

**CALIPSO
AMBIENT AIR PUMP
O. M. 25920**

**DATE OF ISSUE: 03/15/12
REVISION:**

 **WARNING**

Do not proceed with these instructions until you have READ the orange cover of this MANUAL and YOU UNDERSTAND its contents. *

These WARNINGS are included for the health and safety of the operator and those in the immediate vicinity.

***If you are using a Clemco Distributor Maintenance and Part Guide, refer to the orange warnings insert preceding the Index before continuing with the enclosed instructions.**

Electronic files include a Preface containing the same important information as the orange cover.

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⚠ WARNING

- Read and follow ALL instructions before using this equipment.
- Failure to comply with ALL instructions can result in serious injury or death.
- In the event that the user, or any assistants of the user of this equipment cannot read or cannot completely understand the warnings and information contained in these instructions, the employer of the user and his assistants must thoroughly educate and train them on the proper operation and safety procedures of this equipment.

NOTICE TO PURCHASERS AND USERS OF OUR PRODUCTS AND THIS INFORMATIONAL MATERIAL

The products described in this material, and the information relating to those products, is intended for knowledgeable, experienced users of abrasive blasting equipment.

No representation is intended or made as to the suitability of the products described herein for any particular purpose or application. No representations are intended or made as to the efficiency, production rate, or the useful life of the products described herein. Any estimate regarding production rates or production finishes are the responsibility of the user and must be derived solely from the user's experience and expertise, and must not be based on information in this material.

The products described in this material may be combined by the user in a variety of ways for purposes determined solely by the user. No representations are intended or made as to the suitability or engineering balance of the combination of products determined by the user in his selection, nor as to the compliance with regulations or standard practice of such combinations of components or products.

Abrasive Blast Equipment is only a component of the range of equipment used in an abrasive blasting job. Other products may include an air compressor, abrasive, scaffolding, hydraulic work platforms or booms, paint spray equipment, dehumidification equipment, air filters and receivers, lights, ventilation equipment, parts handling equipment, specialized respirators, or equipment that while offered by Clemco may have been supplied by others. Each manufacturer and supplier of the other products used in the abrasive blasting job must be contacted for information, training, instruction and warnings with regard to the proper and safe use of their equipment in the particular application for which the equipment is being used. The information provided by Clemco is intended to provide instruction only on Clemco products. All operators must be trained in the proper, safe, use of this equipment. It is the responsibility of the users to familiarize themselves with, and comply with, all appropriate laws, regulations, and safe practices that apply to the use of these products. Consult with your employer about training programs and materials that are available.

Our company is proud to provide a variety of products to the abrasive blasting industry, and we have confidence that the professionals in our industry will utilize their knowledge and expertise in the safe efficient use of these products.

GENERAL INSTRUCTIONS

Described herein are some, **BUT NOT ALL**, of the major requirements for safe and productive use of blast machines, remote control systems, operator respirator assemblies, and related accessories. Completely read **ALL** instruction manuals prior to using equipment.

The user's work environment may include certain **HAZARDS** related to the abrasive blasting operation. Proper protection for the blaster, as well as anyone else that may be **EXPOSED** to the hazards generated by the blasting process, is the responsibility of the user and/or the employer. Operators **MUST** consult with their employer about what hazards may be present in the work environment including, but not limited to, exposure to dust that may contain **TOXIC MATERIALS** due to the presence of silica, cyanide, arsenic or other toxins in the abrasive, or materials present in the surface to be blasted such as lead or heavy metals in coatings. The environment may also include fumes that may be present from adjacent coatings application, contaminated water, engine exhaust, chemicals, and asbestos. The work area may include **PHYSICAL HAZARDS** such as an uneven work surface, poor visibility, excess noise, and electrical hazards. The operator **MUST** consult with his employer on the identification of potential hazards, and the appropriate measures that **MUST** be taken to protect the blaster and others that might be exposed to these hazards.

ALL machines, components and accessories **MUST** be installed, tested, operated and maintained only by trained, knowledgeable, experienced users.

DO NOT modify or substitute any Clemco parts with other types or brands of equipment. Unauthorized modification and parts substitution on supplied air respirators is a violation of OSHA regulations and voids the NIOSH approval.

OPERATIONAL INSTRUCTIONS

OPERATOR SAFETY EQUIPMENT

⚠ WARNING


- Blast operators and others working in the vicinity of abrasive blasting must always wear properly-maintained, NIOSH-approved, respiratory protection appropriate for the job site hazards.
- **DO NOT USE** abrasives containing more than one percent crystalline (free) silica. Ref. NIOSH Alert #92-102
- Inhalation of toxic dust (crystalline silica, asbestos, lead paint and other toxins) can lead to serious or fatal disease (silicosis, asbestosis, lead or other poisoning).

- **ALWAYS** wear NIOSH-approved supplied-air respirators as required by OSHA, in the presence of any dust including, but not limited to, handling or loading abrasive; blasting or working in the vicinity of blast jobs; and cleanup of expended abrasive. Prior to removing respirator, an air monitoring

instrument should be used to determine when surrounding atmosphere is clear of dust and safe to breathe.

- NIOSH-approved, supplied-air respirators are to be worn ONLY in atmospheres:
 - NOT IMMEDIATELY dangerous to life or health and,
 - from which a user can escape WITHOUT using the respirator.
- Clemco supplied-air respirators **DO NOT REMOVE OR PROTECT AGAINST CARBON MONOXIDE (CO) OR ANY OTHER TOXIC GAS.** Carbon monoxide and toxic gas removal and/or monitoring device must be used in conjunction with respirator to insure safe breathing air.
- Air supplied to respirator **MUST BE AT LEAST GRADE D QUALITY** as described in Compressed Gas Association Commodity Specification G-7.1, and as specified by OSHA Regulation 1910.139 (d).
- ALWAYS locate compressors to prevent contaminated air (such as CO from engine exhaust) from entering the air intake system. A suitable in-line air purifying sorbent bed and filter or CO Monitor should be installed to assure breathing air quality.
- ALWAYS use a NIOSH-approved breathing air hose to connect an appropriate air filter to the respirator. Use of a non-approved air hose can subject the operator to illness caused by the release of chemical agents used in the manufacture of non-approved breathing air hose.
- ALWAYS check to make sure air filter and respirator system hoses are NOT CONNECTED to in-plant lines that contain nitrogen, acetylene or any other non-breathable gas. NEVER use oxygen with air line respirators. NEVER modify air line connections to accommodate air filter/respirator breathing hose WITHOUT FIRST testing content of the air line. **FAILURE TO TEST THE AIR LINE MAY RESULT IN DEATH TO THE RESPIRATOR USER.**
- Respirator lenses are designed to protect against rebounding abrasive. They do not protect against flying objects, glare, liquids, radiation or high speed heavy materials. Substitute lenses from sources other than the original respirator manufacturer will void NIOSH-approval of this respirator.

BLAST MACHINES AND REMOTE CONTROLS

 WARNING
<ul style="list-style-type: none"> • ALWAYS equip abrasive blast machines with remote controls. • Abrasive blast machine operators must wear NIOSH-approved supplied-air respirators (ref: OSHA regulations 1910.94, 1910.132, 1910.139 and 1910.244).

