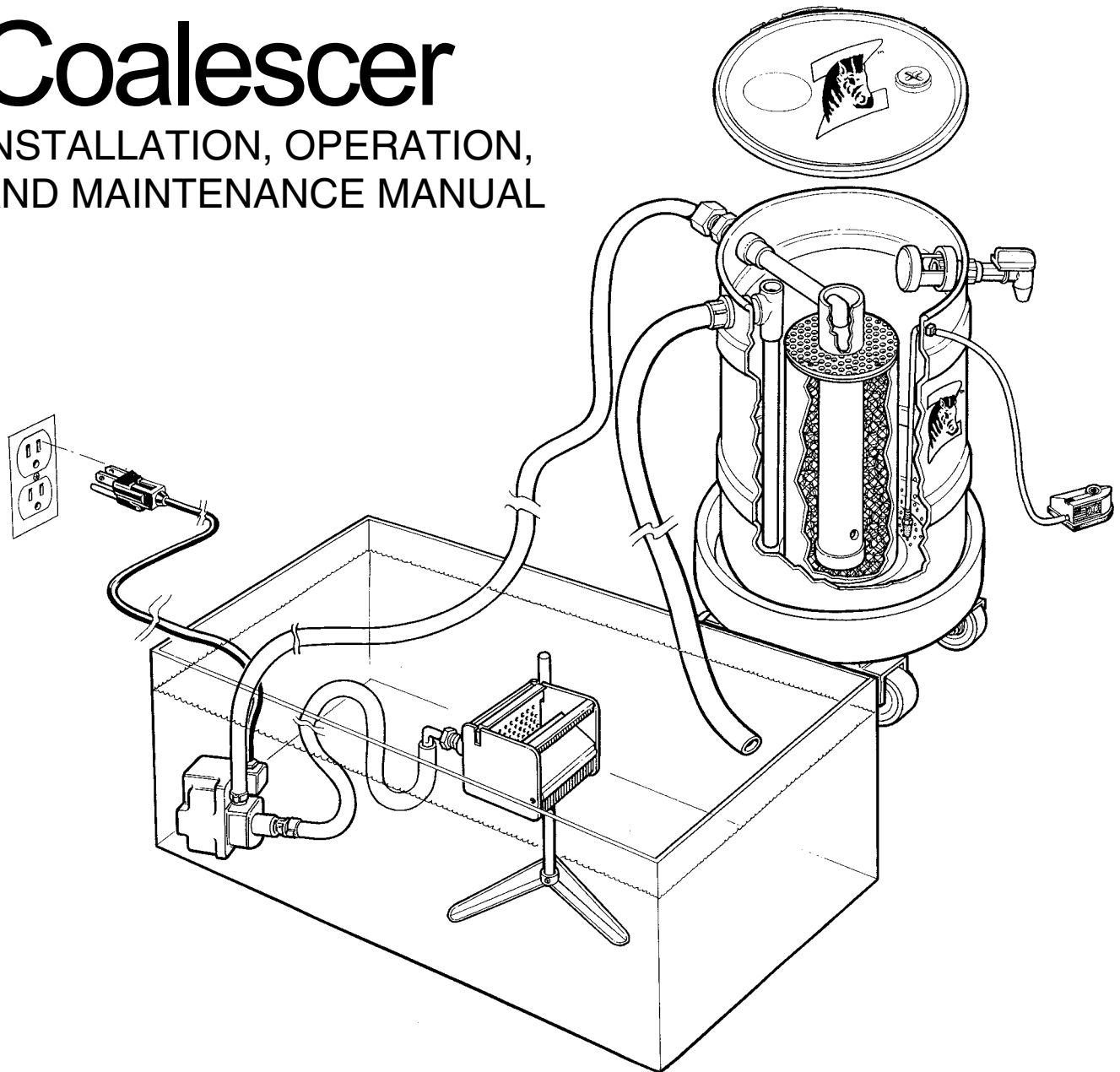


Zebra[®] Muscle[™] Coalescer

INSTALLATION, OPERATION,
AND MAINTENANCE MANUAL



Visit
www.CoolantMaintenance.com
for clean coolant tips



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If you have any questions or require product support,
please contact 888-249-4855

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Information is correct as of the date printed.
We reserve the right to change any
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Table of Contents

Chapter One: Introduction to the Muscle Coalescer

- 1.1 Introduction to Your Muscle Coalescer page 4
- 1.2 Limited Warranty Information page 4
- 1.3 Contacting Customer Support page 4

Chapter Two: Precautionary Safety Measures

- 2.0 Precautionary Safety Measures page 5

Chapter Three: Assembly & Installation Guidelines

- 3.1 Components Listing & Exploded Parts Diagram page 6-7
- 3.2 Assembly & Installation of Main Body page 8
- 3.3 Assembly & Installation of Intake Attachments page 9

Chapter Four: Operation & Maintenance Guidelines

- 4.1 Usage page 10
- 4.2 Routine Inspection page 10
- 4.3 Routine Maintenance page 10-11
- 4.4 Cleaning page 11
- 4.5 Storage page 11

Chapter Five: Troubleshooting the System

- 5.0 Troubleshooting the System page 12

Appendices

- Appendix A: Coolant Performance Curves page 13
- Appendix B: Third Party Equipment page 14-15

Chapter 1

1.1 Introduction to Your Muscle Coalescer

Thank you for purchasing the Zebra Muscle Coalescer System to meet your coolant maintenance challenges.

This system is designed to run continuously on an individual sump application, removing tramp oils and aerating your coolant to prevent bacterial growth. Its coalescing media will accelerate the oil separation process, handling all oils that gravity separate in twenty minutes or less. The oils are then accumulated inside the barrel near its surface for manual discharge through the spigot, to your discharge container. It is recommended to remove this layer daily, or when it is at least 3" thick, whichever comes sooner. Once this system is in operation for a few days, you will have a better idea of how much tramp oil your application has, and when to discharge this separated layer. If you have a filter bag model, it will also separate floating and lightly suspended particles inside the filter bag. It is recommended to change this bag when it is full or when it hinders the system's one gallon per minute flow rate. Zebra offers filter bags with smaller pore sizes, if so needed for your current situation.

Please assemble, install, operate, and maintain this system in accordance with the guidelines provided in this manual. This will help to insure that the unit performs properly to your satisfaction.

1.2 Limited Warranty information

The Zebra® Muscle™ Coalescer is warranted for one year from date of purchase against manufacturing or material defects, except for disposable elements. Individual warranties may apply to third party components, above and beyond this expressed warranty. This warranty will be void, in full or in part, for any use not in keeping with general safe operating procedures or any of those principles outlined in this manual.

