant Alarm, new jam nut, and Quick-Fill System adapter block.

Installing ICM Unit or Redundant Alarm on the Quick-Fill System Adapter Block

Note: If the apparatus is equipped with the Quick-Fill System and either the ICM Unit or Redundant Alarm, a spool will be included.

1. Check that the spool is present in the gauge inlet or the adapter block outlet.

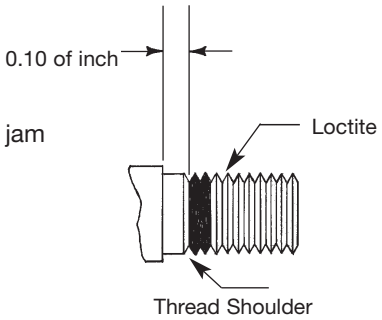
Note: A new O-ring and back-up ring must be installed on each end of the spool.

2. Apply a thin film of Christo-Lube lubricant to two back-up rings (P/N 635277).
3. Place one back-up ring in the groove on each end of the spool.
4. Apply a thin film of Christo-Lube lubricant to two O-rings (P/N 638167).
5. Place one O-ring in the groove on each end of the spool.

6. Insert the spool into the ICM Unit or Redundant Alarm. The spool's larger- diameter hole must face toward the ICM Unit or Redundant Alarm.

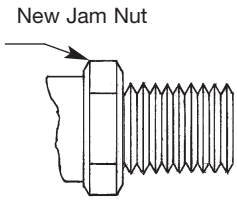
Note: Prior to applying Loctite, ensure the threads on the gauge, ICM Unit, or Redundant Alarm are wiped clean.

7. Remove old jam nut from the gauge, ICM Unit, or Redundant Alarm. Apply Loctite 271 on two threads approximately one tenth (0.10) of an inch from the thread shoulder of gauge, ICM Unit, or Redundant Alarm per view shown.

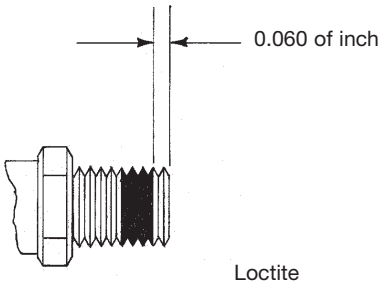


Note: Do not reuse old jam nut.

8. Thread jam nut (supplied with kit) against the threaded shoulder of gauge, ICM Unit, or Redundant Alarm as shown.



9. Apply Loctite 271 to three threads approximately one sixteenth (0.060) of an inch from the end of the gauge, ICM Unit, or Redundant Alarm as shown.



10. Thread gauge, ICM Unit, or Redundant Alarm into the Quick-Fill System adapter block until it stops.

⚠ CAUTION

Do not tighten gauge, ICM Unit, or Redundant Alarm by hand. Use wrenches.

⚠ WARNING

Do not try to screw the small-diameter (tapered thread) gauge (P/N 495764 or 495765) into the Quick-Fill System adapter. Use the larger-diameter gauge (P/N 10003610, P/N 10003611 or 3000psi gauge P/N 10047235)) with a straight thread. Failure to follow this warning can result in serious personal injury or death.

11. The gauge must be facing out and away from the shoulder pad with the Quick-Fill coupling pointing toward the left shoulder strap. To obtain this alignment:
    a. Unthread the gauge, ICM Unit, or Redundant Alarm not more than one full turn.
    b. Hold the Quick-Fill System adapter block and either the gauge or Redundant Alarm to prevent turning.
    c. Hand-tighten the jam nut against the Quick-Fill System adapter block.

    d. Torque to 150-200 in.lbs. See view for suggested torque wrench orientation.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

⚠ WARNING

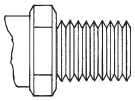
Do not unthread the gauge, ICM Unit, or Redundant Alarm more than one full turn. The gauge-adapter connection may leak, resulting in serious personal injury or death.

12. Make sure the gauge guard (alarm boot on redundant alarm or ICM Units) is in place around the gauge.
13. Check that the dust cover is installed on the gauge hose above the Quick-Fill System adapter.

INTERMEDIATE PRESSURE HOSE

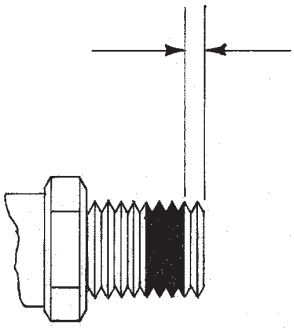
Removing the Intermediate Pressure Hose from the PR14 First Stage Regulator

1. Remove first stage regulator from the mounting bracket and remove U-clip. Refer to First Stage Regulator Disassembly and Repair.



2. Pull firmly on intermediate pressure hose to remove it from regulator body.

3. Use O-ring removal tool to remove O-ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring.



Installing the Intermediate Pressure Hose on the PR14 First Stage Regulator

1. Apply lubricant to new O-ring. See General Note 1.
2. Install new O-ring on hose fitting.
3. Install intermediate pressure hose into intermediate pressure port.
4. Install U-clip and replace first stage regulator onto mounting bracket. Refer to First Stage Regulator Disassembly and Repair.

Removing the Threaded Second Stage Intermediate Pressure Hose from the First Stage Intermediate Pressure Hose

1. Use two wrenches to unthread (counter-clockwise) the intermediate pressure hoses.
2. When the hex nut is completely loose, pull firmly on the hose to break the O-ring connection.
3. Use O-ring removal tool to remove O-ring from hose fitting. Be careful not to damage the O-ring sealing surfaces. Discard O-ring.
4. Remove the first stage intermediate pressure hose from the shoulder strap.

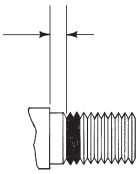
Installing the Threaded Second Stage Intermediate Pressure Hose on the First Stage Intermediate Pressure Hose

1. Insert the first stage intermediate pressure hose through the left shoulder strap.
2. Apply lubricant to new O-ring. See General Note 1.
3. Install new O-ring on hose fitting.
4. Connect intermediate pressure hoses.
5. Use two wrenches to tighten (clockwise) intermediate pressure hoses.

FIRST STAGE REGULATOR

Removing the PR14 First Stage Regulator from the Mounting Bracket. Removing the U-clips.