- NEVER modify OR substitute remote control parts. Parts from different manufacturers are NOT compatible with Clemco

equipment. If controls are altered, involuntary activation, which may cause serious injury, can occur.

- Inspect the air control orifice DAILY for cleanliness. NEVER use welding hose in place of twinline control hose. The internal diameter and rubber composition are UNSAFE for remote control use.
- UNLESS OTHERWISE SPECIFIED, maximum working pressure of blast machines and related components MUST NOT exceed National Board approved 125 psig (8.5 BAR).
- NEVER weld on blast machine. Welding may affect dimensional integrity of steel wall and WILL VOID National Board approval.
- Point nozzle ONLY at structure being blasted. High velocity abrasive particles WILL inflict serious injury. Keep unprotected workers OUT of blast area.
- NEVER attempt to manually move blast machine when it contains abrasive. EMPTY machines, up to 6 cu. ft.(270kg) capacity, are designed to be moved:
 - on flat, smooth surfaces by AT LEAST two people;
 - with the Clemco "Mule"; or
 - with other specially designed machine moving devices.
- Larger empty blast machines or ANY blast machine containing abrasive MUST be transported by mechanical lifting equipment.

AIR HOSE, BLAST HOSE, COUPLINGS, AND NOZZLE HOLDERS

- Air hose, air hose fittings and connectors at compressors and blast machines MUST be FOUR times the size of the nozzle orifice. Air hose lengths MUST be kept as short as possible AND in a straight line. Inspect DAILY and repair leakage IMMEDIATELY.
- Blast hose inside diameter MUST be THREE to FOUR times the size of the nozzle orifice. AVOID sharp bends that wear out hose rapidly. Use SHORTEST hose lengths possible to reduce pressure loss. Check blast hose DAILY for soft spots. Repair or replace IMMEDIATELY.
- ALWAYS cut loose hose ends square when installing hose couplings and nozzle holders to allow uniform fit of hose to coupling shoulder. NEVER install couplings or nozzle holders that DO NOT provide a TIGHT fit on hose. ALWAYS use manufacturers recommended coupling screws.
- Replace coupling gaskets FREQUENTLY to prevent leakage. Abrasive leakage can result in dangerous coupling failure. ALL gaskets MUST be checked SEVERAL times during a working day for wear, distortion and softness.
- Install safety pins at EVERY coupling connection to prevent accidental disengagement during hose movement.
- ALWAYS attach safety cables at ALL air hose AND blast hose coupling connections. Cables relieve tension on hose and control whipping action in the event of a coupling blow-out.

MAINTENANCE

- ALWAYS shut off compressor and depressurize blast machine BEFORE doing ANY maintenance.
- Always check and clean ALL filters, screens and alarm systems when doing any maintenance.
- ALWAYS cage springs BEFORE disassembling valves IF spring-loaded abrasive control valves are used.
- ALWAYS completely follow owner's manual instructions and maintain equipment at RECOMMENDED intervals.

ADDITIONAL ASSISTANCE

- Training and Educational Programs. Clemco Industries Corp. offers a booklet, Blast-Off 2, developed to educate personnel on abrasive blast equipment function and surface preparation techniques. Readers will learn safe and productive use of machines, components and various accessories, including selection of abrasive materials for specific surface profiles and degrees of cleanliness.
- The Society for Protective Coatings (SSPC) offers a video training series on protective coatings including one entitled "Surface Preparation." For loan or purchase information, contact SSPC at the address shown below.

TECHNICAL DATA AND RESEARCH COMMITTEES

- The following associations offer information, materials and videos relating to abrasive blasting and safe operating practices.

The Society for Protective Coatings (SSPC)
 40 24th Street, Pittsburgh PA 15222-4643
 Phone: (412) 281-2331 • FAX (412) 281-9992
 Email: research@sspc.org • Website: www.sspc.org

National Association of Corrosion Engineers (NACE)
 1440 South Creek Drive, Houston TX 77084
 Phone: (281) 228-6200 • FAX (281) 228-6300
 Email: msd@mail.nace.org • Website: www.nace.org

American Society for Testing and Materials (ASTM)
 100 Barr Harbor Dr., West Conshohocken, PA 19428
 Phone (610) 832-9500 • FAX (610) 832-9555
 Email: service@astm.org • Website: www.astm.org

NOTICE

This equipment is not intended to be used in an area that might be considered a hazardous location as described in the National Electric Code NFPA 70 1996, article 500.


WARRANTY

The following is in lieu of all warranties express, implied or statutory and in no event shall seller or its agents, successors, nominees or assignees, or either, be liable for special or consequential damage arising out of a breach of warranty. This warranty does not apply to any damage or defect resulting from negligent or improper assembly or use of any item by the buyer or its agent or from alteration or attempted repair by any person other than an authorized agent of seller. All used, repaired, modified or altered items are purchased "as is" and with all faults. In no event shall seller be liable for consequential or incidental damages. The sole and exclusive remedy of buyer for breach of warranty by seller shall be repair or replacement of defective parts or, at seller's option, refund

- of the purchase price, as set forth below:
1. Seller makes no warranty with respect to products used other than in accordance hereunder.
 2. On products seller manufactures, seller warrants that all products are to be free from defects in workmanship and materials for a period of one year from date of shipment to buyer, but no warranty is made that the products are fit for a particular purpose.
 3. On products which seller buys and resells pursuant to this order, seller warrants that the products shall carry the then standard warranties of the manufacturers thereof, a copy of which shall be made available to customer upon request.
 4. The use of any sample or model in connection with this order is for illustrative purposes only and is not to be construed as a warranty that the product will conform to the sample or model.
 5. Seller makes no warranty that the products are delivered free of the rightful claim of any third party by way of patent infringement or the like.
 6. This warranty is conditioned upon seller's receipt within ten (10) days after a buyer's discovery of a defect, of a written notice stating in what specific material respects the product failed to meet this warranty. If such notice is timely given, seller will, at its option, either modify the product or part to correct the defect, replace the product or part with complying products or parts, or refund the amount paid for the defective product, any one of which will constitute the sole liability of seller and a full settlement of all claims. No allowance will be made for alterations or repairs made by other than those authorized by seller without the prior written consent of seller. Buyer shall afford seller prompt and reasonable opportunity to inspect the products for which any claim is made as above stated.

Except as expressly set forth above, all warranties, express, implied or statutory, including implied warranty of merchantability, are hereby disclaimed.

DAILY SET-UP CHECK LIST

 WARNING
<ul style="list-style-type: none"> • ALL piping, fittings and hoses MUST be checked DAILY for tightness and leakage. • ALL equipment and components MUST be thoroughly checked for wear. • ALL worn or suspicious parts MUST be replaced. • ALL blast operators MUST be properly trained to operate equipment. • ALL blast operators MUST be properly outfitted with abrasive resistant clothing, safety shoes, leather gloves and ear protection. • BEFORE blasting ALWAYS use the following check list.

1. PROPERLY MAINTAINED AIR COMPRESSOR sized to provide sufficient volume (cfm) for nozzle and other tools PLUS a 50% reserve to allow for nozzle wear. Use large compressor outlet and large air hose (4 times the nozzle orifice size). FOLLOW MANUFACTURERS MAINTENANCE INSTRUCTIONS.