THE ABOVE WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

Zebra Skimmers Corp. (ZSC) has made every attempt in earnest and good faith to make this manual as comprehensive, complete and detailed as possible. However, all information contained herein is subject to change without notice at the sole discretion of ZSC, or at the discretion of third party vendors whose information has been reprinted herein with their permission. ZSC is not liable for any damages which may or may not be caused by improper use of this equipment, as explicitly stated within this operator's manual. Furthermore, ZSC is not liable for the quality of information that may be contained in, or unintentionally omitted from this manual. ZSC will repair or replace such defective components at its sole discretion. Customer must pay for shipping any parts or the entire Zebra Muscle™ to or from ZSC repair facilities, at the sole discretion of ZSC. Zebra Muscle™, Zebra Sumpster™, and Zebra Hammerhead™ are wholly owned trademarks of the Zebra Skimmers Corporation.

1.3 Customer Support

If you would like any assistance in assembly or installation of this system, or have any questions on its use or maintenance, please contact customer support at 888-249-4855. We would be glad to help you and welcome your feedback.

For the latest product details, please visit our web site www.ZebraSkimmers.com.

Chapter 2

2.0 Precautionary Safety Measures



WARNING: Read, understand, and follow all instructions contained in this manual before starting. Keep this manual in a safe, yet convenient, place for future reference.



WARNING: Failure to comply with all installation, operating, and maintenance guidelines will void all warranties, may cause damage to the unit, or cause personal injury.



WARNING: It is the responsibility of the user to only allow individuals familiar with, and with full knowledge of, this unit to install, operate, and maintain it. Zebra Skimmers Corp. will not be liable for any damages due to lack of proper use of this equipment.



WARNING: Make sure you have the MSDS for your coolant on file, and measures related to its mixing, measuring, maintenance, and disposal are read and understood. If you have any questions regarding your specific coolant, contact your coolant supplier's technical support service.



WARNING: Care must be taken at all times when handling coolant and waste oils. This includes utilizing safety glasses with side shield protection, gloves, longsleeved shirts and long-legged pants. Sturdy shoes should also be worn, preferably with reinforced toes. Any liquids that come into contact with the skin should be washed off with mild soap as soon as possible. Liquid that comes into contact with the eyes should be washed out immediately with water only.



WARNING: Tramp oils floating on coolant promote growth of anaerobic bacteria. These bacteria create noxious gases, such as hydrogen sulfide (H₂S) and hydrochloric acid (HCl). Hydrogen sulfide causes unpleasant odors. Hydrochloric acid, however, can cause skin, eye, and lung irritation. If these symptoms are present, consult a physician. Use the Zebra Muscle Coalescer in a well-ventilated area to prevent these symptoms, should these gases be present.



WARNING: Waste oil is hazardous and should be handled accordingly. Observe all proper national and local disposal laws and regulations.



WARNING: Do not operate this equipment while under the influence of drugs or alcohol.



WARNING: Do not put hands or feet in the barrel of this unit.



WARNING: While moving this equipment, slow down before turning corners to prevent tipping. To prevent spillage, do not move the unit over hoses, mats, or other floor obstructions.

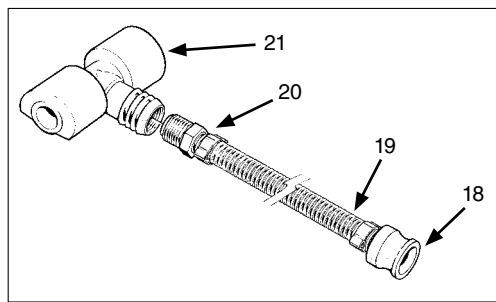
Chapter 3

3.1 Components Listing & Exploded Parts Diagram

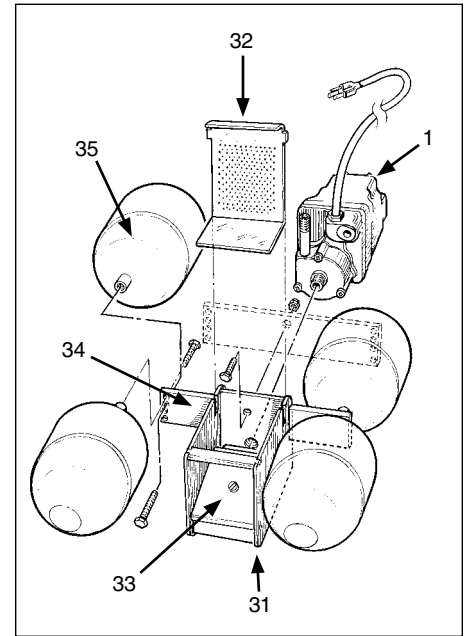
Main Unit

- 1 Submersible, Centrifugal Pump
- 2 Dirty Coolant Intake Hose*
- 3 Flow Restrictor (1 gpm)
- 4 Dirty Coolant Intake Fitting
- 5 Coalescing Cartridge (bag filter, DF model)
- 6 Coalescing Media
- 7 Oxygenator
- 8 Air Diffuser of Oxygenator
- 9 Muscle Barrel, 15 gallon
- 10 Barrel Lid
- 11 Bung Hole Cap
- 12 Dolly (included on D, DF models)
- 13 Clean Coolant Return Pipe w/Siphon Tee
- 14 Clean Coolant Return Fitting
- 15 Clean Coolant Return Hose*
- 16 Internal Oil Discharge Skimmer (IODS)
- 17 Oil Discharge Spigot

Hammerhead, exploded



Floating Sumpster, exploded



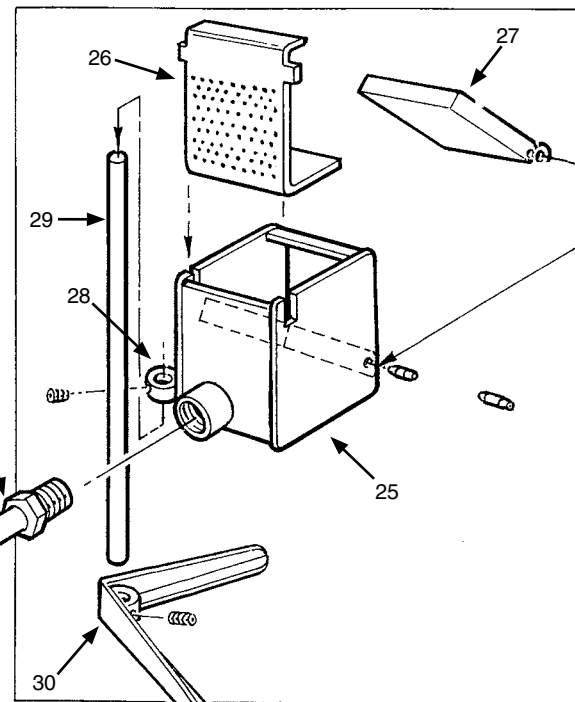
Hammerhead

- 18 Pump Fitting (shown w/quick connect for use w/diaphragm pump)
- 19 Pump Suction Hose, black flexible*
- 20 Suction Hose Fitting
- 21 Float Head

Sumpster

- 22 Pump Fitting
- 23 Pump Suction Hose, braided*
- 24 Suction Hose Fitting
- 25 Sumpster Body
- 26 Chip Screen
- 27 Door w/float Mechanism
- 28 Set Screw
- 29 Upright Rod
- 30 Sumpster Foot