1. Use screwdriver to unthread (counter-clockwise) both screws that secure regulator to mounting bracket.



2. Remove regulator from mounting bracket.
3. Remove loose thread-locking material from removed screw threads.
4. Remove loose thread-locking material from regulator body threads.

5. Remove U-clips from first stage regulator body.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

Removing the PR14 First Stage Regulator Pressure Relief Valve

1. Ensure that U-clip is removed.

2. Pull firmly on the pressure relief valve to remove it from regulator body.

3. Use O-ring removal tool to remove O-ring. Be careful not to damage the O-ring sealing surfaces. Discard O-ring.

Installing the PR14 First Stage Regulator Pressure Relief Valve

1. As necessary, apply lubricant to pressure relief valve O-ring. See General Note 1.
2. As necessary, install new O-ring.
3. Install pressure relief valve into intermediate pressure port.

Installing the PR14 U-clips. Installing the PR14 First Stage Regulator on the Mounting Bracket.

1. Install both U-clips into regulator to retain high pressure and intermediate pressure fittings.
2. Position regulator onto mounting bracket. Align regulator mounting holes with mounting bracket holes.
3. Apply Loctite 222 to each screw. Note: New screws include a pre-applied thread-locker and do not require Loctite 222 application.
4. Thread (clockwise) screws through mounting bracket into regulator. Torque screws to 35-45 inch-pounds.
5. Rotate and pull on each hose fitting and pressure relief valve to verify that components are properly installed and retained.

Removing the MMR First Stage Regulator from the Airframe Backplate

1. Use wrench to remove (counter-clockwise) bolts, lock washers, and flat washers that secure regulator body to backplate.
2. Remove first stage regulator from backplate.
3. Remove plastic slider from backplate.
4. Remove loose thread-locking material from removed bolt threads.
5. Remove loose thread-locking material from regulator threads.

Installing the MMR First Stage Regulator on the Airframe Backplate

1. Install plastic slider into carrier rail. Orient slider with 'TOP' text and arrows pointing up (away from carrier).

2. Position first stage regulator against carrier rail.
3. Apply Loctite 222 to each bolt.
4. Thread (clockwise) bolts through lock washers, flat washers, and slider into the regulator body. Tighten bolts to 25-35 inch-pounds. Ensure that regulator slides freely following installation.

Removing the MMR First Stage Regulator from the Vulcan and Black Rhino Backplates

1. Use wrench to remove (counter-clockwise) bolts, lock washers, and flat washers that secure regulator body to backplate.

2. Remove first stage regulator from backplate.
3. Remove loose thread-locking material from removed bolt threads.
4. Remove loose thread-locking material from regulator threads.

Installing the MMR First Stage Regulator on the Vulcan and Black Rhino Backplates

1. Position first stage regulator against carrier rail.
2. Apply Loctite 222 to each bolt.
3. Thread (clockwise) bolts through lock washers, flat washers, and slider into the regulator body. Tighten bolts to 25-35 inch-pounds.

BREATHING APPARATUS DISASSEMBLY AND REPAIR

Removing the PR14 Mounting Bracket from the Airframe Backplate

1. Use screw driver to unthread (counter-clockwise) screws that secure regulator to mounting bracket.
2. Remove regulator from mounting bracket. Keep U-clips in regulator body.

3. Use wrench to remove (counter-clockwise) bolts, lock washers, and flat washers that secure mounting bracket to backplate.
4. Remove mounting bracket from backplate.
5. Remove plastic slider from backplate.
6. Remove loose thread-locking material from removed bolt threads.
7. Remove loose thread-locking material from mounting bracket threads.

Installing the PR14 Mounting Bracket on the Airframe Backplate

1. Install plastic slider into carrier rail. Orient slider with 'TOP' text and arrows pointing up (away from carrier).
2. Position mounting bracket against carrier rail.
3. Apply Loctite 222 to each bolt.
4. Thread (clockwise) bolts through lock washers, flat washers, and slider into the mounting bracket. Tighten bolts to 25-35 inch-pounds. Ensure that mounting bracket slides freely following installation.
5. Position regulator onto mounting bracket. Ensure that both U-clips are installed. Align regulator mounting holes with mounting bracket holes.
6. Apply Loctite 222 to each screw.
7. Thread (clockwise) screws through mounting bracket into regulator. Torque screws to 35-45 inch-pounds.
8. Rotate and pull on each hose fitting and pressure relief valve to verify that components are properly installed and retained.

Removing the PR14 Mounting Bracket from the Vulcan and Black Rhino Backplates

1. Use screw driver to unthread (counter-clockwise) screws that secure regulator to mounting bracket.
2. Remove regulator from mounting bracket. Keep U-clips in regulator body.
3. Use wrench to remove (counter-clockwise) bolts, lock washers, and flat washers that secure mounting bracket to backplate.
4. Remove mounting bracket from backplate.
5. Remove loose thread-locking material from removed bolt threads.
6. Remove loose thread-locking material from mounting bracket threads.

Installing the PR14 Mounting Bracket on the Vulcan and Black Rhino Backplates

1. Position mounting bracket against carrier rail.
2. Apply Loctite 222 to each bolt.
3. Thread (clockwise) bolts through lock washers, flat washers, and backplate into the mounting bracket. Tighten bolts to 25-35 inch-pounds.
4. Position regulator onto mounting bracket. Ensure that both U-clips are installed. Align regulator mounting holes with mounting bracket holes.
5. Apply Loctite 222 to each screw.
6. Thread (clockwise) screws through mounting bracket into regulator. Torque screws to 35-45 inch-pounds.
7. Rotate and pull on each hose fitting and pressure relief valve to verify that components are properly installed and retained.

CHECKING FOR LEAKS AND PROPER OPERATION

1. Follow the User's Instructions supplied with the air mask to connect the Audi-Larm Assembly to a fully charged cylinder.
2. Check that the MMR bypass is closed and the shutoff button is IN.

⚠ WARNING

Do NOT try to connect a high pressure (4500psig) cylinder to a low pressure apparatus. The coupling nut will not thread all the way on the cylinder valve and bleed holes in the cylinder valve will let the air escape and not enter the system. This is a dangerous condition. Failure to follow this warning can result in serious personal injury or death.

⚠ WARNING

An air mask using the 3000psig URC Assembly without Quick-Fill System can receive (be a receiver) cylinder pressure through the 3000psig URC Assembly. Do not use air mask with Quick-Fill System and 3000psig URC Assembly on the same air mask. Air mask with Quick-Fill System and 3000psig URC Assembly on same air mask will not allow the relief valve in the 3000psig URC Assembly to open as designed. Failure to follow these warnings can result in serious personal injury or death.