2. BREATHING AIR COMPRESSOR (oil-less air pump) capable of providing Grade D Quality air located in a dust free, contaminant free area. If oil-lubricated air compressor is used to supply respirator, it should have high temperature monitor and CO monitor or both. If CO monitor is not used, air **MUST** be tested FREQUENTLY to ensure proper air quality.

3. Clean, properly maintained NIOSH-APPROVED SUPPLIED-AIR RESPIRATOR. ALL components should ALWAYS be present. NEVER operate without inner lens in place. Thoroughly inspect ALL components DAILY for cleanliness and wear. ANY substitution of parts voids NIOSH approval i.e. cape, lenses, breathing hose, breathing air supply hose, air control valve, cool air or climate control devices.

4. OSHA required BREATHING AIR FILTER for removal of moisture and particulate matter from breathing air supply. THIS DEVICE DOES NOT REMOVE OR DETECT CARBON MONOXIDE (CO). ALWAYS USE CO MONITOR ALARM.

5. ASME CODED BLAST MACHINE sized to hold 1/2 hour abrasive supply. ALWAYS ground machine to eliminate static electricity hazard. Examine pop up valve for alignment. Blast machine MUST be fitted with a screen to keep out foreign objects and a cover to prevent entry of moisture overnight.

6. AIR LINE FILTER installed AS CLOSE AS POSSIBLE to machine inlet. Sized to match inlet piping or larger air supply line. Clean filter DAILY. Drain OFTEN.

7. REMOTE CONTROLS MUST be in PERFECT operating condition. ONLY use APPROVED spare parts, including twin-line hose. DAILY: test system operation and check button bumper and spring action of lever and lever lock. DO NOT USE WELDING HOSE.

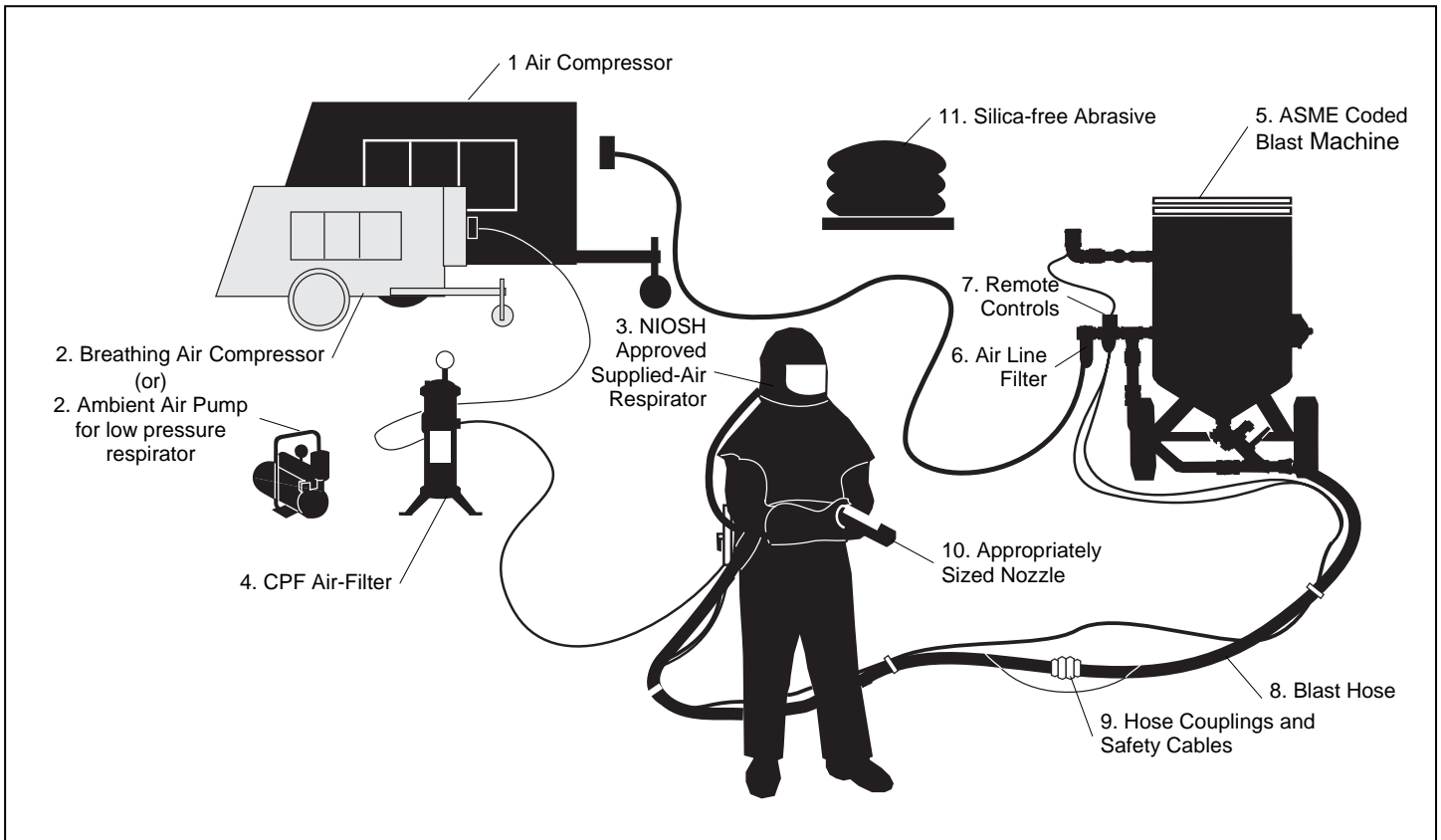
8. BLAST HOSE with ID 3 to 4 times the nozzle orifice. Lines MUST be run AS STRAIGHT AS POSSIBLE from machine to work area with NO sharp bends. Check DAILY for internal wear and external damage.

9. HOSE COUPLINGS, NOZZLE HOLDERS fitted SNUGLY to hose end and installed using PROPER coupling screws. Coupling lugs MUST be snapped FIRMLY into locking position. Gasket MUST form positive seal with safety pins inserted through pin holes. Check gaskets and replace if ANY sign of wear, softness or distortion. ALWAYS install safety cables at every connection to prevent disengagement. Check nozzle holder for worn threads. NEVER MIX DIFFERENT BRANDS OF COMPONENTS. Check each of these components DAILY.

10. Inspect NOZZLE and GASKET DAILY for wear. Replace nozzle when 1/16" larger than original size or if liner appears cracked. Check nozzle threads for wear.

11. Use abrasive that is properly sized and free of harmful substances; such as, free silica, cyanide, arsenic or lead. Check material data sheet for presence of toxic or harmful substances.

12. Test surface to be blasted for toxic substances. Take appropriate, and NIOSH required, protective measures for operator and bystanders which pertain to substances found on the surface to be blasted.



1.0 INTRODUCTION


1.1 Scope of Manual

1.1.1 This manual covers set up, operation, maintenance, troubleshooting, replacement parts, and important warnings required for safe operation of the CALIPSO Ambient Air Pump.

1.1.2 Read this entire manual and all accessory manuals before setting-up or using the pump. Clemco low-pressure respirator manuals are available on our web site www.clemcoindustries.com.