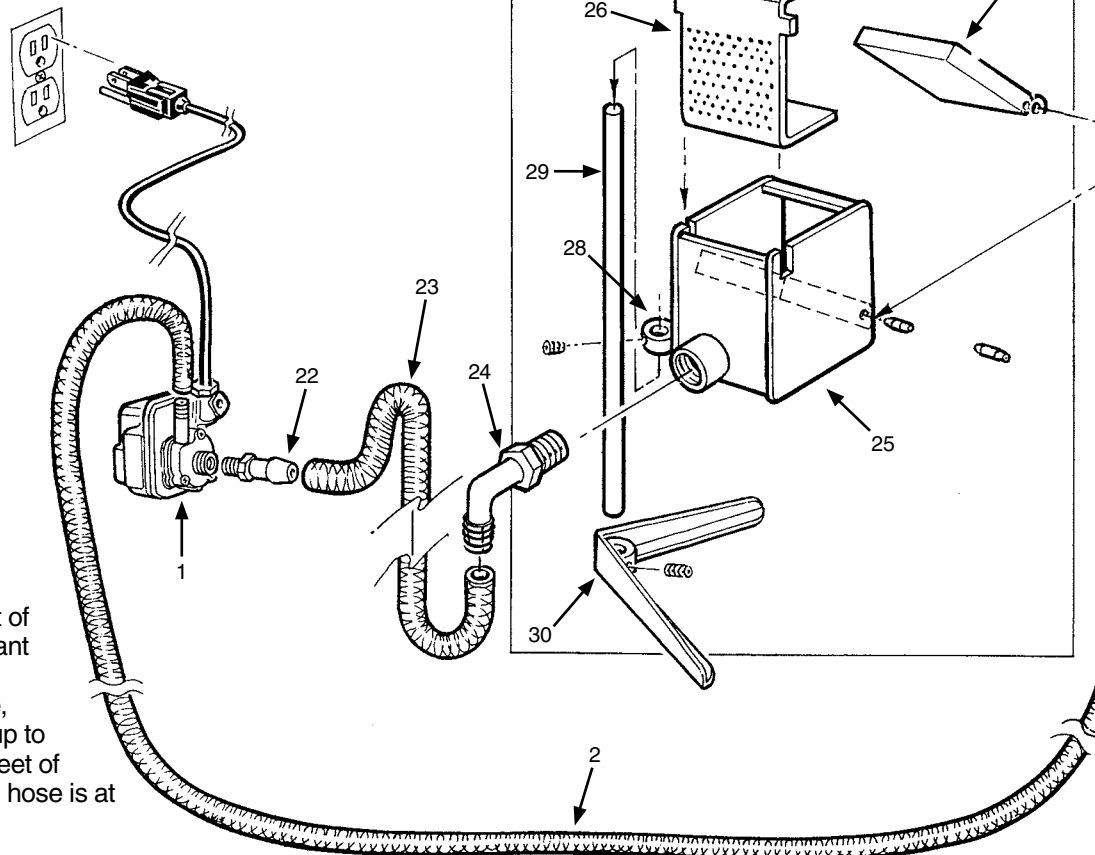
Sumpster, exploded



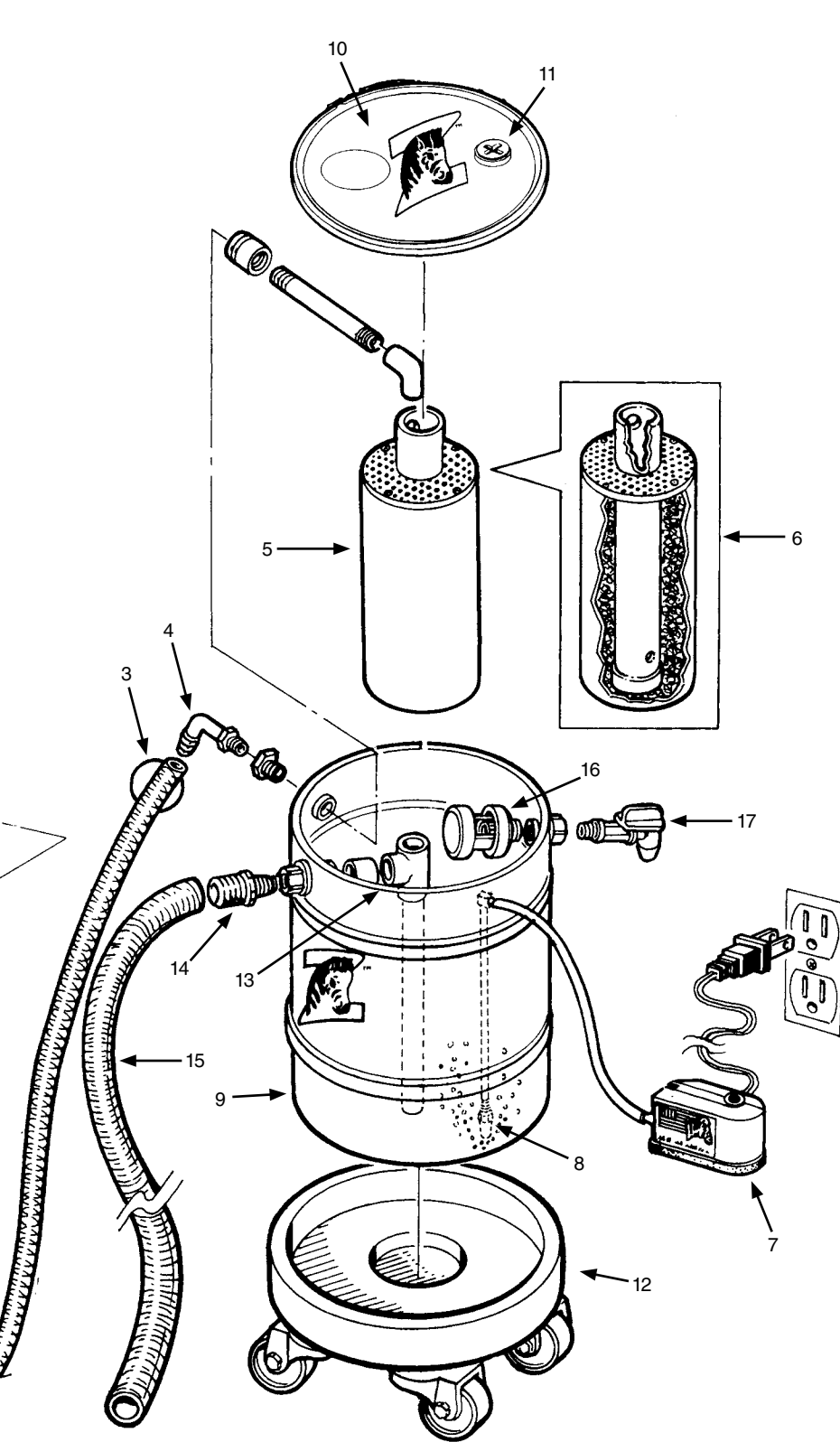
Floating Sumpster

- 31 Sumpster Body
- 32 Chip Screen
- 33 Door w/float Mechanism
- 34 Bracket
- 35 Floats, plastic or steel