3. Open the cylinder valve fully. The remote gauge should indicate the pressure in the cylinder.
4. Close the cylinder valve and watch the remote gauge. There should be no drop in pressure if the apparatus is leak-tight. If the gauge needle moves, check all components for leaks using leak detection solution. Follow the leak testing procedures in the SCBA Maintenance Manual.
5. Correct any leaks before proceeding.
6. Be sure the cylinder valve is fully closed.
7. Open the bypass valve to relieve all pressure from the system.
8. After all pressure is relieved from the system, close the bypass valve completely.
9. The air mask is now ready for service.
10. Read and fully understand the instructions for operating the NightFighter Heads-Up Display System before use. These instructions are located in the NightFighter Heads-Up Display System Instruction Manual (P/N 10035580).

NOTES

HEAD HARNESS REPLACEMENT

RUBBER HEAD HARNESS

Note: To replace the standard rubber head harness (the one with rollers and end-tabs) with the SpeeD-ON Head Harness, see Installing SpeeD-ON Head Harness.

Removing the Rubber Head Harness

1. Lay the facepiece on a table or other flat surface.
2. Grasp the facepiece lug with the thumb and forefinger of one hand. Grasp the head harness metal buckle with the thumb and forefinger of the other hand.
3. Lift the metal buckle with your thumb while stretching the facepiece lug.
4. Turn the facepiece and switch hands to lift on the other side of the metal buckle.
5. Pull the facepiece lug out of the metal buckle.
6. Repeat steps a through d for each remaining strap.
7. If the headstrap was removed to install the SpeeD-ON Head Harness, see Installing the SpeeD-ON Head Harness.

Installing the Rubber Head Harness

1. Lay the new headstrap flat. The MSA logo should be right-side up. Each strap is labeled.
2. Pick the headstrap up by the strap labeled “Front.”
3. Insert the facepiece lug into the metal buckle.
4. Hold the buckle down against the facepiece lug with the thumb and forefinger of one hand while gripping the end of the lug with the thumb and forefinger of the other hand.

5. Pull the buckle and lug in opposite directions while twisting them from side to side to work the buckle down until it snaps in place over the lug.

6. Repeat steps a through c for each remaining strap. Check that the installed headstrap is not twisted.
7. Don the facepiece and check the face-to-facepiece seal. Follow the Check Facepiece Fit procedure.

SPEED-ON HEAD HARNESS

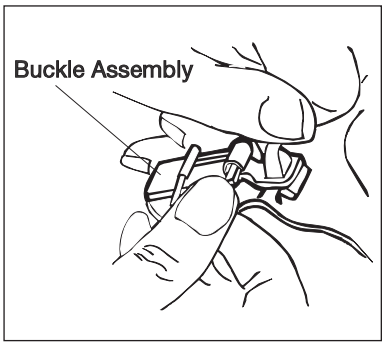
Removing the SpeeD-ON Head Harness

1. Lay the facepiece on a table or other flat surface.
2. The procedure for each of the top three straps is the same as in replacing the Rubber Head Harness.
3. To remove the bottom buckles, pull the back of the buckle away from the rubber strap and pull slightly so the rubber harness end-tab is at the buckle.
4. Fold the end-tab sides together, then slide each tab through its buckle.
5. Repeat steps 3 and 4 for the other buckle.

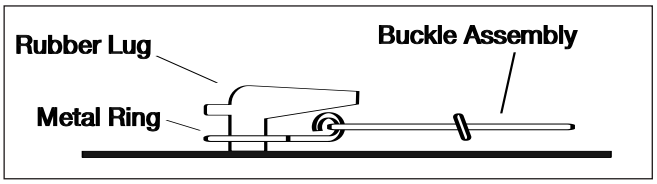
Installing the SpeeD-ON Head Harness

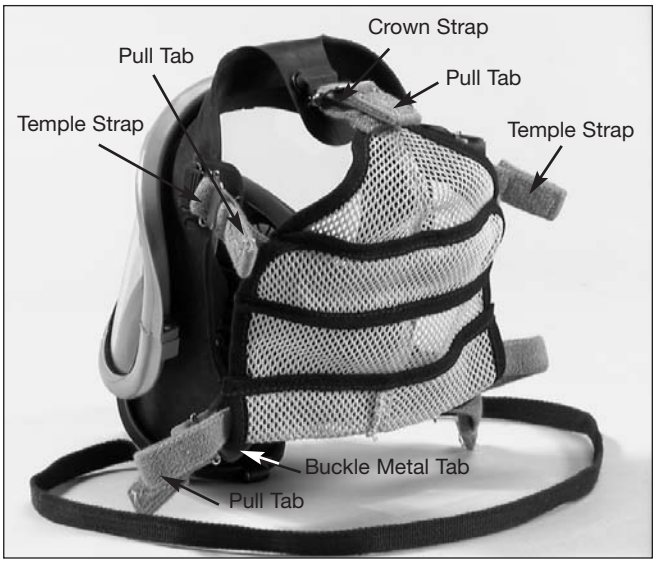
1. Install the harness strap buckles to the facepiece rubber lug at the crown and temple locations.
   a. Insert the long tab end of the rubber lug into the metal ring.

   b. Pull the entire rubber lug through the metal ring.



2. Refer to Kit 817088 Head Harness Installation Instructions, to attach the harness.





Cleaning the SpeeD-ON Head Harness

Machine wash in warm water (maximum 120°F) with a mild detergent. Hang the harness in an open area to airdry. Do not dry clean. Do not bleach or use abrasive cleaners. Do not fold or store when wet.

NOTES

ULTRA ELITE FACEPIECE DISASSEMBLY AND REPAIR

ULTRA ELITE FACEPIECE

Removing the Component Housing Cover and Slide Adapter Assembly

1. Remove the two component housing cover screws.
2. Remove the neckstrap.
3. Remove the cover by pulling it away from the housing.
4. Unthread and remove the adapter assembly.

⚠ CAUTION

Be careful not to damage the internal parts of the component housing assembly (exhalation valve, spring, retainer, or speaking diaphragm) once the cover is removed.

Installing the Slide Adapter Assembly and Component Housing Cover

Note: See Replacing Spider Valve section for installing a new spider valve and disc valve.