1.2 Hazard Alerts

1.2.1 Clemco uses signal words, based on ANSI Z535.2-1991, to alert the user of a potentially hazardous situation that may be encountered while operating this equipment. ANSI's definitions of the signal words are as follows:

 This is the safety alert symbol. It is used to alert the user of this equipment of potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

CAUTION

Caution used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

 **CAUTION**

Caution indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

 **WARNING**

Warning indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

 **DANGER**

Danger indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

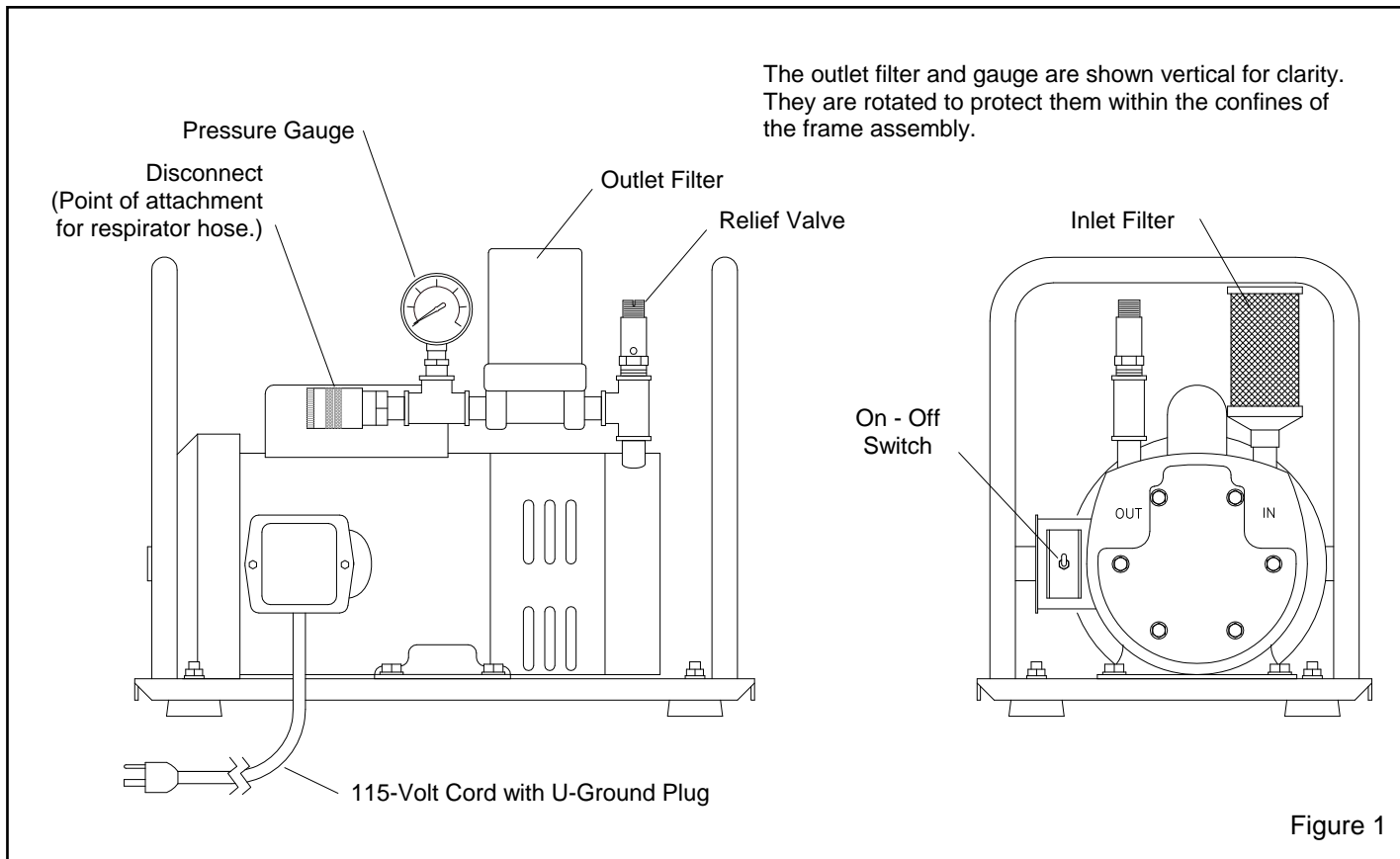


Figure 1

1.3 General Description

1.3.1 The CALIPSO Ambient Air Pump assembly is shown in Figure 1. It includes a 115-volt, 3/4 hp TEFC drive motor with supply cord and switch, an oil-less rotary vane pump unit, inlet filter, and outlet end plumbing consisting of a relief valve, pressure gauge, air filter, and disconnect. The (hose) disconnect is the attachment point for the respirator hose.

1.3.2 The pump is a non-oil lubricated air pump designed to convey 8 cfm at 10 psi of respirable ambient air to low pressure, continuous-flow, supplied-air respirators. The respirator used with the pump must be approved by NIOSH to operate at 10 psi. The pump is a compatible air source for Clemco's Apollo LP (low-pressure) Respirators.

1.3.3 The maximum continuous outlet pressure is 10 psi. The pump does not provide the pressure required to operate air-volume control valves or temperature control valves that require more than 10 psi.

WARNING

Observe all OSHA and NIOSH requirements and limits for supplied-air respirators while operating this pump. To ensure safe operation and compatibility with the respirator, read the owner's manuals and all instructions, labels, and warnings relating to the pump and respirator. Compare the air demand of the respirator with the output of the pump prior to using the pump.

WARNING

Air supply to the respirator must be Grade D or higher quality, as described in Compressed Gas Association Commodity Specification pamphlet G-7.1., titled Commodity Specification For Air, published by Compressed Gas Association Inc., Chantilly, VA. Website: www.cganet.com (29 CFR 1910.134 (i)). The pump filters are particulate filters. They do not remove carbon monoxide or other toxic gases. Air supplied to the pump intake must be at least Grade D quality. If air quality is unknown, consult a safety professional or industrial hygienist. Poor quality air will cause serious respiratory injury or death to the user.

1.4 Construction

1.4.1 The end plate, rotor and mounting bracket are cast iron and steel. Consequently, any moisture that accumulates in the pump will corrode the interior, especially if it stands idle for a long period in a humid environment. The vanes are made of hard precision ground carbon.

2.0 SET-UP

2.1 Initial Check

2.1.1 Make sure that all outlet fittings are tight.

2.1.2 Make sure the cap on the inlet filter is snug against the felt filter media. Do not over-tighten.

2.1.3 Unscrew the metal bowl on the outlet filter. Make sure the cartridge cap is snug against the cartridge. Do not over-tighten.

WARNING

The outlet filter is the final air filtering media. Do not operate the pump without the filter cartridge in place and fully seated.

2.1.4 Before reattaching the metal bowl, make sure the bowl gasket is in place in the filter body.

2.2 Placement

WARNING

To avoid risk of electrocution, do not use the pump in an area where it could be exposed to water or other liquids. If the pump is exposed to the elements, it must be weather protected.

2.2.1 Take precautions to prevent contaminants from entering the air pump's inlet. Locate the air pump inlet away from all sources of contaminants, and in an area that ensures the following conditions are continuously met.

- The area must be free of harmful vapors and gases, including carbon monoxide, found in engine exhaust, and in any form of combustion.
- The area must be free of airborne contaminants such as silica dust, generated from sandblasting, and dust from lead or other heavy metals, produced

from the removal or application of coatings containing toxic elements.

