USER'S MANUAL

AMBIENT AIR BREATHING APPARATUS (AABA) PUMPS

P/N 9806
P/N 9821
P/N 9832
P/N 9833
P/N 9846
P/N 9850

Read and understand all instructions before using this product.

Open carton carefully and inspect product for damage caused by carrier.
If any damage is found, report and submit claim to carrier.

ALLEGRO® INDUSTRIES

P/N: **UM006**

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INTRODUCTION

This manual provides instructions for the use and maintenance of Allegro Ambient Air Breathing Apparatus (AABA) Pumps. You must read and understand this manual and be trained in the proper use of the equipment before using it in a contaminated atmosphere.

There are many federal, state, and local codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary. Allegro cannot be held responsible for how the products are used and installed. Before purchase and use, the buyer must review the product application, and be sure that the product installation and use will comply with those regulations.

For more information and assistance on Allegro Products, contact Allegro Technical Support Department at 800-622-3530 or e-mail techsvc@allegrosafety.com.

DESCRIPTION

Allegro AABA pumps are designed to pump clean, breathable air from an ambient source to NIOSH approved Type C, Continuous Flow Supplied Air Respirators.

WARNINGS AND LIMITATIONS

CAUTION

NIOSH approved respirators and corresponding hose lengths must function at pressures generated by air pumps. Use only Type "C" (constant flow, low pressure) respirators with AABA pumps.

WARNING!

Exhaust filter DOES NOT remove dangerous organic vapors, gases, or particulate. DO NOT use this equipment if dangerous organic vapors, gases, or particulates are present.

WARNING!

Ambient air breathing pumps should only be used in areas containing sufficient oxygen to support life. Do not use where contaminants are Immediately Dangerous to Life and Health (IDLH).

S A F E T Y P R E C A U T I O N S

FOLLOW ALL WARNINGS AND CAUTIONS

ALL PUMPS:

DO NOT place oil-less air pump in an area that cannot GUARANTEE clean Grade D breathable air, per OSHA 29 CFR 1910.134 to the AABA inlet. See below for Grade D requirements.
DO NOT attempt to service the air pump while it is running or while it is connected to electrical or air power.
DO NOT oil or lubricate the pump.
DO NOT kink power cord and never allow the cord to come in contact with oil, grease, hot surfaces, or chemicals.
DO NOT use ungrounded electrical receptacles.
DO NOT use undersized electrical extension cords or wiring.
DO NOT use the pump as an air-filtering device for vapors, gases, or particulates.
DO NOT start pump without respirator(s) and hose(s) connected to pump.
DO NOT use Vortex type cooled respirators with Allegro pumps.
DO check all airline hoses for weakness and wear before use.
DO Ensure that all hose and plumbing connections are secure.
DO Ensure that the power source conforms to the requirements of your equipment.
DO remove aluminum canister on exhaust filter assembly and check that exhaust filter is firmly seated in place before startup.

AIR DRIVEN PUMP: (P/N 9850)

DO NOT attempt to service the air pump or air motor while it is in operation, and air source connected.
DO NOT run air motor with less than 75 cfm at 80 psi.
DO NOT run air motor with dirty particulate filter.
DO run air motor with inline lubrication properly filled and adjusted.
DO make sure that the air pressure and volume conforms to the requirements of your equipment.

EXPLOSION PROOF PUMP: (P/N 9833)

DO NOT remove plug or cord from motor. Hazardous location plug and receptacle must be used at all times.
DO NOT place pump's inlet filter (or extension) in a hazardous location.
DO ensure proper electrical power to motor.
DO ensure proper cooling for electrical motor, to avoid heat sources in a hazardous location.

NOTE: For further information on how to operate Allegro AABA pumps with various NIOSH approved respirators, please contact our Technical Support Department.

WARNING!

DO NOT run pump without attaching the breathing hose and respirator. Failure to do so may result in a "back pressure" causing damage and/or stalling the pump.

C.G.A. Grade-D Air Requirements

Oxygen	19.5 - 23.0 %
Hydrocarbons (condensed) in mg/m3 of gas	5 mg/m^3 Max.
Carbon Monoxide	10 ppm Max.
Carbon Dioxide	1,000 ppm Max.

