

**AMBIENT AIR PUMP MODEL CAP-1
O.M. 21909**

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 **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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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 trouble free operation of the Clemco CAP-1 Ambient Air Pump. Read the entire manual before attempting operation of the pump.

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.

1.3 General Description

1.3.1 The CAP-1 Ambient Air Pump assembly is shown in Figure 1. It includes a 115-volt, 3/4 hp drive motor with supply cord, an oil-less rotary vane pump unit, inlet filter/muffler, 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.

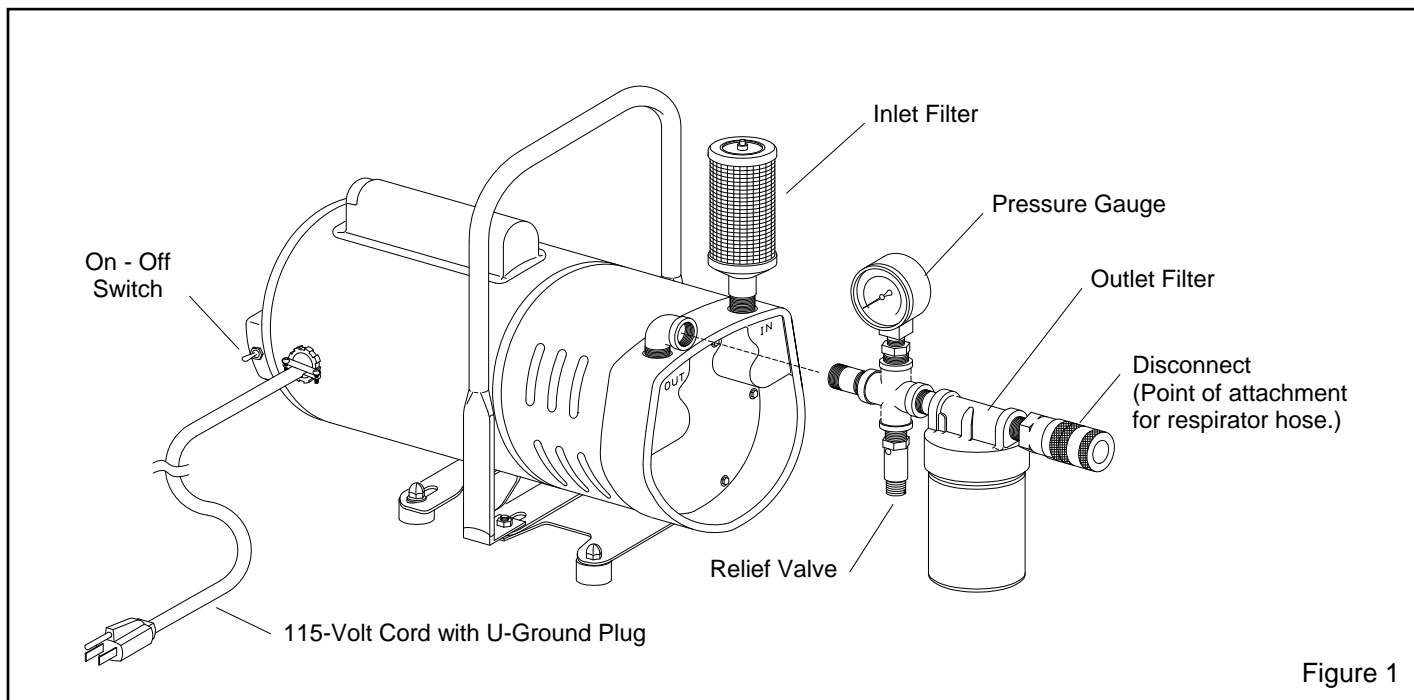


Figure 1

1.3.2 The pump is an oil-less air pump designed to convey respirable ambient air to low pressure, continuous-flow, supplied-air respirators, approved by NIOSH to operate at 10 psi.

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. The pump is a compatible air source for Clemco's Apollo LP (low-pressure) Respirators.

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 Assembly

2.1.1 Connect the outlet plumbing assembly to the elbow on the outlet port, as shown in Figure 1.

2.2 Initial Check

2.2.1 Make sure that all outlet fittings are tight.

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

2.2.3 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.

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

2.3 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.

2.3.1 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.), hose 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.

2.3.2 An ambient-air, carbon monoxide monitor is recommended to safeguard against accidental transfer of CO from engine exhaust or other sources that can contaminate ambient air.

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

2.4 Power Supply

2.4.1 Make sure the switch located on the back 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.

2.5 Respirator Hose

2.5.1 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" 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 the respirator is correctly fitted and in place, air is supplied to the respirator, 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 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 of time, 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 CAP-1 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. To do 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.