- Locate the pump away from any exhaust system outlet, ventilation flue, vehicle traffic, or source of fumes or particles of any kind.

DANGER

DO NOT operate the pump in a flammable or explosive atmosphere. An arc from the electrical system will ignite flammable or explosive gases.

- Locate the pump away from any source of heat, so that cool air can circulate around the pump. During operation, the pump becomes hot. Do not operate when ambient temperature exceeds 104° F.
- If the ambient air pump cannot be placed in an area where clean, respirable air is guaranteed at all times, use the optional air intake hose(s). A 50 ft. air intake hose and up to five additional 50 ft. extension (for a total maximum length of 300 ft.), hoses may be attached to the pump inlet, to draw air from an area where clean respirable air is ensured.

WARNING

Clemco provides intake hose and hose extensions as optional accessories. Do not substitute with homemade hose or hard pipe. Any inlet restrictions will cause rapid wear to the pump and motor, and restrict air flow to the respirator. Reduced air flow may result in ingress of hazardous dust, fumes or gases, exposing the user to immediate health risk and subsequent respiratory disease and possible death.

2.2.2 A carbon monoxide monitor such as Clemco CMS-3 In-helmet CO Monitor is recommended to safeguard against accidental transfer of CO from engine exhaust or other sources that can contaminate ambient air. Refer to Page 10, Section 8.1 for CMS-3 information.

2.2.3 Rubber shock mounts are used to minimize noise and vibration. Place the pump on a solid surface that will not resonate.

2.3 Power Supply

2.3.1 Make sure the switch located on the side of the motor is in the OFF position before plugging the cord into a grounded 115-volt outlet that provides necessary overload protection.

CAUTION

Extension cords may be used to a maximum length of 100 feet, and must be at least 14-gauge wire with ground.

WARNING

If the pump is to be permanently wired, make sure the electric motor is properly grounded and a qualified electrician familiar with national and local electrical codes and safety standards does the wiring.

2.4 Respirator Hose

2.4.1 Attach an approved respirator air supply hose (and coupling if required) to the outlet plumbing disconnect. If the disconnect is not compatible with that of the approved respirator hose, remove the disconnect and attach a compatible coupling to the 3/8" NPT threads on the filter body.

WARNING

Outlet couplings (the point of attachment) and respirator hose must be NIOSH-approved for use with the respirator. Use of non-approved couplings and hose will void the NIOSH approval of the respirator, and could restrict air flow. Do not use bushings or reducers that reduce the internal diameter of the plumbing. Reduced air flow may result in ingress of hazardous dust, fumes or gases, exposing the user to immediate health risk and subsequent respiratory disease and possibly death.

CAUTION

The hose disconnect coupling on the pump is not equipped with a shut-off. Therefore, if the respirator hose is disconnected from pump while it is in operation, air will continue to flow freely from the coupling. Any couplings added to enable the use of other approved hose should not have a shut-off valve. The reason the coupling is not equipped with a shut-off valve is to prevent excessive pressure build-up, if the respirator hose were removed from the pump before it is shut off.

3.0 OPERATION

WARNING

Do not use this pump to supply air to any respirator used in atmospheres immediately dangerous to life or health.

WARNING

Do not use this pump to supply air to any respirator for which the air demand is unknown. Do not use with respirators that have approved minimum pressure exceeding 10 psi. This pump may not provide sufficient air volume to those respirators. Do not use respirators that are not NIOSH-approved.

CAUTION

The maximum recommended continuous operating pressure for this pump is 10 psi. Do not remove the relief valve or operate above 10 psi. Doing so will damage the motor and pump unit.

3.1 Start-Up

3.1.1 If the pump is extremely cold, allow it to warm to room temperature before starting. Start the pump by positioning the switch to ON. Do not operate in ambient air temperatures in excess of 104 degrees Fahrenheit (40 degrees C).

3.1.2 Attach the respirator hose to the pump, and run the pump for several minutes to expel hose odor and condensation from the hose, before connecting it to the respirator.

3.1.3 Connect the hose to the respirator.

3.1.4 Check respirator hose and connections for tightness and leaks.

3.1.5 Don the respirator in a clean non-hazardous environment, free of contaminants, where the air is safe to breathe.

WARNING

Do not don the respirator, or store it in a blast contaminated or other contaminated environment.

3.1.6 Enter the work area only after air is supplied to the respirator, the respirator is correctly fitted and all conditions specified by the respirator manufacturer are met.

3.2 During Operation

3.2.1 During operation, it is normal for the pump to become hot. Some of the heat is transferred to the air, causing it to become warmer than ambient. To prevent excessive heat build-up in the respirator hose, stretch-out the hose and keep it in shaded areas when possible. Do not place the hose in direct sunlight, on hot surfaces, or near any other source of heat.

WARNING

The end plate and shroud may become hot enough during operation to burn skin. Do not touch these parts until the pump has been turned off and has cooled.

3.2.2 If the air inside the respirator becomes uncomfortably hot, coil the respirator hose in the bottom of a large, covered, container filled with water and ice.

3.3 Shut-down

3.3.1 Remove the respirator outside the respirator-use area and where the air is safe to breathe.

WARNING

Do not remove the respirator in a contaminated environment except for emergency evacuation when the use of the respirator hinders escape.

3.3.2 Shut off the pump when the respirator is not in use. Stop the pump by positioning the switch to OFF.

3.3.3 If the pump is used outdoors, move it indoors when not in use.

3.4 Storage

3.4.1 The pump is made of material that is subject to corrosion if left idle for a period, especially under humid conditions.

3.4.2 Before storing the pump for an extended period, disconnect the inlet filter and outlet plumbing, and allow the pump to run open for at least 5 minutes before shutting down.

3.4.3 Unplug the power cord, and plug the inlet and outlet ports to prevent dirt and other contaminants from entering the pump assembly.

3.4.4 Store the pump in a clean, dry environment.

4.0 ADJUSTMENTS

4.1 There are no adjustments on the CALIPSO air pump.

CAUTION

The relief valve is set to open at 10 psi. Do not attempt to adjust, remove, or otherwise alter the relief valve. Doing so will damage the motor and pump unit.

5.0 MAINTENANCE

⚠ WARNING

The electric motor may be thermally protected, and will automatically restart when the protector resets. To prevent injury, disconnect the power and make sure all rotating components are at a standstill before servicing.

⚠ WARNING

The end plate and shroud may become hot enough during operation to burn skin. Do not touch these parts until the pump has been turned off and cooled.

CAUTION

Never lubricate the oil-less air pump. The carbon vanes and grease packed motor bearings require no oil. The service life of the vanes will be reduced by use of petroleum or hydrocarbon products.