1. Thread the adapter assembly into the facepiece. Use the component housing cover to continue to tighten until the top flat on the octagon is horizontal.

2. Place the component housing cover over the adapter assembly.

Note: Adapter octagon flats **must** be aligned with component housing cover and component housing. If the adapter octagon flats are not aligned, use component housing cover to tighten for alignment of adapter, component housing cover, and component housing.

3. Insert the tab on the cover into the slot in the lens ring.

4. Press in on the front of the cover until the cover hook snaps into place.

5. Place the neckstrap brackets into the cover sockets. Install the phillips screws and tighten. Be careful not to cross thread the screws.
6. Verify that there is no loose play in the assembly of parts.
7. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedures.

Removing the Component Housing Cover and Pushto-Connect (PTC) Adapter Assembly

1. Remove the two component housing cover screws.
2. Remove the neckstrap.
3. Pull the cover away from the housing to release the retaining hook.

4. With the cover between the hex flats and the flange of the PTC adapter, unthread the adapter from the component housing.

Installing the Push-to-Connect Adapter Assembly and Component Housing Cover

Note: See Replacing Spider Valve section for installing a new spider valve and disc valve.

1. Insert facepiece component housing cover tab into lens ring slot, leave the cover loose.

2. Place the facepiece adapter through the facepiece component housing cover.
3. Thread the adapter assembly into the facepiece.

4. Tighten facepiece adapter until the top flat on the octagon is horizontal.

Note: The octagon flats on the facepiece adapter must align with octagon flats of component housing. If the flats do not align, tighten the adapter for proper alignment.

5. Press in on the front of the cover until the cover hook snaps into place.
6. Place the neckstrap clips into the cover sockets.
7. Install the new phillips screws and tighten.
8. Verify that there is no loose play in the assembly of parts.
9. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedures in the Operation and Instructions Manual (P/N 10023638).

Removing the Facepiece Lens Ring and Lens

⚠ CAUTION

The protective labels on the lens should not be taken off until the lens is completely assembled in the facepiece.

Note: Remove the component housing cover and adapter assembly.

1. Using a phillips screwdriver, loosen and remove the screw from each side of the facepiece lens retaining ring.

2. Remove the upper and lower lens retaining rings.
3. Fold the facepiece flange rubber back and pull the lens out of the groove.

Installing the Facepiece Lens and Lens Ring

1. Remove any dirt, lens fragments, or other debris from the groove.
2. Line up the new lens centerline marks (top and bottom) with the facepiece centerline mark.
3. Insert the top of the lens into the groove.
4. Work the facepiece rubber flange around the lens to fully seat the lens in the groove. When installed correctly, the bottom lens centerline mark lines up with the bottom facepiece centerline mark.

5. Moisten the facepiece lens groove and the inside of the component housing ring.
6. Install the bottom ring.
7. Insert the tab at the top of the component housing into the slot at the bottom center of the lower lens ring. The tab should snap into place.
8. Line up the top lens ring centerline with the facepiece rubber flange centerline mark. Press the ring into place.
9. Press the ring halves together at the top and bottom of the lens so that the ends mate.
10. Install a screw on each side. Start the screws. They should thread easily. If not, remove and reinstall the screws to avoid cross-threading. Keep hand pressure on both ring halves.
11. As the ring halves come together, alternate tightening the left and right screws to be sure the rings seat completely on the rubber flange.

⚠ CAUTION

Do not over-tighten. Rubber must not show between the lens ring ends at the joint. If this happens, reassemble.

12. Remove all lens protective papers from the new lens.
13. Reinstall the adapter assembly and the component housing cover.
14. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedure.

⚠ WARNING

Do not use a cover lens in a high-temperature environment. High temperatures may distort the cover lens. Moisture trapped between a cover lens and the facepiece lens may condense and distort vision. Always remove the cover lens before donning the facepiece. Failure to follow this warning can result in serious personal injury or death.

ULTRA ELITE FACEPIECE DISASSEMBLY AND REPAIR

Removing the Component Housing Assembly

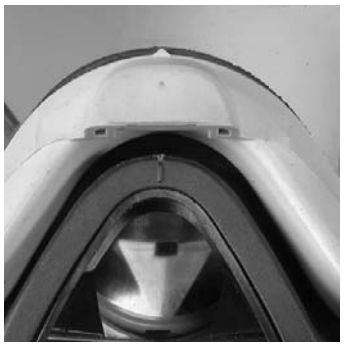
Note: Remove the component housing cover and the adapter assembly.

1. Using a small phillips screwdriver, remove the component housing ring screw. Grasp the ring with the thumb and forefinger of each hand. Gently spread the ring halves apart at the bottom.
2. When the facepiece rubber is out of the ring groove, lift the ring up away from the facepiece. You may need to pull the housing down slightly to allow enough room to remove the ring from between the housing and the lower lens ring.
3. Remove the facepiece rubber from the component housing and pull the housing and nosecup (if installed) out of the facepiece.

Installing the Component Housing Assembly

1. Slide the housing into the front of the facepiece.
2. Starting at the top (narrow end) of the housing, place the housing in the facepiece groove.
3. Work the rubber all the way around the housing.
4. Check that the housing is completely captured inside the groove and centerlines are lined up.

5. Moisten the facepiece housing area and the inside of the housing ring.
6. Insert the narrow end of the ring into the space between the lower lens ring and the facepiece housing area.
7. Line up the component housing ring mark with the facepiece centerline.



8. Starting at the top, work the housing ring down on the facepiece to capture the facepiece rubber in the ring groove. Work your way down each side of the ring until the facepiece rubber is completely captured inside the ring.

9. Gently squeeze the ring halves together at the bottom of the housing. Watch the facepiece rubber at the top as you do this. If any bulges or wrinkles appear in the facepiece rubber, it is not captured in the groove. Rework the ring around the facepiece rubber until there are no bulges or wrinkles.

⚠ WARNING

Bulges or wrinkles mean that the facepiece rubber is not seated correctly in the ring. Reinstall the ring to seat it correctly. Failure to follow this warning can cause the facepiece to leak and result in serious personal injury or death.

10. When the housing ring appears to be seated, grasp the outside of the ring and the inside of the housing at the top between your thumb and forefinger and squeeze them together. Then do the same with the ring halves at the bottom.
11. Install the screw and tighten using a small phillips screwdriver. Be careful not to cross thread the screw.