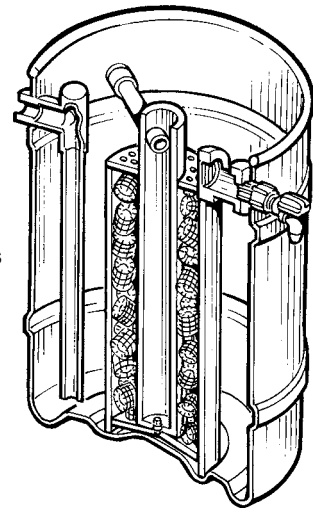
*The Muscle is supplied with 4 feet of dirty coolant intake and clean coolant discharge hose, standard. Should your application require more hose, the Muscle can be equipped with up to 15 feet of intake hose and up to 8 feet of discharge hose. The pump suction hose is at its maximum length, standard.



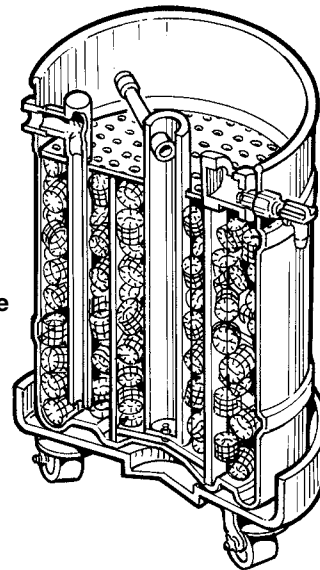
Internal Views of Muscle Body Styles



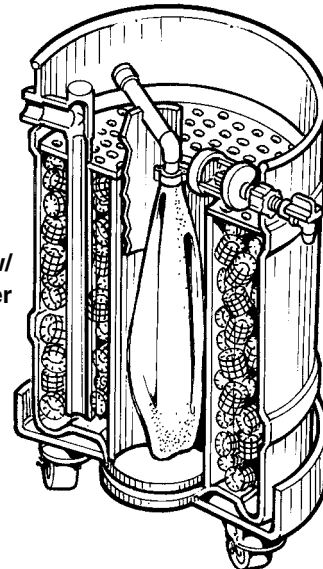
Plus



Deluxe



Deluxe w/
Filter



3.2 Assembly & Installation of Main Body

1. Verify the model number of your unit, which is located on the outer shrink wrap label. Remove contents from the barrel (#18).
2. Screw the oil discharge spigot into the bulkhead fitting (#14). Hand-tighten so the spout is facing downward.
3. If you have the Plus model, place the coalescing cartridge (#20) in the center of the barrel and insert its pipe into the internal side of the coolant intake fitting (#23) using enough pressure to ensure a snug fit.
4. Screw the 1/2" braided, coolant intake hose (#10) elbow fitting to its external bulkhead fitting (#23) and hand tighten.
5. Screw the 1 1/4" spiral wound, coolant return hose (#17) to its bulkhead fitting (#24) and hand-tighten.
6. Place the barrel next to your coolant sump so it is level and the oil discharge spigot is easily accessible. Make sure that the spigot is in a closed position.
7. Install your preferred tramp oil intake attachment and the pump (#11). See instructions and diagrams at the right for attachment details. Locate the attachment in an area where the oil naturally collects, if possible. Also make sure the discharge port of the pump (which has hose going to the barrel) is in an upright position to allow for any entrained air to escape. For baffled sumps, two attachments may be necessary, and a Y-fitting should be used for both to connect to the pump.
8. Place the clean coolant return hose on the opposite side of the sump, as far away from the intake attachment as possible. This will allow for proper surface oil flow to the intake attachment. This hose should also be installed and secured above the sump liquid line to prevent possible back pressure into the barrel. Also make sure this hose is in a continuous downward slope since the discharge is gravity fed.
9. Position the IODS (#21) so the opening is level. This position may be adjusted during oil discharge, if necessary.
10. If using a drum dolly (#16), place the barrel upon it once the wheels have been attached.
11. Fill the barrel with fresh coolant, at the required concentration for the application, until it reaches the bottom of the IODS (about 12 gallons).
12. Replace the lid (#12) on the barrel, and fasten the ring. Unfasten the bung hole cap (#25) to help prevent possible siphoning of liquid from the barrel during power outages or pump cavitation.
13. Attach the Oxygenator™ (#15) tubing to the 1/8" elbow fitting (#22) located on the side of the barrel. Place the Oxygenator on the barrel of the lid, or in a convenient location outside of the barrel and the sump. Plug it in to an appropriate GFCI outlet nearby.
14. Plug the pump (#1) into an appropriate GFCI outlet and let the unit do its job.

CAUTION: Do not use the Muscle to service machine sumps that run different brands of coolant or the same brand of coolant, but at different concentrations. Also be aware of possible bacterial crosscontamination between sumps. We recommend a diaphragm pump upgrade when using this system for multiple sumps.

CAUTION: Do not remove the flow restrictor (#19) from the dirty coolant intake hose (#10). It ensures the most effective flow rate (1 gpm) and its removal will cause the barrel to overflow.

3.3 Assembly & Installation of Intake Attachments

Hammerhead™ Installation

1. Unpack the Hammerhead.
2. Attach the 1/2" black flexible hose (#2), via its straight fitting, to the intake port of the pump. Hand-tighten only.
3. Attach the Hammerhead body to the opposite side of the flexible hose, turning it up to TWO TURNS ONLY. This will allow it to float properly.
4. Place both the pump and the Hammerhead into the sump. The Hammerhead should float on the surface foam side up. See installation step #7 at left for pump configuration.
5. You may need to dip the Hammerhead below the liquid surface for a few minutes, to aid in pump priming, when initially introducing it to the sump.

NOTE: The Hammerhead will handle a level fluctuation of 12" only. We recommend use of the Floating Sumpster for all other applications.

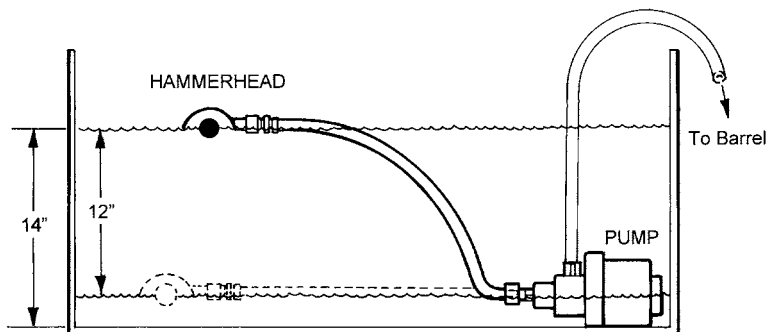


Figure 1, HAMMERHEAD

Sumpster™ Installation

1. Unpack the Sumpster and its components.
2. Connect the 1/2" braided hose (#2) to the intake port of the pump.
3. Connect the opposite end of the braided hose to the back of the Sumpster box.
4. The Sumpster can be mounted to the rod and crow's feet, placed directly on the bottom of the sump, or mounted on a sump side bracket.
5. Place both the pump and the Sumpster into the sump. See installation step #7 at left for pump configuration.
6. Adjust the height of the box by following the diagram below, positioning the top of the box 1/4" above the maximum fluid level.