No toxic contaminants at levels which would make the air unsafe to breathe.

USER'S INSTRUCTIONS

1) Ensure that the pump (or inlet extension filter) is in a clean uncontaminated air environment.
   - If clean air CANNOT be guaranteed at the pump inlet at all times, use the Inlet extension hose kit (P/N: 9700-65). See instructions on the Inlet extension kit below.
2) Ensure canister on the discharge filter assembly is firmly seated and secure before startup.
   - Discharge air passes through the HEPA outlet filter located inside the discharged filter assembly.
   - HEPA filter is NOT for use as protection against vapors and gases.
   - D.O.P. efficiency: 99.97% (0.3-0.6 micron particles)
3) Attach respirator/hood and air breathing hose to pump.
   - Check respirator manufacturers' recommendation for inspection/operation procedures.
   - Never start pump without hose and respirator attached.
   - This may result in excessive back pressure that will lead to pump damage.
4) Ensure that air hoses are not tightly coiled or kinked.
   - This may cause some restriction of the air flow causing the pump to run at a higher PSI and overheat.
5) Plug the pump into proper electrical outlet and turn on the power switch.
6) Properly adjust pressure relief valve. (see instructions for PRV below)
   - Pumps are designed for multiple users and may require an adjustment to the pressure relief valve to fit the number of workers using the system.
7) Don the respirator as instructed per manufacturer user's instructions.
8) Ensure all users are receiving sufficient air to the respirator.
   - Use Allegro P/N 9900-40 "Flow test kit" to verify proper airflow (CFM) to the respirator.
   - Ambient air pump gauge indicates the dynamic air pressure (back pressure), NOT air volume.
9) Enter work/contaminated area.

PRESSURE RELIEF VALVE (RPV):

1) Before making any adjustments check with the respirator manufacturer for the required CFM to that specific respirator.
2) To adjust the relief valve, loosen the lock nut.
3) Turn the adjustment knob counterclockwise to "bleed-off" air.
   - This will decrease pump output to the respirators.
   - It is important to set the proper air flow to the respirator, too much air will over work the pump motor, causing it to overheat. Too little air will not provide sufficient air to the user.
4) Turn the adjustment knob clockwise to decrease air being bled off.
   - This will increase the pressure and air flow to respirators.
   - Care must be taken to ensure that the respirator and air hose are not disconnected while pump is running, when the PRV is set to this setting. Pump damage will occur.
5) Tighten lock nut.
   - PRV must be readjusted each time the number of users, respirator type or length of air hose is changed.

INLET EXTENSION KIT: (P/N 9700-65)

1) Locate the inlet filter where breathing air CANNOT be contaminated by harmful vapors, gases, or particulate and where it will be protected from excessive moisture.
   - Inlet hose extensions may be used to increase distance from the inlet filter to the pump up to 250 feet.
   - With the use of remote Inlet Extension Hose(s), noise level at the pump is greatly reduced.
   - The noise will be transferred by the hose to wherever the Inlet Filter is located.
   - Respirators must be supplied with clean breathable air at all times, per OSHA 29CFR 1910.134.
2) In order to achieve this requirement, it may be necessary to use the inlet extension to reach a clean air environment.
3) Remove the inlet filter assembly from the pump.
4) Install inlet extension hose to the pump inlet port, using the supplied reducers/ adapters.
5) Install the inlet filter assembly on the other end of the extension hose.
   - The A300 pump will require an inlet filter assembly (P/N: 9700-08) for use with the extension hose.
6) Place the extension hose in a clean, uncontaminated environment.

TOLERANCES AND WARNINGS

Allegro ambient air pumps are precision pumps that have only .0015-.003 clearance between the top of the rotor and cylinder bore, and .003 or less clearance between end of the rotor and the end plate. Any thrust on the shaft such as mishandling or dropping the pump on its end will tend to close these clearances, causing the rotor to jam. Foreign particles, excessive dirt or dust build up may cause sluggish performance and eventual "jamming" of the pump. The pumps have carbon vanes and grease packed bearings. They **MUST NOT** be lubricated or flushed with petroleum base solvents.