ULTRA ELITE FACEPIECE DISASSEMBLY AND REPAIR

⚠ CAUTION

Rubber must not extrude between the component housing ring ends at the joint. If this happens, reassemble.

12. Reinstall the adapter assembly and the component housing cover.
13. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedure.
14. Reinstall the nosecup or air baffle (if used) in the facepiece.

Removing the Speaking Diaphragm

1. Remove the baffle and nosecup (if installed) from inside the facepiece.
2. Unthread the speaking diaphragm retaining ring by hand and remove.
3. Turn the facepiece upside down and shake out the metal speaking diaphragm and gasket assembly.
4. Check the speaking diaphragm and gasket assembly for damage. Replace it if it is worn or damaged.

Installing the Speaking Diaphragm

1. Be sure that the gasket is on the diaphragm assembly.
2. Place the diaphragm in the retaining ring. Be sure that the gasket side of the speaking diaphragm will be facing the component housing.
3. Replace the retaining ring and hand-tighten.
4. Reinstall the nosecup or air baffle (if used) in the facepiece.
5. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedure.

Removing the Spider Valve and Inhalation Disk

1. Remove the component housing cover and the adapter assembly.

⚠ CAUTION

Be careful not to damage internal parts of the component housing assembly (exhalation valve, spring, retainer, or speaking diaphragm) once the cover is removed.

2. Pull up on the pull-tab to remove spider valve.
3. Remove the inlet disc from the spider valve and inspect for wear.
4. The inlet disc should be very soft and pliable. Install a new inlet disc if it is damaged or hardened.

Installing the Inhalation Disk and Spider Valve

1. Gently stretch the hole in the center of the disc valve over the tab on the new spider valve.
2. Note that the inlet gasket has a groove around it.
3. With the pull-tab facing you, insert the spider valve into the facepiece at an angle so that its groove captures the housing rim. The lower lip on the spider valve must be placed under the rim in the component housing.

Note: The spider valve may need bent slightly to work the groove under the rim all the way around. When installed correctly, the spider valve will lay flat in the housing and none of the spokes will be bent.

4. Reinstall the adapter assembly, and component housing cover.
5. Don the facepiece and check the face-to-facepiece seal. Follow the Facepiece Fit Check procedure. (See P/N 10023638)

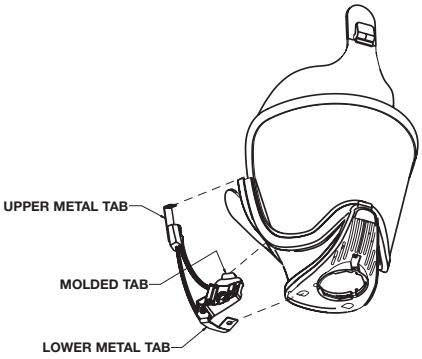
NIGHTFIGHTER HEADS-UP DISPLAY SYSTEM DISASSEMBLY AND REPAIR

NIGHTFIGHTER HEADS-UP DISPLAY SYSTEM

The NightFighter Heads-Up Display System bracket and transmitter kit is designed to attach to an MSA Air Mask with an Ultra Elite Facepiece to allow the easy attachment and removal of the NightFighter Heads-Up Display System.

Note: The NightFighter Heads-Up Display System can only be used with an Ultra Elite Facepiece.

Installing the Mounting Bracket to the Facepiece



1. Remove the component housing cover. See Removing the Component Housing Cover.

⚠ CAUTION

Be careful not to damage internal parts of the component housing assembly (exhalation valve, spring, retainer, or speaking diaphragm) once the cover is removed.

2. Using a phillips screwdriver, loosen and remove the screw from right side of the facepiece lens retaining ring. (Be sure not to lose the nut, if applicable).
3. Slide the bracket assembly onto the facepiece. Ensure that molded tab of bracket is under the lower lens ring.
4. Position the upper metal tab of the mounting bracket over the screw hole in the upper lens ring and reinstall the screw. Ensure that the screw goes through the hole in the upper metal tab. Tighten firmly.
5. Ensure the alignment of screw hole in the lower metal tab over component housing screw hole.
6. Reinstall the component housing cover. See Installing the Component Housing Cover.

Removing the NightFighter System Transmitter

⚠ WARNING

Before starting the procedures below, be sure that the cylinder valve is completely closed. Be sure that nothing blocks the regulator outlet. Open the bypass valve to relieve any pressure in the system. Failure to follow this warning can cause serious personal injury or death.

1. Use open-end wrenches to loosen and remove the harness gauge, redundant alarm, or ICM Unit from the NightFighter Transmitter.
2. Use open-end wrenches to loosen and remove the NightFighter Transmitter from the Harness Gauge Hose.
3. If the NightFighter Transmitter is equipped with the Quick-Fill coupling, there should be a spool in between the gauge and the NightFighter Transmitter. Remove the spool.
   a. Remove the O-Ring and back-up ring from each end of the spool.
   b. Use open-end wrenches to loosen and remove the Quick-Fill coupling from the transmitter body.
4. Remove the O-Ring and backup ring from the end of the harness gauge hose.

Installing the NightFighter System Transmitter

1. If the NightFighter Transmitter is equipped with the Quick-Fill coupling, replace the O-Ring on the coupling then reinstall the coupling into the Transmitter (see Installing the Quick-Fill Coupling in the Adapter Block).
2. Apply a thin film of Christo-Lube lubricant to a new back-up ring (PN 635277) and O-Ring (PN 638166). Place the backup ring in the groove on the end of the harness gauge hose.
3. Place the O-Ring in the groove on the end of the harness gauge hose. The O-Ring should be closest to the end of the hose.
4. Insert the hose fitting into the NightFighter Transmitter Block. Torque the fitting to 100-125 in-lbs.
5. Apply a thin film of Christo-Lube lubricant to two new back-up rings (PN 635277). Place one back-up ring in the groove on each end of the spool (PN 10003605).
6. Apply a thin film of Christo-Lube lubricant to two new O-Rings (PN 638167). Place one O-Ring in the groove on each end of the spool (PN 10003605).
7. Insert the spool into the pressure gauge, redundant alarm, or ICM Unit. The end of the spool with the larger-diameter hole must be inserted into the gauge.
8. Thread the gauge, Redundant Alarm, or ICM Unit into the NightFighter Transmitter. The gauge must thread in at least 6 1/2 turns with the jam nut firmly against the Transmitter Block (see Installing ICM Unit or Redundant Alarm on the Quick-Fill System Adapter Block).