NOTE: The Sumpster will handle a level drop of 3" only. We recommend use of the Hammerhead if there is a 3-12" fluctuation, or the Floating Sumpster for all other applications.

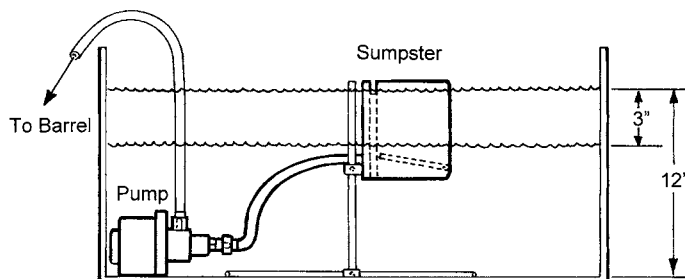


Figure 2, SUMPSTER

Floating Sumpster™ Installation

1. Unpack the Floating Sumpster.
2. Connect the pump intake port directly to the back of the Sumpster box.
3. Place the Floating Sumpster w/ pump into the sump.
4. Adjust the height of the box by following the diagram at right, positioning the top of the box 1/4" above the fluid level.

NOTE: The Floating Sumpster will handle a level fluctuation of up to 2' with the use of the standard 4' dirty coolant intake hose provided (4' max lift with custom hose size).

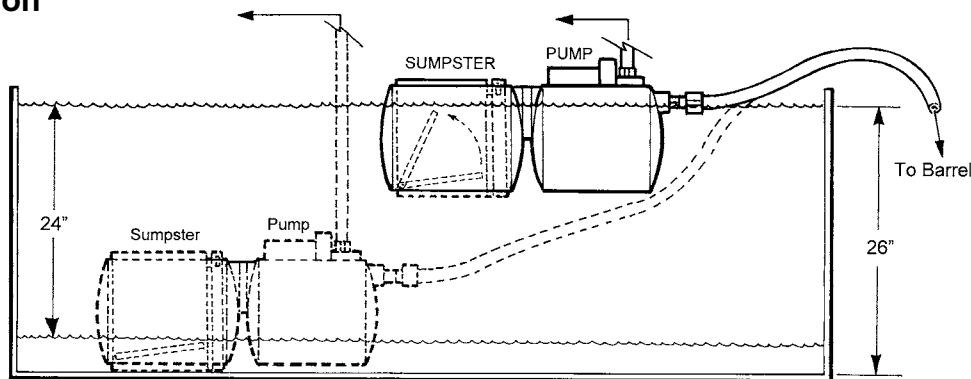


Figure 3, FLOATING SUMPSTER

Chapter 4

4.1 Usage of the Muscle Coalescer

The Muscle Coalescer has been designed to work continuously on one individual machine sump. It is recommended to operate this unit 24 hours per day, and 7 days per week, to keep the fluid circulating, preventing bacterial contamination.

The Hammerhead is rated to float on a 1/4" maximum depth oil layer. If your application currently has a thicker layer of oil on its surface and you are using the Hammerhead intake attachment, it may be necessary to manually hold the Hammerhead at the surface until the oil layer becomes less than 1/4" in depth.

If you use this equipment for more than one machine, you may experience poor pump life, as it captures air, due to its reintroduction to various machine sumps. We recommend removing the intake attachment and capping off the intake hose before unplugging the pump in order to keep the pump primed with liquid. Zebra offers a diaphragm pump upgrade for use of the Muscle on multiple sumps, if necessary or preferred.

If you are utilizing the Muscle on a high-pressure coolant delivery system (add-on equipment to your machine tool), you may experience a very low amount of separated oil. High pressure systems tend to emulsify tramp oils more deeply into coolant compared to standard delivery pumps, and generally require more time than the Muscle allows for separation. If this situation occurs, it is best to operate the Muscle only when the machine pumps are shut down.

4.2 Routine Inspection

Periodically inspect the intake attachment as well as its hose to make sure it is not clogged with chips or debris. Blockages cause stress on the pump and may totally impair the flow of the system. If there is a poor flow (less than 1 gpm) then it is likely that there is debris blocking the flow route.

Be aware of the quality of the connection between the intake attachment and intake hose. If the connection is loose, admits air, or is clogged, it will impair the function of the unit.

On occasion, check to make sure that there is not an excessive buildup of debris in the bottom of the barrel. Excessive sediment will restrict the clean coolant return flow, causing the barrel to overflow or return debris to your tank.

Fully inspect the operation of the machine before leaving it unattended. Verify that the flow rate is normal and tank levels are maintained. All connections, filters, and hoses should be free of all possible obstructions and airtight.

4.3 Routine Maintenance

INTAKE ATTACHMENTS (Hammerhead, Sumpster, or Floating Sumpster)

If using the Sumpster intake attachment, you may need to periodically remove debris from the chip screen. To clean the screen, lift the door/float assembly, then remove, clean, and replace the screen as soon as possible to prevent debris from entering pump.

FILTER BAGS

If you have a filter bag model, then you will need to clean, and possibly replace, the filter bag when it is filled to capacity or if it prevents the recommended 1 gpm flow rate of the system. The standard bags, in most instances, can be emptied, washed, and reused as long as the bags are not compromised. The Muscle is shipped with 100µ filter bags, unless otherwise specified. Smaller micron sizes are available for replacement.

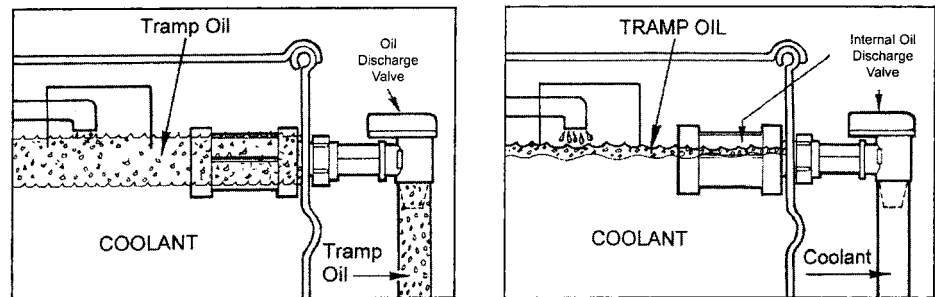
OXYGENATOR

Inspect the diffuser end of the Oxygenator to verify that it is letting air escape through the diffuser pores. It may be necessary to clean the diffuser, usually every 3 months, with a compressed air to remove debris. If the pores remain blocked, the unit's diaphragms will wear prematurely.