All models have precision ground vanes inside the pump that take up their own wear and will last approximately 3,000 hours, depending upon workload, maintenance, speed and degree of pressure. Excessive dirt, foreign particles, or moisture could cause the vanes to stick in the rotor slots and even break. Periodic "flushing" could prevent this. Use the Allegro flushing cleaner (P/N: 9700-65) in the pump chamber only.

CAUTION!

The basic materials used in the pumps are cast iron and steel. Consequently, any moisture will tend to corrode the interior, especially when pump stands idle for extended periods.

AIR PUMP: (9850)

- The motor for the Air driven pump is a precision built rotary-type motor. The vanes for this motor take up their own wear and will last 5,000 to 15,000 hours depending upon speed, operating pressure, and the precautions taken in maintaining the motor.
- The type of shaft seal used does not lend itself to operating pressures above 100 psi (6.89 bar).
- The air motor requires a minimum of 75 cfm at 80 psi inlet pressure and volume to operate pump.
- The starting torque is less than the running torque and could vary depending on the position at which the vanes stop in relation to the air intake port.
- The speed and torque can be regulated by using the pressure regulator or shut-off ball valve to obtain desired power.

EXPLOSION PROOF PUMP: (9833)

- The Ambient air pump is rated for use in hazardous locations, however the user must ensure that the following guidelines are followed:
  - The inlet filter (or Extension) must not be in a hazardous environment; this will endanger the respirator user. Inlet filter must be in a clean uncontaminated environment at all times.
  - Testing of ambient location where inlet filter is placed is strongly recommended, to ensure it meets CGA specifications of grade D or higher.
- The pump is rated to be used in the following hazardous locations:
  - Class I, Group D
  - Class II, Group F and G
- Verify your location classification.
  - Ensure the pump design meets the hazardous class and group classifications of job site.
  - The National Electric Code divides these locations into Classes and Groups according to the type of explosive gas/agent, which may be present.
  - For specific information, consult the National Electric Code, Section 500.
- The Hazardous Location plug and receptacle must be used to hardwire the pump to the power source. Consult a qualified electrician and the National Electric Code articles 500 through 517.

CAUTION!

Hazardous location equipment may be required in any area where the presence of flammable gases, vapors or finely pulverized dusts in the atmosphere is sufficient to create a threat of explosion or fire. It may also be required where easily ignitable fibers of flyings are present.

SPECIFICATIONS

The table shows the maximum allowable number of tight-fitting respirators or loose-fitting hoods.

MODEL NUMBER	PART NO.	MAX NO. RESP.	MAX NO. HOODS	POWER REQUIRED	LBS	HP	PSI	CFM
A-300	9806	1	0	5.5A 115/230V	30	¼	0 – 15	0 – 5
A-750	9821	2	1	8.3A 115/230V	53	¾	0 – 15	0 – 10
A-1500TE	9832	3	2	16A 115/230V	97	1 ½	0 – 15	0 – 20
A-1500EX	9833*	3	2	10.6A 115/230V	122	1 ½	0 – 15	0 – 15
A-3000ATE	9846	6	4	30A 115/230V	203	3	0 – 15	0 – 32
A-4000AD	9850	4	3	75 cfm@80 psig	73	4(3,7kW)	0 – 15	0 – 20

*Single Phase Explosion Proof Motor, complete with Hazardous location type plug and receptacle.

INSPECTION

ALL PUMPS:

Regular inspection, cleaning filters, and "flushing" may prevent extensive repairs. Dirty or clogged filter elements can cause overheating (in excess of 200°F) and possible pump failure.

It is normal for the pump surface and immediate output air temperatures to reach 200°F when the unit is run continuously under a heavy load or high pressure settings.

- If there is evidence of overheating or excessive noise, stop immediately.
- High-pressure operation will shorten pump's life.
- Keep external surfaces clean for proper heat dissipation.
- Do not allow pump to operate in ambient air temperatures excess of 40°C (104°F).