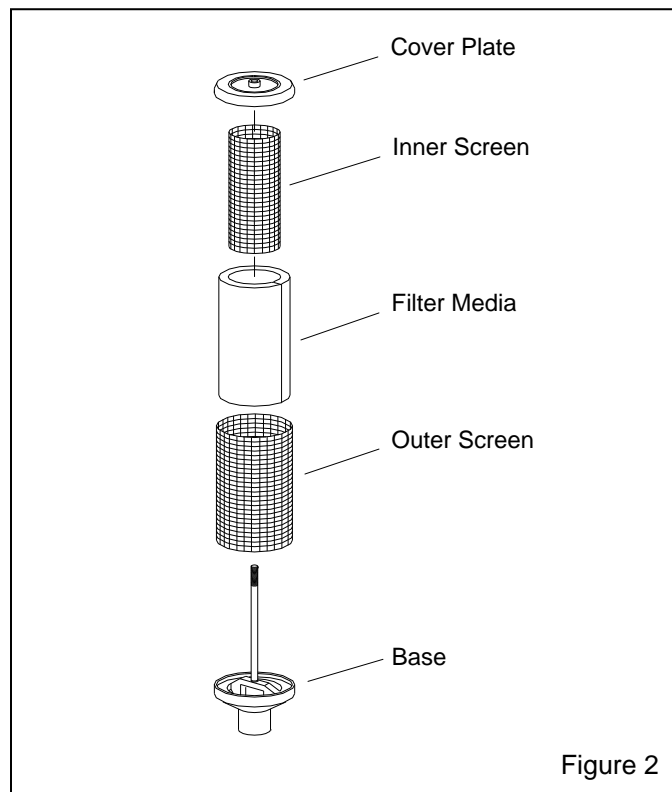
⚠ WARNING

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



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.

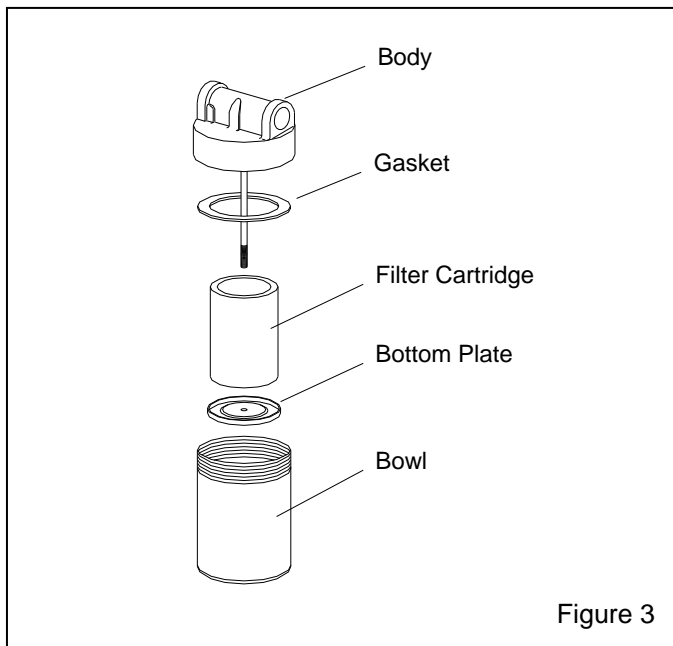


Figure 3

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. AH255B, Locktite Safety Solvent, or equivalent 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 up to but not including the 90° st. elbow, as shown in Figure 4.