5.1 Inlet filter, Ref. Figure 2

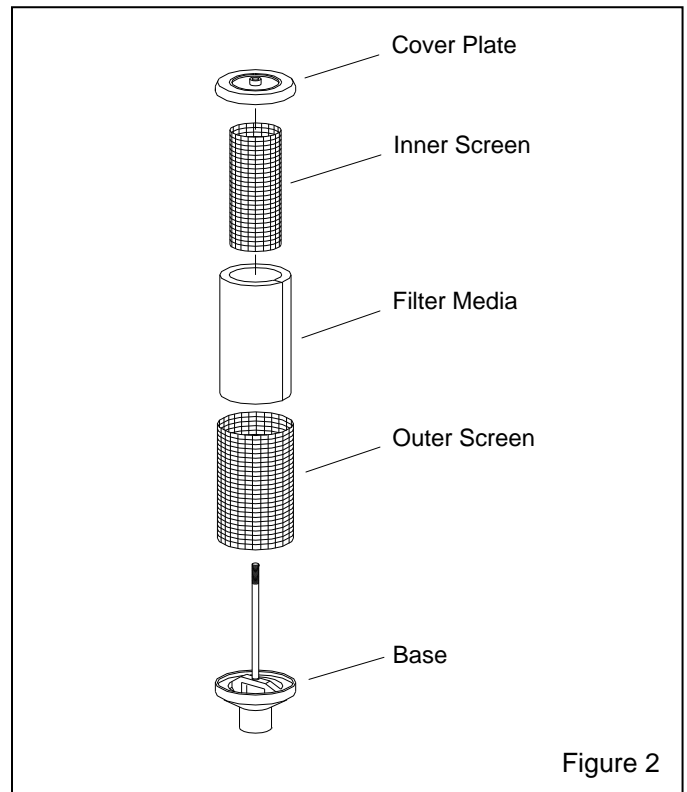


Figure 2

5.1.1 The inlet filter ensures that no foreign particles enter the pump inlet. A dirty filter restricts air flow, and if not corrected could lead to possible motor overload, poor performance and early pump failure.

5.1.2 Check the inlet filter for contamination every 100 hours of operation. To remove the filter media, unscrew the cover plate, remove the filter media, and screen assembly.

5.1.3 Remove the inner and outer screens from the filter media.

5.1.4 Place the cleaned or new filter media between the inner and outer screens. Replace the media at least every 500 hours of operation. The ends of the filter media must protrude past the screens. This assures a tight seal against the cover plate and base.

5.1.5 Place the filter assembly on the base and tighten the cover plate snugly against the filter. Do not over-tighten.

CAUTION

Over-tightening the cover plate will damage the screens.

5.2 Outlet Filter, Ref. Figure 3

5.2.1 Check the filter regularly to make sure the cartridge is not blocked and causing an air restriction.

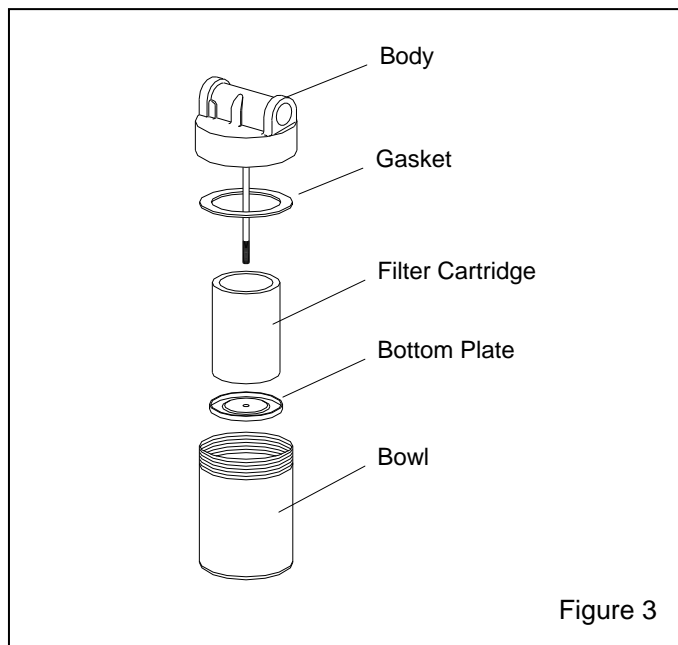


Figure 3

5.2.2 Replace the cartridge at least every 200 hours of operation, sooner if a decrease of air is noted at the respirator, if pressure increases above normal at the gauge, or if the relief valve activates.

5.2.3 To remove the filter cartridge, unscrew the bowl and bottom plate.

5.2.4 Inspect the gasket and replace if damaged.

5.3 Flushing, Ref. Figure 4

⚠ WARNING

Use Gast Flushing Solvent No. AH255D (www.gastmfg.com) to flush the pump. DO NOT use kerosene or other petroleum-based solvents. These solvents are flammable, and may contaminate the pump with harmful vapors.

5.3.1 Should excessive dirt, foreign particles, moisture, or oil enter the pump, the vanes will act sluggishly or break. If the pump is unused for a period of time, surface-rust may develop in the pump and cause the same condition. Flushing the pump normally removes these contaminants.

5.3.2 Remove the inlet filter.

5.3.3 To prevent the flushing solvent from entering the outlet filter and breathing air channel, remove the entire outlet plumbing assembly, as shown in Figure 4. Rotating the assembly away from the motor may be required to remove as an assembly, or, remove in section as needed

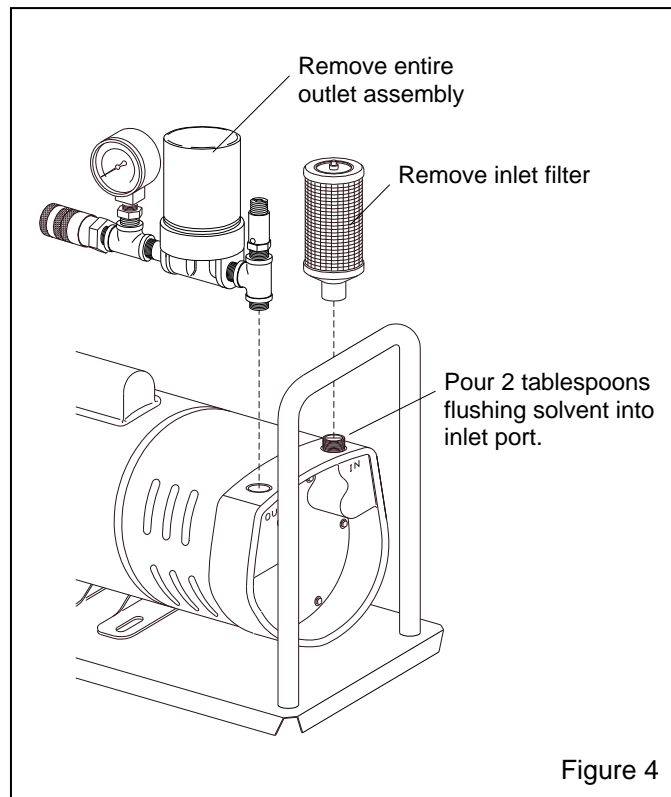


Figure 4

5.3.4 Point the outlet in a safe direction, away from any objects.

5.3.5 With the pump running, pour about two tablespoons of flushing solvent into the inlet port.

5.3.6 If necessary, repeat the flushing procedure. If flushing has freed the vanes, continue with this section. If flushing does not remedy the situation, inspect the pump assembly per Section 5.4.

5.3.7 Run the pump until all traces of solvent odor have disappeared. **DO NOT REASSEMBLE UNTIL DISCHARGE AIR IS FREE OF SOLVENT ODOR.**

5.3.8 Reassemble the outlet assembly and respirator hose.

5.4 Pump Inspection

5.4.1 Unplug the electric supply cord, or disconnect the electrical power. Lockout and tagout the power supply, if the unit is permanently wired.