Failures due to pressure buildup are due to the following:

- Improper setting of pressure relief valve
- Leaks in airline connections
- Damaged filter canister threads
- Collapsed or kinked air lines, dirty filter elements
- Vanes sticking in the rotor slots

ELECTRICAL MOTORS:

Some electrical motors are equipped with a thermal protector that shuts motor down automatically when subjected to mechanical or electrical overloads. Ensure electrical power source corresponds to what is on the motor name plate.

AIR DRIVEN MOTORS:

The air coming out of the discharge port will cool as it expands. It is important that the PVC extension (included with the blower) is used to extend the muffler from the motor discharge port. This will help prevent ice from forming on the muffler due to moisture in the air.

M A I N T E N A N C E

FILTERS:
- Change inlet filter every 200 running hours or if the pressure gauge shows a drop in pressure.
- Change discharge filter every 200 running hours or if the pressure gauge shows an increase in pressure.

FLUSHING INSTRUCTIONS:
1. Perform this procedure in a well ventilated area.
2. Wear solvent resistant gloves and eye protection while performing the flushing procedure.
3. Disconnect airline hose and respirator to prevent contamination.
4. Remove inlet filter assembly and pressure relief valve, to prevent damage to pump from back pressure.
5. Add 10-15 squirts of flushing solvent, Allegro P/N: 9700-11, through the inlet port opening.
6. Turn pump on and let run for 1 minute to flush out contaminants.
7. Repeat flushing procedure if pump is in extremely dirty or is under performing.
8. Replace inlet filter assembly and pressure relief valve.
9. Replace exhaust filter and inlet filter.
10. Reconnect airline hose and respirator, do not use respirator until all steps are complete.
11. Turn pump on for 10 minutes, this allows the flushing solution to dry out completely.

AIR DRIVEN MOTOR: (**P/N 9850**)
1. Disconnect inlet plumbing from pump and muffler assembly.
2. Add 10-15 squirts of solvent into the inlet port.
3. Rotate the shaft by hand in both directions for a few minutes.
4. Reassemble plumbing and reconnect the inlet air supply line and slowly apply pressure.
5. Flushing liquid should slowly exit the exhaust port, let run for 10 minutes
6. Reassemble exhaust assembly.

WARNING!
Keep face away from exhaust port. **DO NOT** flush unit with KEROSENE OR OTHER COMBUSTIBLE LIQUIDS. Personal injury and/or property damage will result.

LUBRICATION: (For Air Driven Pump Only **P/N: 9850**)
To lubricate the air motor (which drives air driven Model: A-400AD), use a detergent SAE #10 automotive engine oil. DO NOT lubricate air pump. For proper operation and maximum service-life, an automatic air line lubricator has been installed inline just before of the air motor.
- The lubricator should be adjusted to feed one drop of oil per minute.
- Lubrication is necessary for all internal moving parts and rust prevention.
- Excessive moisture in the air line can cause rust formation in motor and might also cause ice to form in the muffler due to expansion of air through the motor.
- The moisture problem can be corrected by installing an additional moisture separator inline.

VANE REPLACEMENT: (Consult factory prior to replacing vanes.)
To replace vanes or inspect the pump interior:
1. Remove only the endplate by removing the six bolts holding the end plate to the body.
2. Remove the endplate and the four vanes, pay attention to the direction the vanes are facing.
3. Do not remove the rotor or loosen any electric motor “through-bolts.”
4. Inspect used vanes for signs of cracking due to backpressure.
5. Inspect interior surface of chamber and rotor, for any signs of scaring or metal to metal contact.
6. Ensure surface is smooth and free of rust or contaminants, sand down surface if needed.
7. Clean with appropriate flushing solution.
8. If necessary align body to set proper clearance.
9. Insert the vanes with the beveled edge fitting the contour of the body bore of the pump.
10. The rotor should be turned while setting clearance to assure that all points on the rotor clear the body.
11. Replace the endplate and endplate bolts securely. (Do not over-tighten).