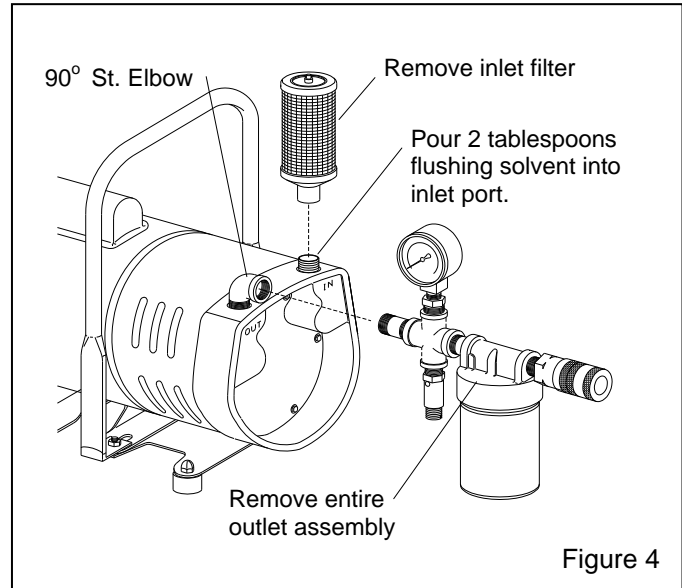


Figure 4

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

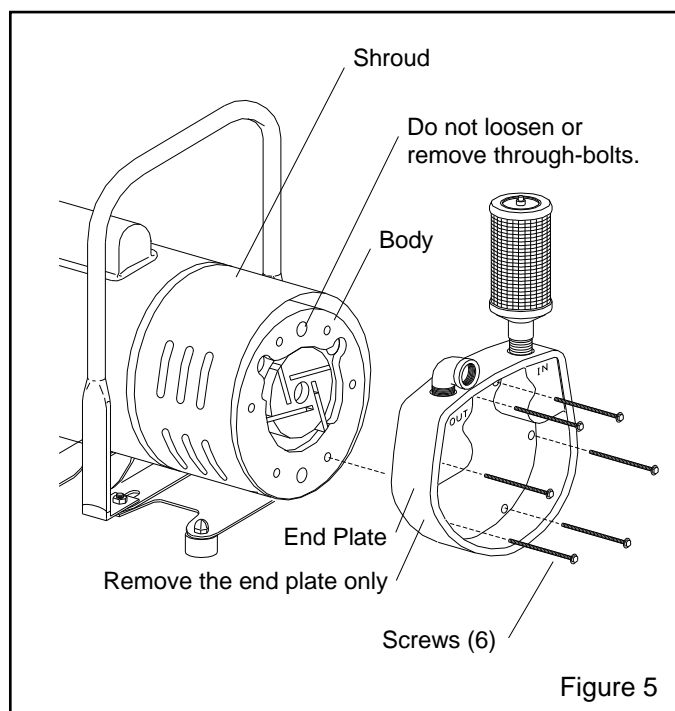
Disassemble and reassemble the pump in a clean environment; all parts should be clean and dry.

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

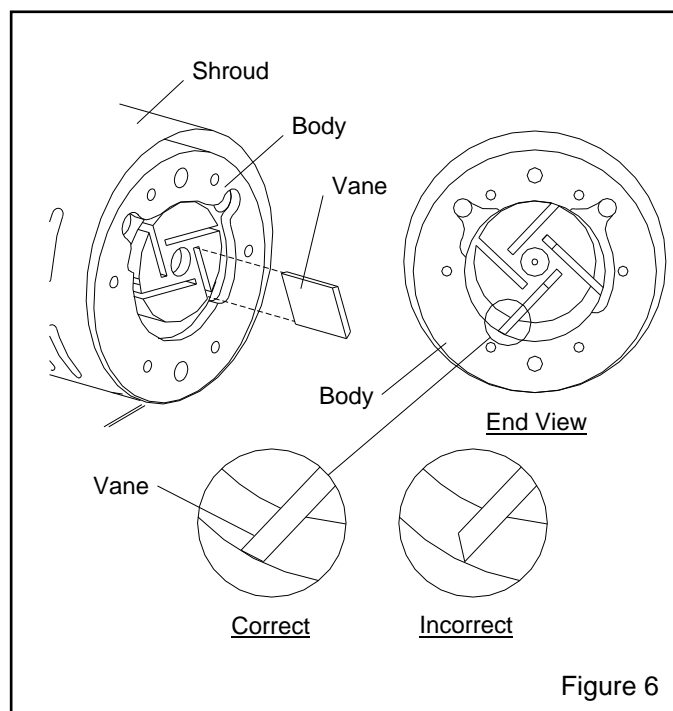
5.4.4 Remove the end plate.

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 Gast Mfg. Corp., (269) 926-6171 for a service facility referral.



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



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, check 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.

6.2 High Pressure at Pump

6.2.1 Outlet filter cartridge dirty. Replace.

6.2.2 Restriction (such as a pinch or kink) in respirator hose. Check hose.

6.3 Pump Overheating

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

6.3.2 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 (such as a pinch or kink) in respirator 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.

6.5 Motor Fails to Start or Slows Down

6.5.1 Check power supply for open breakers or blown fuses.

6.5.2 Make sure the supply voltage conforms to the requirements on the motor data plate.

6.5.3 If anything appears to be wrong with the motor, contact an authorized service facility.

6.5.4 Dirt in pump assembly. Flush the pump; if flushing does not correct the condition, inspect the vanes, rotor and body.

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 Blockage, kink, or break in respirator hose. Check 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 ambient air pump is warranted to be free of 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 assembly or 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 should be made by contacting the manufacturer for the name and location of the nearest service facility. Return the pump prepaid, and include a written explanation of the failure, and return shipping information.