NOTES

BLACK RHINO CARRIER AND HARNESS DISASSEMBLY AND REPAIR

BLACK RHINO CARRIER AND HARNESS

The low pressure and high pressure carrier and harness assemblies are identical except for the approval plate, part number disc, and the labels on the cylinder band.

Removing the Shoulder Straps from the Carrier

1. Disconnect the harness gauge hose from the first stage regulator. See Harness Gauge Hose.
2. Disconnect the intermediate pressure hose from the first stage regulator hose. See Second Stage Intermediate Pressure Hose.
3. Pull the two hoses through the shoulder strap pads.

4. Remove the screw, washer, and tee nut where the straps attach to the top of the carrier backplate. Note how the wear pads are installed.
5. Remove the screw, washer, and tee nut at the friction buckle. If both shoulder straps are being removed, pay close attention to how the screws are installed and what length screws are used at each location.

Installing Shoulder Straps to the Carrier

Note: A drop of Loctite #222 thread sealant must be placed on all screws before they are threaded into tee nuts.

1. Install the shoulder strap and wear pad on the carrier.
2. Reinstall screw, washer, and tee nut.
3. Reattach the friction buckle to the shoulder strap.
4. Reinstall screws, washers, and tee nuts.
5. Feed the intermediate pressure hose back through the shoulder strap.
6. Feed the harness gauge hose back through the shoulder strap.
7. Reconnect the hoses to the first stage regulator.

Removing the Pull-straps

1. Remove the screw, washer, and tee nut where the strap joins the triangular backpad and the backplate (attached in two places).
2. Pull the adjusting strap through the friction buckle. Pay attention to the path the strap follows for reassembly.

Installing the Pull-straps

Note: A drop of Loctite #222 thread sealant must be placed on all screws before they are threaded into tee nuts.

1. Feed the new adjusting strap through the friction buckle.
2. Using a screw, washer and tee nut, secure the new adjusting strap to the triangular backpad and backplate

Removing the Waiststrap

1. To remove the waiststrap, remove the screws, washers, and tee nuts from the triangular backpad and backplate.
2. Save the hardware for reassembly.

Installing the Waiststrap

Note: A drop of Loctite #222 thread sealant (P/N 29787) must be placed on all screws before they are threaded into tee nuts.

1. Secure the waiststrap with the screws, washers, and tee nuts saved on removal.

Removing the Backpad

1. To remove the backpad, remove the screws, washers, and tee nuts from the adjusting straps, backpad, and waiststrap.
2. Save the hardware for reassembly.

Installing the Backpad

Note: A drop of Loctite #222 thread sealant must be placed on all screws before they are threaded into tee nuts.

1. Secure with the screws, washers, and tee nuts saved on removal.

Carrier Assembly

1. To replace a carrier assembly, remove and replace the first stage regulator, shoulder pads, waiststrap, and backpad (see Removing the Backpad).

Installing the MMR Decals

1. Clean the cylinder clamp.
2. Peel the decals from the tack paper, orient, and press them into place on the cylinder clamp.

This completes the carrier and harness replacement procedures.

NOTES

AIRFRAME AND VULCAN CARRIER AND HARNESS REPAIR

AIRFRAME AND VULCAN CARRIER AND HARNESS

Removing the Right Shoulder Strap from Carrier
1. Disconnect the harness gauge hose from the first stage regulator. See the Harness Gauge Hose section.
2. Unthread and remove from shoulder strap.
3. Unthread the free end of the pull-strap (waist) from the shoulder strap friction buckle.
4. Remove the shoulder strap from the carrier by rotating the tri-bar until it can be slid through the carrier slot.

Connecting the Right Shoulder Strap
1. Attach the shoulder strap to the carrier by rotating the tri-bar until it is aligned with carrier slot.
2. Pull on shoulder strap to ensure tribar is secure.
3. Thread the free end of the pull-strap through the shoulder strap friction buckle.
4. Slide the harness gauge hose through the entire shoulder strap tunnel.
5. Connect the gauge hose to the first stage regulator. See the Harness Gauge Hose section.
6. Leak test all connections.

Removing the Left Shoulder Strap from Carrier
1. Disconnect the second stage regulator from the first stage regulator. See the Second Stage Intermediate Pressure Hose section.
2. Unthread second stage regulator from shoulder strap.
3. Unthread the free end of the pull-strap (waist) from the friction buckle of the shoulder strap.
4. Remove the shoulder strap from the carrier by rotating the tri-bar until it can be slid through the carrier slot.

Connecting the Left Shoulder Strap
1. Attach the shoulder strap to the carrier by rotating the tri-bar until it is aligned with carrier slot.
2. Pull on shoulder strap to ensure tribar is secure.
3. Thread the free end of the pull-strap (waist) through the shoulder strap friction buckle.
4. Slide the second stage pressure hose with redundant alarm through the entire shoulder strap tunnel.
5. Replace the second stage pressure hose O-ring with a new O-ring with a thin film of Christo-Lube lubricant.
6. Connect the second stage pressure hose to the first stage regulator.
7. Leak test all connections.

Removing the Pull-Straps from Carrier (both right and left straps)
1. Unthread the free end of the pull-strap from the shoulder strap friction buckle.
2. Unthread the waist belt(s) from the pull straps.
3. Remove the pull-strap from the carrier by rotating the tri-bar until it can be slid through the carrier slot.

Reassembling the Pull-Straps
1. Rotate strap tri-bar until it is aligned with carrier slot.
2. Slide the tri-bar through the carrier slot.
3. Pull on strap to ensure the tri-bar is secure.
4. Thread pull-strap free end through back of friction buckle, over the top of the slide bar, and under the front of the curved buckle.

Reassembling Double-Pull Waist Belts
1. Thread strap free end through back of friction buckle over the top of slide bar, and under the front of the curved buckle.

Reassembling Single-Pull Belt
1. Rotate strap tri-bar until it is aligned with carrier slot.
2. Slide tri-bar through carrier slot.

Chest Strap Replacement (optional)
See instructions P/N 10012166.