PARTS & ACCESSORIES

All Models

- 9700-02 Exhaust filter element (Each)
- 9700-11 Pump flushing liquid
- 9700-15 Exhaust filter canister (Canister only)
- 9700-65 Universal inlet hose kit (50 Feet)
- 9700-68 ⅜" Coupler, locking Hansen
- 9700-69 ⅜" Coupler, Hansen
- 9700-71 ¼" Coupler, Schrader
- 9700-72 ½" Coupler, Hansen
- 9700-73 ¼" Coupler, OBAC
- 9700-74A ¼" Coupler, Hansen

Model A-300

- 9700-04 Pressure gauge
- 9700-07 Inlet filter
- 9700-79 Pressure relief valve
- 9700-40 Service kit (includes set of 4 vanes, filters & flushing liquid)
- 9512-02A Electric power cord

Models A-750, A-750TE

- 9700-01 Inlet filter element (each)
- 9700-04 Pressure gauge
- 9700-03 Pressure relief valve
- 9700-05 Carrying handle
- 9700-06 Rubber foot (4 Ea. required)
- 9700-08 Inlet filter assembly
- 9700-09 Exhaust filter assembly (filter element incl.)
- 9700-50 Service kit (includes set of 4 vanes, filters & flushing liquid)
- 9512-02 Electric cord with integrated switch.

Models: A-1500TE, A-1500EX, A-4000AD

- 9700-01 Inlet filter element (each)
- 9700-55 Service kit (includes set of 4 vanes, filters & flushing liquid)
- 9700-76 Pressure relief valve
- 9700-77 Inlet filter assembly
- 9700-78 Exhaust filter assembly
- 9700-04 Pressure gauge

Model A-3000ATE

- 9700-76 Pressure relief valve
- 9700-78 Exhaust filter assembly
- 9842-01 Inlet filter element (each)
- 9842-04 Pressure gauge
- 9842-56 Service kit (includes set of 4 vanes, filters & flushing liquid)
- 9842-75 Electrical cord (30Amp NEMA Plug)
- 9842-77 Inlet filter assembly

T R O U B L E S H O O T I N G

ELECTRIC MODELS:

1) If motor fails:

- If motor is extremely cold.
  - Bring to room temperature before starting.
- Ensure respirator and hose are connected when pump is running; failure to do so may cause lock-up.
  - Loosen all six pump endplate bolts slightly. Re-tighten and try to run unit.

- Some motors are thermally protected. An electrical overload or mechanical failure may cause a thermally protected motor to stop running.
  - Let motor cool down (15-20 min.) and try restarting.

- If the motor fails to start or hums.
  - Pull plug and check for correct electrical current as shown on motor nameplate.
  - Check the wiring instructions on motor case or on thermal plate cover.

- If electrical motor hums but the air pump is not turning.
  - Turn off motor, loosen all six end plate bolts, then re-tighten and start unit.
  - If unsuccessful, remove endplate.
  - Check vanes and rotor for free movement.
  - Broken or chipped vanes should be replaced.

- If rust has formed in pump chamber due to exposure to moisture.
  - Sand down if necessary.
  - Clean chamber with approved solvents.

- If pump becomes noisy.
  - Check for sticking vanes.
  - Flush pump, if necessary replace vanes (see disassembly for instructions)

2) If output air hot or pump is running hot:

- If there is a drastic temperature increase on pump surface or air temperature coming out of the respirator.
  - Check alignment of pump rotor and housing. (see Maintenance section)

- If outlet pressure is too high.
  - Adjust pressure relief valve, while maintaining sufficient air flow to the respirator.

- Check inlet and/or exhaust filter for excessive dirt or dust.
  - Replace if necessary.

- Check airline hose.
  - Loosen hose coils to allow heat to dissipate.
  - Use NIOSH approved airline hose only.
  - Do not use more than 100 feet of airline hose per respirator user.
  - Joining separate lengths of airline hose to complete 100 feet will increase pressure and temperatures.

3) If there is a rise in outlet pressure:

- Check for kinked airline hoses.
- Make sure only NIOSH approved airline hoses are used
- Adjust pressure relief valve, to adjust for any change in number of users, or lengths of airline hose.
  - Check condition of filter elements.
  - Replace if necessary.