Contact:

Gast Manufacturing Corp.
2300 Highway M-139
Benton Harbor, MI 49023
Tel: (269) 926-6171
FAX: (269) 927-0808
Website: www.gastmfg.com

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. |
|------|---|-----------|
| (-) | Intake hose kit, 50 ft. | 21837 |
| (-) | Extension kit, intake hose, 50 ft. | 21838 |
| (-) | Elevated intake stack kit | 21839 |

8.2 Replacement Parts, Figure 7

| Item | Description | Stock No. |
|------|--|-----------|
| (-) | CAP-1 Ambient Air Pump | 22383 |
| 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" | 21834 |
| 7. | Vaness, set of 4 | 21835 |
| 8. | Inlet filter assembly | 21836 |
| 9. | Outlet filter assembly | 24204 |

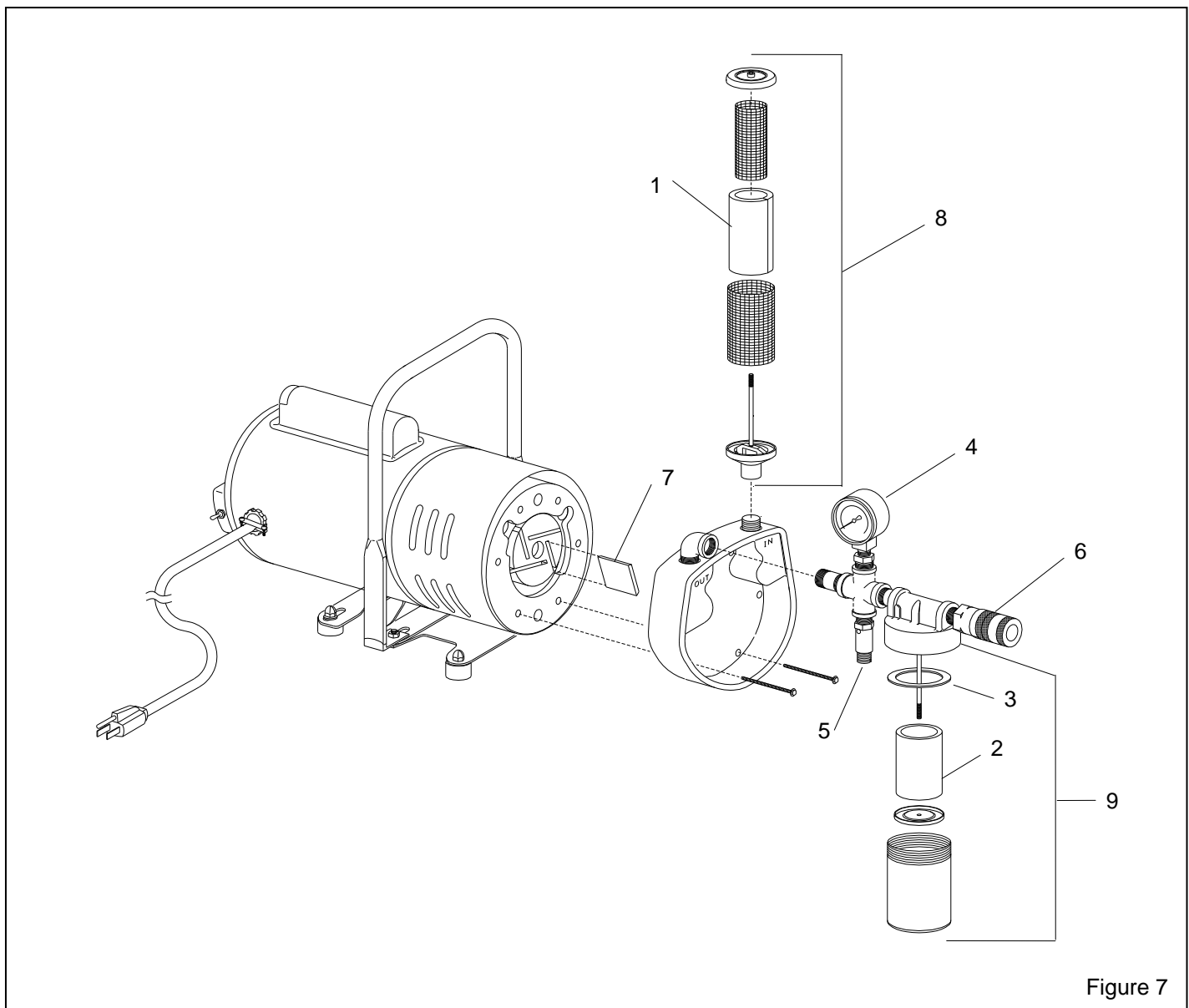


Figure 7