NOTES

CYLINDER VALVE DISASSEMBLY AND REPAIR

CURRENT CYLINDER VALVE DISASSEMBLY AND REPAIR

⚠ WARNING

Before repairing the cylinder valve, all air must be bled from the cylinder. Open the cylinder valve handwheel 1/2 turn and leave it open until all air has been exhausted. Wear hearing protection if this is done in an enclosed area to avoid possible hearing damage. Do not attempt to repair the valve if pressure is shown on the cylinder pressure gauge. If pressure cannot be relieved by opening the cylinder valve handwheel, loosen the safety plug (no more than 1/4 turn). Failure to follow this warning can result in serious personal injury or death.

Removing the Pressure Gauge

1. Remove the rubber gauge protector.
2. Unscrew and remove bezel ring and lens.
3. Store the lens in a safe place.
4. Position the cylinder valve so that the gauge is upside-down. If the plastic center-post falls out of the gauge, apply a thin film of Christo-Lube lubricant to the part and re-install it.
5. Place the gauge wrench on the gauge flats.
6. Turn the gauge counter-clockwise and remove it from the cylinder valve body.
7. Clean out the threads in the cylinder valve body to be sure no tape residue remains.

Installing the Pressure Gauge

1. Apply pipe-sealing tape to gauge threads. (see General Note 2).
2. Place the gauge wrench on the gauge flats. Turn the gauge clockwise to tighten. Do not over-tighten.
3. Position the gauge so that the gauge needle points to the threads of the cylinder valve outlet.
4. Replace the lens in the bezel ring and tighten the ring.
5. Replace the rubber gauge protector.
6. Refer to Leak Testing and check all connections.

This completes the pressure gauge replacement procedure.

Cylinder Valve Disassembly

1. Using the spanner wrench, remove the locknut and spring.
2. Remove the handwheel from the top of the valve stem.
3. Place a 7/8” socket (deep-well) on the packing gland flats.
4. Unscrew the packing gland from the valve body.
5. Pull the stem out of packing gland.
6. Remove the O-ring and valve stem washer from the packing gland.

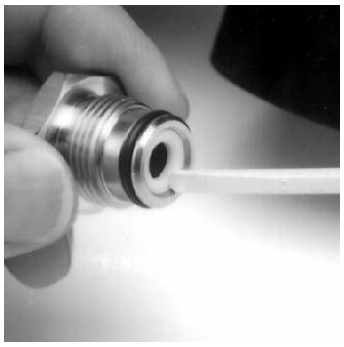
Note: The O-ring removal tool can be used to remove O-ring from the packing gland.

7. Place the valve stem back in the valve body.
8. Replace the handwheel on the valve stem.
9. Turn the stem until the slot drops onto the insert.
10. Turn the handwheel counter-clockwise until the insert can be removed.

Note: If the insert shows signs of wear or damage it must be replaced.

Cylinder Valve Reassembly

1. Using the valve stem, install the insert in the valve body.
2. Thread the stem clockwise until the insert is finger-tight.
3. Place a thin film of Christo-Lube lubricant on a new O-ring.
4. Place the O-ring on the packing gland.



5. Place a **new** washer into the packing gland. Press the washer down to its seat.
6. Insert the stem into the valve body.
7. Turn the stem until the slot drops on the insert.

8. Thread the packing gland into the cylinder valve until it is finger-tight.
9. Turn the valve stem counter-clockwise until the stem stops. Be sure the gland does not turn.

10. Using the inch-pound torque wrench with a 7/8” socket (deep-well), tighten the packing gland to 85- 105 in.lbs.

CYLINDER VALVE DISASSEMBLY AND REPAIR

11. The valve stem square must fit into the square hole in the handwheel.
12. Place the handwheel on the stem and check the valve for proper motion. The handwheel should move freely.
13. Replace the spring. Be sure that the valve is fully open to allow the locknut to be installed more easily.
14. Put one drop of Loctite #222 on the stem threads.

15. Press the locknut against the spring using the locknut spanner wrench.

16. Tighten clockwise until it is flush with the top of the handwheel.
17. Open and close the valve completely several times to seat the stem, insert, and the valve stem gasket.
18. Leak test the valve.

Removing the Burst Disc

Note: The procedures for removing and installing burst discs are the same for all models of MSA apparatus. However, part number, tools, and torque specifications do vary. Refer to the following chart for specific items.

MSA SCBA Model	Socket Size	Safety Plug	Torque Ft/Lbs.	Burst Disc & Gasket Kit
Low Pressure MMR (2216 psig)	11/16”	68550	50 - 53	482225
Low Pressure MMR (3000 psig)	3/4”	495636	26 - 30	494928
High Pressure MMR (4500 psig)	9/16”	473254	21 - 26	482226

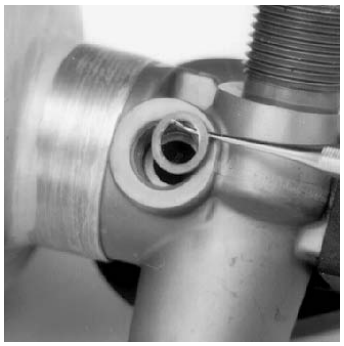
1. Place a socket on the safety plug hex flats and turn the plug counter-clockwise to remove the safety plug.

2. Use a smaller screwdriver to punch a hole in the burst disc.

3. Pull the burst disc out of the cylinder valve body.

4. Discard the disc.

5. Use the O-ring removal tool to lift the gasket out of the cylinder valve body. Be careful not to scratch the surface of the cylinder valve body.



Installing a New Burst Disc

1. Insert a new gasket into the cylinder valve body.
2. Place a thin film of Snoop on the new burst disc. Place the new burst disc on top of the gasket. Be sure the gasket and disc lay flat.

⚠ WARNING

Be sure gasket, then burst disc, are installed in the order described. Failure to install properly may cause burst disc malfunction, and can result in serious personal injury or death.

⚠ CAUTION

Do not reuse the burst disc or the copper gasket.

3. Thread the safety plug into the cylinder valve body. Use a torque wrench and socket to tighten the plug to the torque in chart.
4. Leak test the assembly.

This completes the burst disc repair procedure.

Removing the Cylinder Valve Body from the Cylinder

1. Secure the cylinder in a suitable fixture.
2. Remove the rubber pressure gauge guard.
3. Place a 13/16” crowsfoot wrench on the flats on the end of the cylinder valve.