WARNING

Failure to disconnect the power source could result in severe injury from the motor starting, or injury or death from electrical shock.

5.4.2 Remove the respirator hose.

CAUTION

Disassemble and reassemble the pump in a clean environment; all parts should be clean and dry.

5.4.3 Remove the six bolts holding the end plate to the pump body, as shown in Figure 5.

5.4.4 Remove the end plate.

CAUTION

DO NOT remove the rotor or loosen any electric motor through-bolts. Alignment and tolerances are critical for the performance of the pump. The motor, rotor and body are not field-serviceable. Any service other than vane replacement must be performed by an authorized service facility. Contact Clemco Customer Service at 636-239-4300.

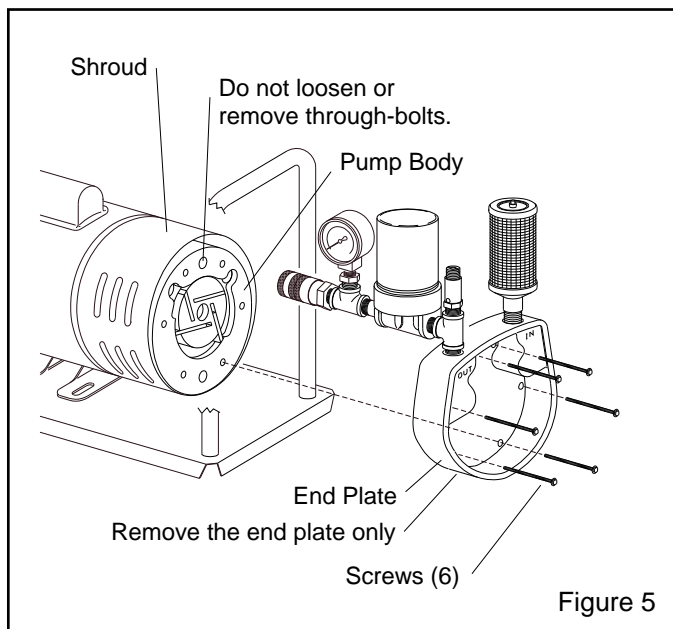


Figure 5

5.4.5 Before removing the vanes, note how the beveled edges on the vanes conform to the contour of the body's bore, Ref. Figure 6. They must be reinstated in the same position.

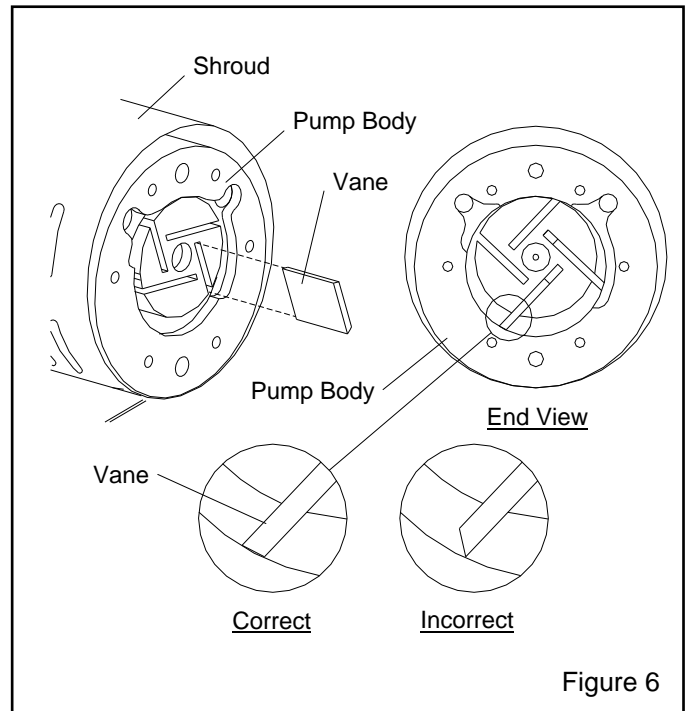


Figure 6

5.4.6 Inspect the body for scoring. If severe scoring is visible, or if bearings need replacement, or any further maintenance is required, return the complete pump to an authorized service facility.

5.4.7 The vanes could be worn or require further cleaning. When reinstalling or replacing the vanes, face the bevels in the proper direction as shown in Figure 6.

5.4.8 Reinstall the end plate, and tighten the bolts holding the end plate to the body.

5.4.9 Before putting the pump back in service, inspect all external accessories for wear and damage. Check the inlet and outlet filters for contamination.

6.0 TROUBLESHOOTING

WARNING

To avoid the risk of injury from electrical shock, all electrical troubleshooting should be performed by a qualified electrician.

6.1 Low Pressure at Pump

6.1.1 Make sure the pressure gauge is operational. Replace if faulty.

6.1.2 Make sure the outlet filter bowl gasket is in place and that it is not worn, and the bowl is tight against the gasket.

6.1.3 Check the outlet plumbing for leaks.

6.1.4 Inlet filter media dirty. Remove and clean, or replace.

6.1.5 Optional intake hose blocked or collapsed. Make sure the intake hose is unobstructed.

6.1.6 Vanes sticking. Flush.

6.1.7 Vanes worn. Replace.

6.1.8 Dust in pump. Flush.

6.1.9 Motor not running at full RPM. Check power supply and wiring.

6.1.10 Make sure the pressure range of the respirator is compatible with the pump. The pump produces 8 cfm at 10 psi.

6.2 High Pressure at Pump

6.2.1 Restrictions at respirator or respirator hose. Make sure the pressure range of the respirator and the size of the respirator hose is compatible with the pump.

WARNING

Clemco low-pressure respirators require 1/2" ID approved respirator hose. 3/8" ID hose used with high-pressure respirators causes restrictions, and does not supply the air volume needed for low-pressure respirators.

6.2.2 Outlet filter cartridge dirty. Replace.

6.2.3 Restriction in respirator hose such as a pinch, kink, blockage, or undersized hose. Inspect hose.

6.3 Pump Overheating

6.3.1 Restriction at respirator or respirator hose. Make sure the pressure range of the respirator and the size of the respirator hose is compatible with the pump.

6.3.2 Dirty inlet and/or outlet filter. Clean or replace.

6.3.3 Optional intake hose blocked or collapsed. Make sure the intake hose is unobstructed.

6.3.3 Relief valve stuck closed. If outlet pressure is above 10 psi, the relief valve should open. If it does not open, replace it.

6.3.4 Dust in pump. Flush.

6.3.5 Faulty power supply.

6.3.6 Undersized or too long an extension cord. Cord must be at least 14-gauge wire, and maximum length of 100 feet.

6.4 Motor Overload

6.4.1 Dirty inlet and/or outlet filter. Clean or replace.

6.4.2 Intake hose blocked or collapsed. Make sure the intake hose is unobstructed.

6.4.3 Relief valve stuck closed. If outlet pressure is above 10 psi, the relief valve should open. If it does not open, replace it.