DRAINING TRAMP OIL

We recommend draining the accumulated oil layer within the Muscle barrel when it is at least 3" thick (10" maximum). This can be done while the Muscle is operating. Please a bucket beneath the discharge spigot. Open the spigot, letting the oil drain, until just a thin layer of oil is left, or coolant starts to flow out. Shut the spigot. In some cases, especially on high pressure coolant delivery systems, there will be an inverse layer which does not fully separate into tramp oil and coolant. It is best to discharge this highly emulsified layer as well.

This process will need to be repeated, as necessary, and will depend upon your situation. It is recommended to start a routine inspection on a by-shift basis, which will ensure that the layer is thick enough for draining, yet thin enough as to not encourage bacterial growth.



REPLACING THE PUMP

When replacing the pump, make sure the flow restrictor is contained in the intake hose which goes to the barrel. Removing it will cause the barrel to overflow.

If reinstalling the pump on a Floating Sumpster, remove the Sumpster box from the bracket first, replace the pump, then reattach.

4.4 Cleaning the Unit

The only time you will need to thoroughly clean the Muscle is when there is a build up of settled debris in its bottom or if there is a known bacterial contamination problem.

Empty the liquid contents of the barrel by siphoning the unit.

- Remove intake attachment from sump
- Lift clean coolant return hose until filled with fluid
- Unplug the pump
- Cap off return pipe siphon tee
- Place discharge hose into the appropriately sized liquid holding container

Disassembly of the barrel's internal components should not be necessary, except in extreme cases. There is no need to replace the coalescing media. Wash it well with an antibacterial cleaner and water (pressure washers work well). If the media is oily-looking then it is doing its job by pulling emulsified oils out of the coolant, and does not need to be de-oiled.

4.5 Storage

Never store the Muscle for an extended period of time without cleaning it first. It should never be stored with coolant and oils in the barrel for more than a few days. Whenever storing it with coolant, utilize the Oxygenator whenever possible. In doing so, it will help to prevent bacterial contamination.

Chapter 5

5.0 Troubleshooting the System

When the Muscle is installed and operated according to the provided guidelines, there should be no problems with its performance. The most common failure points are outlined, per component, below. Following our recommendations should get you up and running in a matter of a few minutes. Please let us know if our assistance would be helpful.

BARREL

| | | |
|--------------------|---|--|
| Barrel Overflowing | Restrictor removed from intake hose | Replace restrictor |
| | Power outage | No solution to date |
| | Discharge hose not gravity fed | Configure hose with downward slope |
| | Discharge hose or return pipe is obstructed | Remove debris from area |
| | Discharge hose contains air bubbles | Remove air bubbles by repositioning hose |
| | Excessive foam | Operate Oxygenator less often or add defoaming agent |
| Barrel Siphoning | Return tee is capped or obstructed | Remove cap or obstruction |
| | Bung hole fastened closed | Unfasten bung hole cap |
| | Filter bag is full (DF model) | Clean or replace filter bag |

PUMP

| | | |
|------------------|--|---|
| Pump Not Pumping | Misconfigured installation | Configure so discharge port is in vertical position |
| | Impeller obstruction | Remove obstruction by unfastening screws, 3 places |
| | See last 4 items of "Barrel Overflowing" | |

HAMMERHEAD

| | | |
|----------------------------|-------------------------------|---|
| Inconsistent Floatation | Not installed foam side up | Turn it over |
| | Mis-threaded to hose | Thread up to 2x only |
| | Oil layer too thick | Remove excessive oil using Hammerhead manually, until 1/4" or less in thickness |
| | Debris obstruction | Remove debris in body, hose, or fitting |
| | Hole in hose | Replace hose to 12" max length |
| Sinking Below Liquid Level | Weight has been added | Remove added weight |
| | Coating shrunken or dissolved | Contact us for uncoated Hammerhead replacement at no charge |

SUMPSTER OR FLOATING SUMPSTER

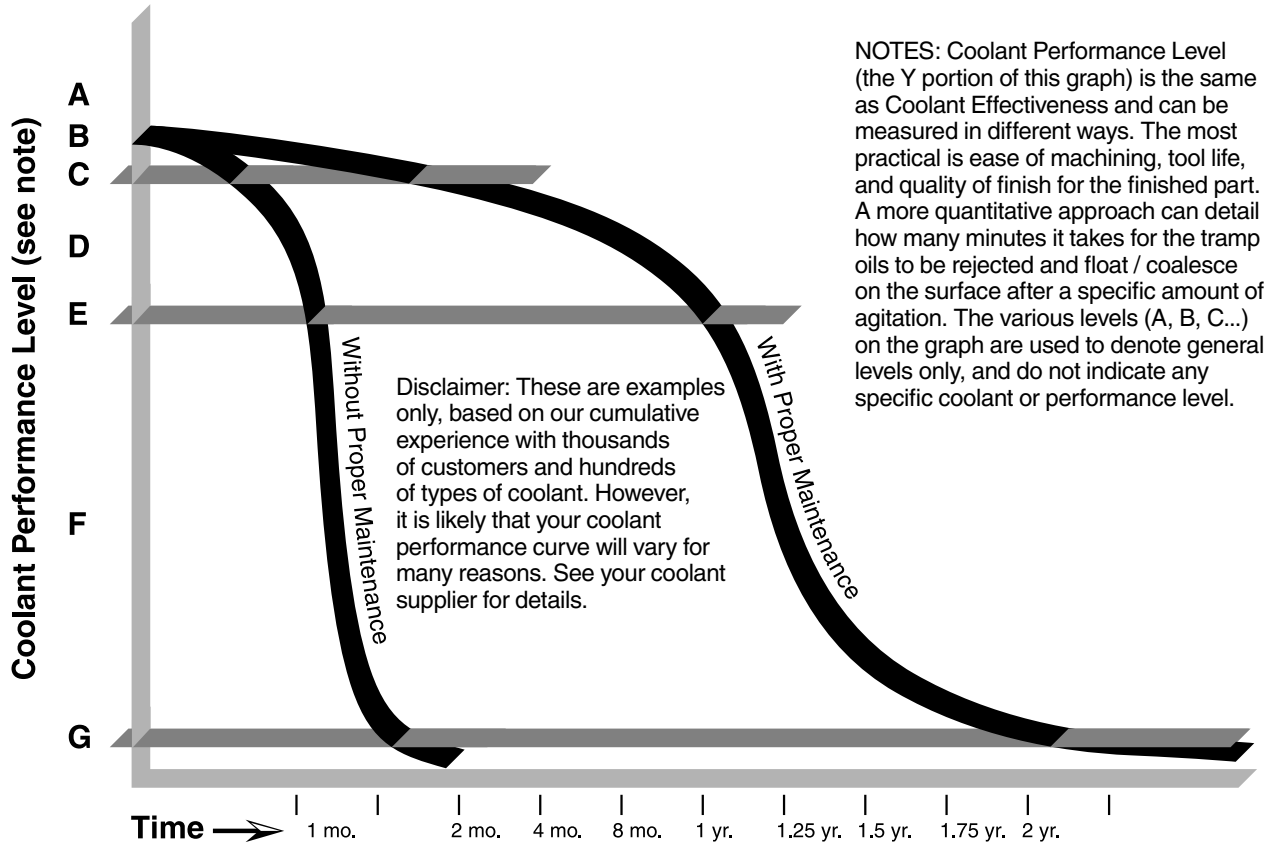
| | | |
|--|----------------------------------|-------------------|
| Sumpster/Floating Sumpster Not Drawing Oil | Chip screen is blocked by debris | Clean chip screen |
| | See "Pump Not Pumping" | |