4) <u>If there is a drop in outlet pressure:</u>

- Check if exhaust filter housing and canister is cross-threaded or not seated firmly onto housing gasket.
  - Remove canister, inspect threads and gasket and reinstall.
- Check for dirty inlet filter element.
  - Replace if necessary.
- Check if vanes are sticking or worn out.
  - Flush pump with approved solvent.
  - If unsuccessful, follow instructions under **Disassembly**, to check vane condition.
  - Replace if necessary.
- Check adjustment of pressure relief valve.
  - Adjust if necessary.

<u>AIR DRIVEN PUMP:</u>

1. <u>If low torque or speed, or motor runs hot:</u>

- Check for dirt foreign material, rust, or a jammed machine.
- Check for misalignment or poor lubrication.
- Check for insufficient air pressure.
  - Inspect interior of motor, remove contaminants or foreign objects.
  - Realign motor, add lubricant to inline lubricator.
  - Check source of air (compressor) for proper pressure and CFM settings and/or capability.
  - Supply airline to the motor could be too small (1/2"I.D. minimum).
- Ensure the exhaust is not restricted.
  - Clean of debris or ice formed on muffler.
  - If ice has formed on muffler, check for excess moisture in air supply.
  - Make sure you use muffler extension.
- If runs well, then slows down.
  - Check for proper alignment, and realign.
  - Make sure the exhaust port or muffler is not restricted.
  - Make sure machine is not jammed

2. <u>If motor won't turn at all:</u>

- Check for dirt, foreign material, rust, or a jammed machine.
- Check for misalignment or poor lubrication.
- Contact Allegro Technical Support Department.

WARNING!
Shut down pump and unplug before working on unit.

WARRANTY

Damage resulting from carrier handling abuse is not covered by product warranty. To protect your interest, inspect product immediately. The following warranty information is made in lieu of all other warranties expressed, implied or statutory, including but not limited to, the implied warranties of merchantability and fitness for purpose. It is in lieu of any implied warranty of merchantability, fitness for a particular purpose or other warranty of quality, except of title and against patent infringement.

In the event any ALLEGRO INDUSTRIES' product is found to be defective in material, workmanship, or not in conformance with any expressed warranty for a specific purpose, ALLEGRO'S only obligation and your exclusive remedy shall be to repair, replace, or refund the purchase price of such parts or products upon timely notification thereof and not to exceed 1 year from date of purchase and substantiation that the product has been stored, maintained and used in accordance with ALLEGRO INDUSTRIES' written instructions. (Disposable hoods excluded.) Maximum liability is in no case to exceed the value of the ALLEGRO INDUSTRIES' unit involved.

LIMITATION OF LIABILITY

Except as provided above, ALLEGRO INDUSTRIES shall not be liable or responsible for any loss or damage, whether direct, indirect, incidental, special or consequential, arising out of sale, use, or misuse of ALLEGRO INDUSTRIES' products, or the user's inability to use such products.

Refer to this Users Manual for proper use.

Transportation charges in all cases will be at customer expense.

THE REMEDIES SET FORTH HEREIN ARE EXCLUSIVE.

FOR MORE INFORMATION AND ASSISTANCE ON ALLEGRO INDUSTRIES PRODUCTS OR PARTS CATALOG, CONTACT ALLEGRO TECHNICAL SERVICES TOLL FREE AT 1-800-622-3530, OR E-MAIL techsvc@allegrosafety.com.

RETURN POLICY

NOTE: THE FOLLOWING REQUIREMENTS MUST BE FOLLOWED IN RETURNING GOODS OR PRODUCTS TO ALLEGRO INDUSTRIES.

1. ALLEGRO INDUSTRIES requires that you obtain a Return Merchandise Authorization Number (RMA#) prior to returning merchandise to us. This number can be obtained by calling ALLEGRO INDUSTRIES Customer Service at 800-622-3530, or requesting it in writing. **NOTE: Products returned to ALLEGRO INDUSTRIES without a Return Merchandise Authorization number will not be accepted and/or processed until one is acquired.**

2. Before returning the product, decontaminate and clean it to remove any hazardous materials that may have settled on the product during use. Products suspected of asbestos and/or other dangerous contamination will be refused and returned freight collect.

3. The products or components must be returned to ALLEGRO INDUSTRIES freight prepaid, with the RMA number marked clearly on the outside of the package.