6.4.4 Restriction in respirator hose such as a pinch, kink, blockage, or undersized hose. Inspect hose.

6.4.5 Dust in pump. Flush.

6.4.6 Motor not running at full RPM. Check power supply and wiring.

6.4.7 Undersized or too long an extension cord. The cord must be at least 14-gauge wire, and maximum length of 100 feet.

6.4.8 Allow pump to cool before restarting.

6.5 Motor Fails to Start or Slows Down

- 6.5.1 High pressure at pump. Refer to Section 6.2.
- 6.5.2 Motor overloaded. Refer to Section 6.4. Allow pump to cool before restarting.
- 6.5.3 Check power supply for open breakers or blown fuses.
- 6.5.4 Make sure the supply voltage conforms to the requirements on the motor data plate.
- 6.5.5 Dirt in pump assembly. Flush the pump. If flushing does not correct the condition, inspect the vanes, rotor and pump body.
- 6.5.6 If anything appears to be wrong with the motor, contact an authorized service facility.

6.6 Low Pressure at the Respirator

- 6.6.1 Inlet or outlet filter dirty. Replace.
- 6.6.2 Leaks at outlet plumbing. Check fittings and outlet filter for leaks.
- 6.6.3 Restriction in respirator hose such as a blockage, pinch, kink, or undersize hose. Inspect hose.
- 6.6.4 Respirator pressure not compatible with air pump. Check respirator operating pressure; it must be approved to operate at 10 psi.

6.7 High Pressure at the Respirator

- 6.7.1 Respirator pressure not compatible with air pump. Check respirator operating pressure; it must be approved to operate at 10 psi.
-

7.0 Warranty

7.1 The CALIPSO ambient air pump is warranted to be free from defects in materials and workmanship by the manufacturer for a period of one year from the original date of shipment from Clemco Industries Corp.

This warranty does not apply to any damage or defect resulting from negligent or improper use of the product, or from any alterations or attempted repair by any persons other than an authorized agent. The warranty is extended to the pump only, and does not include any add-on accessories such as filters and fittings.

All warranty claims or repair service inquiries should be made by contacting Clemco Customer Service at 636-239-4300 or info@clemcoindustries.com. Only after obtaining a Returned Goods Authorization (RGA), should the pump be returned. All returns are to be shipped freight prepaid and include a written explanation of the failure as well as return shipping instructions.

8.0 ACCESSORIES and REPLACEMENT PARTS

Never substitute, modify, add, or omit parts. Use only genuine replacement parts in the configuration as specified by the manufacturer.

8.1 Optional Accessories

Item	Description	Stock No.
(-)	Hose kit, air intake hose, 50 ft.	21837
(-)	Hose extension kit, intake hose, 50 ft.	21838
(-)	Intake kit, elevated air stack	21839
(-)	CMS-3 CO Monitor Package	24612
	CMS-3 Literature is available on our web site www.clemcoindustries.com .	

8.2 Replacement Parts, Figure 7

Item	Description	Stock No.
(-)	CALIPSO Ambient Air Pump	25908
1.	Filter media, inlet filter	21830
2.	Filter cartridge, outlet filter	15030
3.	Gasket, outlet filter bowl	21831
4.	Gauge, 1/4" pressure, 0 - 30 psi	21832
5.	Relief valve	21833
6.	Disconnect, 3/8" NPT	21834
7.	Vaness, set of 4	21835
8.	Inlet filter assembly	21836
9.	Outlet filter assembly	24204
10.	Foot, rubber, each	25903
11.	Washer, 5/16 lock	03217
12.	Nut, 5/16-NC hex	03211

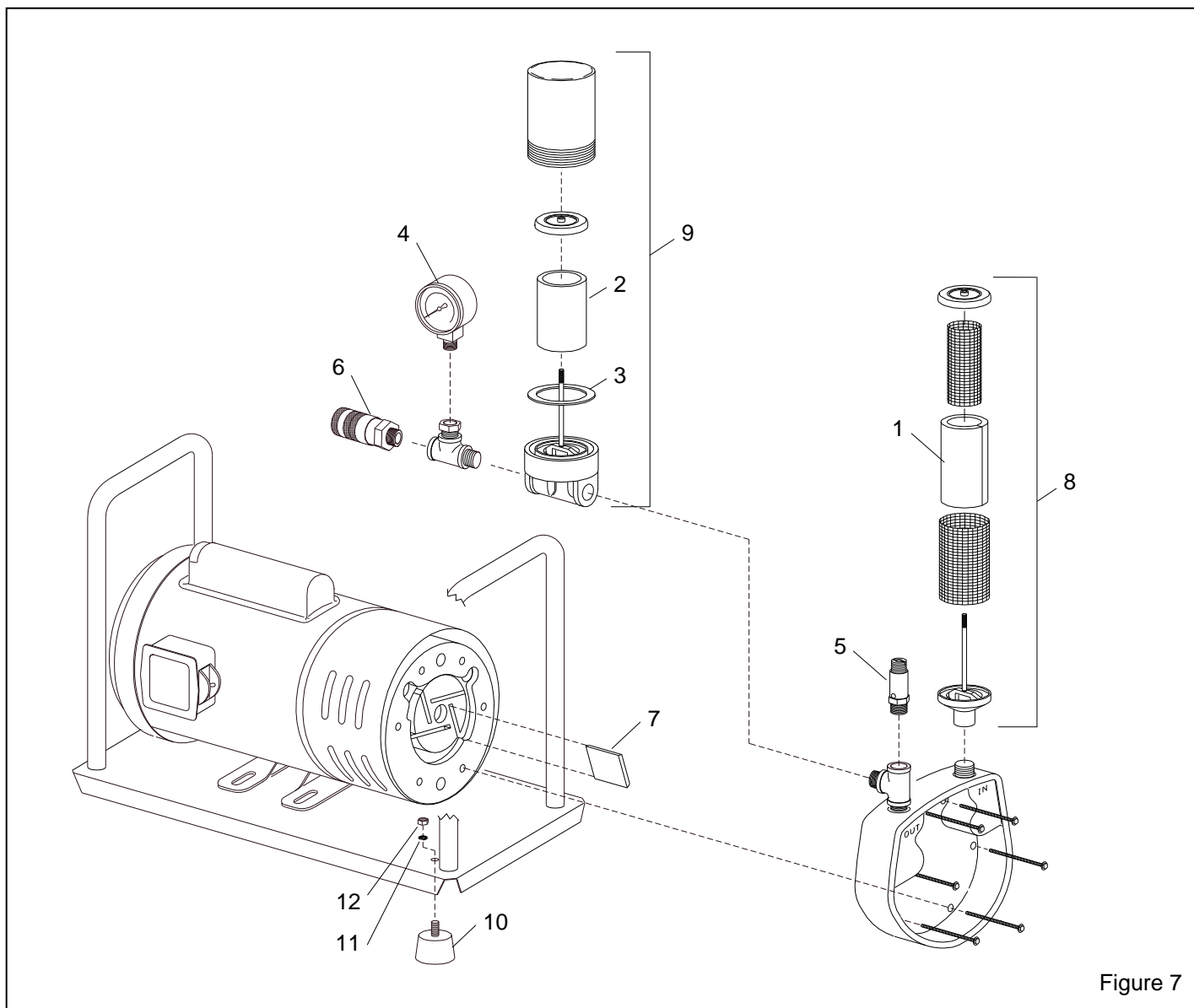


Figure 7