APPENDIX

APPENDIX A: Coolant Performance Curves

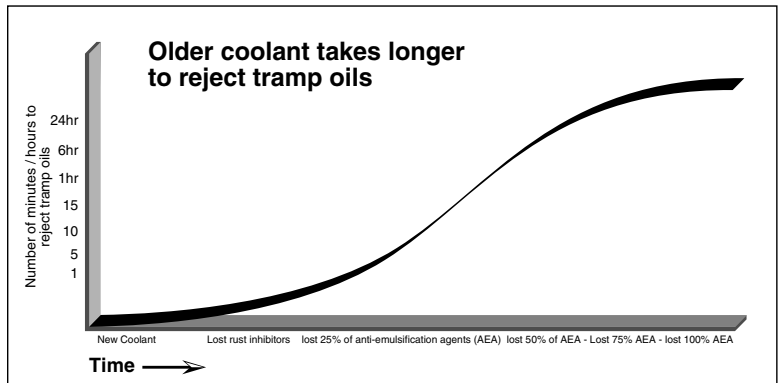
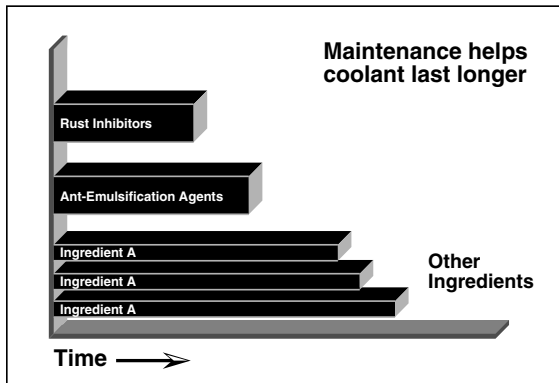
With and Without Proper Maintenance

A machine shop using flood coolant machines only eight hours per day and five days a week will find the first curve typical - while a shop using the flood coolant machines 24/7 will find the second curve more typical - also, the times are relative - in fact, abused coolant could 'die' (stage 'G') in several weeks if it is abused and not properly maintained.



NOTES: Coolant Performance Level (the Y portion of this graph) is the same as Coolant Effectiveness and can be measured in different ways. The most practical is ease of machining, tool life, and quality of finish for the finished part. A more quantitative approach can detail how many minutes it takes for the tramp oils to be rejected and float / coalesce on the surface after a specific amount of agitation. The various levels (A, B, C...) on the graph are used to denote general levels only, and do not indicate any specific coolant or performance level.

- A Brand new coolant
- B Coolant has lost antirust inhibitors
- C This is the level of performance required in a shop that works with very high tolerances and finishes. This can also be a production shop where tool life and performance is critical.
- D Coolant lost most anti-emulsifiers and takes longer than 15 minutes to reject tramp oils.
- E This is the level of performance required by an above average machine shop, working in both rough and high tolerance specifications.
- F This level of coolant performance is acceptable to a rough and ready shop working with low-tolerance parts and little attention to finish. Tool life is not a consideration as setups are frequent. This is not a production shop.
- G Coolant is "dead."



APPENDIX B: Third Party Equipment

Little Giant-Small Submersible Encapsulated Pump Model 1-EA-42

* Installation * Maintenance * Operation * Repair Parts

These instructions will provide you with information required to safely own and operate the Little Giant Encapsulated 1-EA Series Pump. The pump you have purchased with your F2b and F3 Zebra Muscle & Sumpster Unit is a submersible epoxy encapsulated pump (some models are for in-line use) with outer case constructed of durable die cast aluminum and polyester. The inside case is filled with a special heat transfer epoxy.

These instructions cover the standard models of the 1-EA Series. Always order replacement parts for the specific Catalog Number of your pump. If the catalog number of your pump is not listed in the replacement parts section, then caution should be exercised when ordering replacement parts.

Little Giant pumps are carefully inspected, tested, and packaged to insure safe operation. When you receive your pump, examine it carefully to determine that there are no broken or damaged parts that may have occurred in shipment. If damage has occurred, make notation and notify Zebra Skimmers as soon as possible. We will assist you in the replacement or repair of your pump.

READ INSTRUCTIONS CAREFULLY BEFORE ATTEMPTING TO INSTALL, OPERATE OR SERVICE THE LITTLE GIANT PUMP. KNOW THE PUMP APPLICATIONS, LIMITATIONS, AND POTENTIAL HAZARDS. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE! RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

SAFETY GUIDELINES

WARNING

1. DO NOT USE TO PUMP FLAMMABLE OR EXPLOSIVE FLUIDS SUCH AS GASOLINE, FUEL OIL, KEROSENE, ETC. DO NOT USE IN EXPLOSIVE ATMOSPHERES. PUMP SHOULD ONLY BE USED WITH LIQUIDS COMPATIBLE WITH PUMP COMPONENT MATERIALS.
2. DO NOT HANDLE PUMP WITH WET HANDS OR WHEN STANDING ON WET OR DAMP SURFACE, OR IN WATER.
3. DO NOT PULL THE PUMP OUT OF WATER BY THE POWER CORD WHEN THE PUMP IS OPERATING OR CONNECTED TO THE POWER SOURCE.
4. THIS PUMP IS SUPPLIED WITH A GROUNDING CONDUCTOR AND/OR GROUNDING TYPE ATTACHMENT PLUG. TO REDUCE THE RISK OF ELECTRIC SHOCK, BE CERTAIN THAT IT IS CONNECTED TO A PROPERLY GROUNDED-GROUNDING TYPE RECEPTACLE.
5. THE NATIONAL ELECTRIC CODE REQUIRES A GROUND FAULT CIRCUIT INTERRUPTER (GFCI) BE INSTALLED IN THE BRANCH CIRCUIT SUPPLYING FOUNTAIN EQUIPMENT, POOLS, ETC.
6. IN ANY INSTALLATION WHERE PROPERTY DAMAGE AND/OR PERSONAL INJURY MIGHT RESULT FROM AN INOPERATIVE OR LEAKING PUMP DUE TO POWER OUTAGES, DISCHARGE LINE BLOCKAGE, OR ANY OTHER REASON, A BACKUP SYSTEM(S) AND/OR ALARM SHOULD BE USED.
7. SUPPORT YOUR PUMP AND PIPING WHEN ASSEMBLING AND WHEN INSTALLED. FAILURE TO DO SO MAY CAUSE PIPING TO BREAK, PUMP TO FAIL, MOTOR BEARING FAILURES, ETC.