CYLINDER VALVE DISASSEMBLY AND REPAIR

4. Turn the valve counter-clockwise until the cylinder valve is completely out of the cylinder.
5. Roll the O-ring over the threads.
6. Discard the O-ring.
7. If the cylinder valve inlet tube is damaged it must be removed using pliers.

Installing a New Inlet Tube

1. Turn the cylinder valve upside down.
2. Place one drop of Loctite #290 on the inlet tube threads.
3. Finger-tighten the inlet tube into the valve body.
4. Allow the sealant to cure for 4 hours.

Inspecting the Inside of the Cylinder

1. Use a high intensity light to inspect the inside of the cylinder for contamination. Be sure the cylinder interior is completely dry.

⚠ CAUTION

Do not use the cylinder if it has an odor, is contaminated internally, or has any visible signs of damage. If the cylinder appears damaged return it to a Certified MSA Air Mask Service Center for repair.

Installing the Cylinder Valve Body

1. Clean the O-ring sealing surface on the cylinder with a clean, dry, lint-free cloth. Be sure the cylinder sealing surface is undamaged and free from contaminants, such as dirt or tape residue.
2. Inspect the cylinder neck area. Do not use the cylinder if it has scratches, cuts, or grooves which may prevent an air-tight seal.
3. Install a new O-ring on the cylinder valve following the steps below:

⚠ CAUTION

Apply Christo-Lube lubricant to the O-ring and the O-ring groove just before installing the cylinder valve. Do not store these parts after lubricating them. Christo-Lube lubricant may collect dirt and/or contaminants.

a. Place a thin film of Christo-Lube lubricant on the new O-ring.
b. Place two small diameter drops of Christo-Lube lubricant into the O-ring groove at locations 180 degrees apart.
c. Wrap the threads with clear plastic tape.
d. Roll the O-ring (P/N 68542 for 2216psig valves; P/N 633550 for 3000psig valves; or P/N 630926 for 4500psig valves) to the bottom (male thread) end of the valve body.

e. Remove the tape.

4. Carefully insert the cylinder valve into the cylinder neck so that the sealing surface of the cylinder is not damaged by the tube or sharp edges of the valve threads.
5. Use the foot-pound torque wrench with a 13/16” crowsfoot wrench to tighten the cylinder valve to 70-75 ft.lbs.
6. Leak test the assembly. This completes the cylinder valve body replacement procedure.

Note: If after performing the remedy, the Audi-Larm still does not perform properly during the Audi-Larm test, it must be replaced.

TROUBLESHOOTING

Trouble	Probable Cause	Remedy
Cylinder pressure gauge reads low or high pressure	Cylinder temperature may be very low or high.	Bring cylinder indoors and let it sit until it comes up to room temperature (approximately 68F), then recheck pressure gauge. **⚠ WARNING** **Do not attempt to heat cylinder by using a torch or placing in an oven. Attempting to heat the cylinder in this way may cause the cylinder to rupture, resulting in serious personal injury or death.**
	Cylinder charge may be low.	Change the cylinder.
	Gauge needle may be stuck.	Tap lightly on the gauge lens. If gauge reading does not change, check to be sure indicator needle is not bent or damaged. If operation or accuracy of gauge is still doubtful, replace the gauge.
	Cylinder valve assembly may have leaks.	Completely leak test cylinder valve assembly.
High Pressure Hose is leaking.	If leak is from the end fittings, O-rings may need to be replaced.	See leak testing and repair.
Harness gauge shows different pressure from cylinder valve gauge.	Cylinder valve may not be fully opened.	Fully open cylinder valve.
	Gauge needle may be stuck.	Tap lightly on the gauge lens. If gauge reading does not change, check to be sure needle is not bent or damaged.
	Gauge accuracy is out of tolerance.	Gauges are required by NIOSH to be accurate to ±5% of full scale. If the cylinder valve gauge has a +5% accuracy and the regulator has a -5% accuracy, then a compared reading between the two gauges may differ by 10% (e.g., 220 or 300 psig on Low Pressure; and 450 psig on High Pressure). If the gauges are within this requirement, then they are acceptable. If the gauges are not, one or both should be replaced.
	Orifice blocked.	Replace hose.
Harness gauge shows unacceptable pressure drop in check procedure.	Leak at high pressure hose or coupling nut.	Check the hand-tight coupling nut for tightness. If leak continues, leak test the high pressure connections and tighten those that are leaking.
	Leak through the regulator.	Completely leak test the regulator.
Regulator has low flow performance.	Cylinder valve not fully open.	Fully open cylinder valve handwheel.
	Second Stage Regulator may require adjustment.	Return to Certified MSA Air Mask Service Center for repair.
	First Stage Regulator may require adjustment.	Return to Certified MSA Air Mask Service Center for repair.

AUDI-LARM TROUBLESHOOTING

Trouble	Probable Cause	Remedy
Audi-Larm does not ring when pressurized.	Audi-Larm bell is loose	Install new screws and washers. Refer to PIN P/N 10041212 (Single Screw) and PIN P/N 10041213 (Dual Screw)
	Dirt or foreign matter may have affected the o-ring seals inside the Audi-Larm or the proper operation of the Audi-Larm striker.	Overhaul Audi-Larm.
	Internal Leak	Overhaul Audi-Larm.
		Overhaul Audi-Larm and replace piston.
Audi-Larm leaks	Audi-Larm insert O-ring is leaking	Try to hand tighten coupling nut further onto the cylinder valve. If this is unsuccessful, the insert o-ring may need to be replaced.
	Leakage at the pipe thread fitting	Completely leak test all fittings on the Audi-Larm assembly. Relieve pressure, and then tighten if necessary.
Audi-Larm does not fully pressurize	Cylinder pressure too low	Replace cylinder with a fully pressurized cylinder.
	Internal leak	Overhaul Audi-Larm and replace piston.
	External leak	Replace Coupling-nut nipple O-ring
Audi-Larm does not start to ring at required setting	Adjustment too high	Adjustment: Turn the adjusting screw counter clockwise (out) 1/8 turn. Retest the Audi-Larm.
	Adjustment too low	Adjustment: Turn the adjusting screw clockwise (in) 1/8 turn. Retest the Audi-Larm.
Audi-Larm does not ring continually all the way down to 200 psig or lower.	Internal leak	Overhaul Audi-Larm.
		Overhaul Audi-Larm and replace piston.

Note: If after performing the *remedy*, the Audi-Larm still does not perform properly during the Audi-Larm test, it must be replaced.

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