ELECTRICAL CONNECTIONS

WARNING

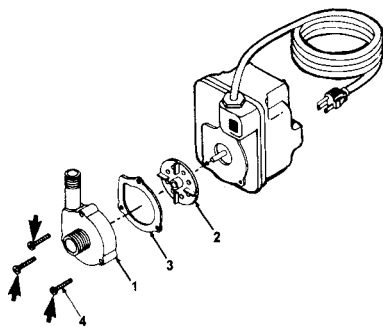
1. Check the pump label for proper voltage required. Do not connect to voltage other than that shown.
2. If pump is supplied with a 3-prong electrical plug, the third plug is to ground the pump to prevent possible electrical shock hazard. DO NOT REMOVE the third plug from the cord. If the plug is cut or the cord is shortened, then this action will void the warranty.
3. If the cord is equipped with stripped lead wires, such as on 230v models, be sure that the lead wires are connected to a power source supply correctly. The green/yellow wire is the ground, the other two are live.

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3810 N. Tulsa Street
Oklahoma City, OK 73112

Elite-Rolf C. Hogan (USA) Corp.
50 Hampton Road
Mansfield, MA 02048

OPERATION

1. The 1-EA style pumps must be run submerged. The pump should be placed with the screen as a base or with cord up. The volute should always be flooded or under water. If the surface is sandy or muddy a separate hard surface such as a brick should (provided) be under the pump to help prevent clogging of the screen.
2. The 1-EA 42 style pumps may be operated submerged or inline. They may be positioned at any attitude, but preferably with the volute located down or to the side.
3. The weight of the pumps must be supported adequately. DO NOT support the pumps by the discharge connection alone. Pumps may be supported by using the two mounting holes in the back of the pump. The holes are designed for #8 self-tapping screws. Hole depth is .37 - DO NOT exceed the hole depth.
4. Do not attempt to restrict the intake side of these pumps. Restricting the intake may cause damage to the seal and may starve the pump. If you require reduced flow rates, then place a valve on the discharge side of the pump or if flexible vinyl tubing is used, a clamp can be used to restrict the flow.
5. Do not let the unit operate dry. It is designed to be cooled by pumping fluid. You may damage the seal and the motor may fail if the pump is allowed to run dry.
6. If the unit is going to be idle for a period of time, follow the cleaning instructions outlined in the next section. Do not let the unit freeze in wintertime. This may cause cracking or distortion that may destroy the unit.



| ITEM NO. | PART NO. | DESCRIPTION | QTY. | MODEL |
|----------|----------|-----------------------------------|------|----------|
| | | | | CAT. NO. |
| | | | | 1-EA-42 |
| | | | | 518087 |
| 1 | 101377 | VOLUTE, NYLON, 1/4 x 1/2 NPT | 1 | • |
| 2 | 118442 | IMPELLER, NYLON, PRESS-ON | 1 | • |
| 3 | 131009 | GASKET, NEOPRENE | 1 | • |
| 4 | 902411 | SCREW, 8-18 x 7/8 STAINLESS STEEL | 3 | • |

SERVICE INSTRUCTIONS

⚠ WARNING

MAKE CERTAIN THAT THE UNIT IS DISCONNECTED FROM THE POWER SOURCE BEFORE ATTEMPTING TO SERVICE OR REMOVE ANY COMPONENT!

1. This unit is permanently lubricated. Oiling is not required. DO NOT, in any case, open the sealed portion of the unit or remove the housing screws.
2. Periodic cleaning of the pump parts will prolong the LIFE and EFFICIENCY of the pump. Refer to the drawing below for the assembly and disassembly of the pumping head.
3. First remove the screen from the pump. Then remove the 3 screws as indicated by the arrows. (Do NOT remove other screws which may be exposed).
4. Lightly scrape and clean any corrosion or debris which may clog the impeller. Use a brush and penetrating oil and lightly scrape to remove encrusted material.
5. Turn the impeller by hand to make sure it turns freely. Set pump down so you are not touching pump and impeller is not touching anything. Plug the unit into GFCI circuit for 10 seconds to see if the impeller turns; (a) if it is rotating and GFCI did not trip, unplug unit and install parts in reverse order in which they were removed. (b) If it does not rotate, if pump is tripping circuit breakers, or not operating properly after cleaning, return to Little Giant or it's authorized (Zebra Skimmers) service center. DO NOT attempt repairs yourself!
6. Be certain power cord is in good condition and contains no nicks or cuts.

Limited Warranty LITTLE GIANT WARRANTY STATEMENT

Your Little Giant product is guaranteed to be in perfect condition when it leaves our factory. It is warranted against defective materials and workmanship for a period of 12 months (90 days warranty on Models 1-AA-OM, GKPK-SC, PP-1, PPS-12, PP-230 and Cooler King) from date of purchase by the user. No warranty on brush wear in Model 35-OM and impeller or cam in Models PP-1, PP-12, PP-230. Any product that should fail for either of the above two reasons and is still within the warranty period, will be repaired or replaced if returned prepaid to our factory. All defective products returned under our warranty will be fully inspected to determine "CAUSE OF FAILURE" before any warranty is approved. Little Giant will honor the warranty within the warranty time period specified on satisfactory written proof of purchase.

DISCLAIMER: Any oral statements about the product made by the seller, the manufacturer, the representatives or any other parties, do not constitute warranties, shall not be relied upon by the user, and are not part of the contract for sale. Seller's and manufacturer's only obligation, and buyer's only remedy, shall be the replacement and/or repair by the manufacturer of the product as described above. Neither seller nor the manufacturer shall be liable for any injury, loss or damage, direct, incidental or consequential (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss), arising out of the use or the ability to use the product, and the user agrees that no other remedy shall be available to it. Before using, the user shall determine the suitability of the product for his/her intended use, and user assumes all risk and liability whatsoever in connection therewith. THE WARRANTY AND REMEDY DESCRIBED IN THIS LIMITED WARRANTY IS AN EXCLUSIVE WARRANTY AND REMEDY AND IS IN LIEU OF ANY OTHER WARRANTY OR REMEDY, EXPRESSED OR IMPLIED, WHICH OTHER WARRANTIES AND REMEDIES ARE HEREBY EXPRESSLY EXCLUDED, INCLUDING, BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Warranty will be VOID if any of the following conditions are found:

1. Sealed motor housing opened.
2. Product connected to voltage other than indicated on name plate.
3. Cord cut off to a length less than three feet.
4. Pump allowed to operate dry (fluid supply cut off).
5. Pump used to circulate anything other than fresh water, light oils, or other mild liquids at approximately room temperature.
6. Product abuse by customer.

The National Electric Code requires a Ground Fault Circuit Interrupter (GFCI) be installed in the branch circuit supplying fountain equipment rated above 15 volts. Little Giant Pump Company offers a variety of FGCI's and recommends each pump be used with a GFCI.



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