EMI MSD INSTALLATION & OPERATION

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Congratulations on the purchase of THE EMI Marine Sanitation Device. THE EMI is a simple, easy to use, and long lasting solution to the problem of recreational and commercial boating, sewage Treatment. The three main parts of The EMI MSD are the Processing Tank, the Treatment Tank and the External Compressor Blower. This Installation and Operation Manual has been designed to guide you through the Installation, Set-up, Operation, Maintenance and Storage of THE EMI MSD. Before beginning the Installation or Operation of THE EMI MSD, read these instructions thoroughly. For peak performance of THE EMI MSD, its is important to understand how it operates and the function of each part.

1.1 - BIOLOGICAL DIGESTION

THE EMI MSD Type 11 Marine Sanitation Device is a biological Aerobic (bacteria and air) Sewage Treatment System. Liquid and solid wastes are removed from the water by bacteria naturally contained in sewage

The Processing Tank consists of the aeration chamber and the clarification chamber. In the Aeration Chamber the bacteria grow and multiplies using the sewage as their food supply. This action reduces the quantity and size of the solid matter. In the Clarification Chamber, the bacterial floc is separated from the treated solid matter. The processed water is clear and free from solids, however, the liquid must be disinfected prior to discharge overboard to kill any disease causing bacteria. Disinfecting is accomplished in the Treatment Tank or the (Chlorine Contact Chamber).

The introduction of sewage into the Processing Tank begins the biological process. The Flow through the Processing Tank and Treatment Tank is caused by direct displacement when new sewage flows into the Processing Tank, an equal volume flows into the Treatment Tank. From the Treatment Tank, the treated liquid is discharged overboard or to the Optional Storage Tank.

No Internal Sewage Pumps are Necessary

1.2 - TYPES OF SEWAGE DIGESTION

It is important to understand that THE EMI MSD is Aerobic (alive) and requires certain care and protection to ensure its effectiveness. There are two types of sewage digestion, Aerobic (the presence of air by-product of carbon dioxide and water) and Anaerobic (the absence of air by product of hydrogen sulfide and methane gas).

Aerobic digestion occurs when the natural bacteria in sewage, in the presence of air, begins to grow, and feed on the organic material (food) found in the waste. As long as there is food and air, the bacteria will continue to grow. When the food is gone, the bacteria goes dormant, until more food is introduced into the system.

The main difference between Aerobic and Anaerobic digestion is the Smell associated with the digestion process. Aerobic digestion is Not as Offensive as Anaerobic. You can tell when THE EMI MSD is not working properly by the presence of a Foul Odor, from the vent. This means that your system has gone Septic, and is now Anaerobic.
1.3 - OPERATION OF THE EMI MSD" DIGESTION PROCESS

PROCESSING TANK

**Aeration** - Sewage is aerated as soon as it enters the Processing Tank, and mixes with the aerated liquid already in the Processing Tank. Plastic non-clog diffusers inject air near the bottom of the Processing Tank so that the sewage remains in a state of Aerobic decomposition. This aerated liquid contains the bacterial sludge that reacts with the sewage to start the reduction process. The movement created by the injected air helps mix the sewage with the bacterial sludge and prevents sludge and sewage solids from settling to the bottom. The air discharged from the surface of the liquid in the Processing Tank is vented to the atmosphere through a vent line connection.

**Clarification** - The aerated liquid circulates from the aeration portion of the Processing Tank to the filtration portion of the Processing Tank. As the waste is circulated, some of the suspended material will settle out into the chamber below, where it will be returned via Pneumatic Lifting Tubes to the aeration chamber. The remaining sludge and waste material is removed as the liquid flows upwards through the biological filter media. Bacteria grows on the surface of the media and produce a sticky, slimy film that traps small particles of waste. The trapped waste is then consumed by the bacteria on the surface of the filter media. By the time the liquid reaches the top of the biological filter, it has passed by several layers of bacteria, ensuring that the sludge and waste removal process is completed. Clear water accumulates here until it is displaced into the Treatment Tank.

TREATMENT TANK

**Disinfecting** - The water flowing out of the Processing Tank is collected in the Treatment Tank (chlorine contact chamber), where disinfecting chlorine tablets are located. In the Treatment Tank, the water mixes with the disinfectant for a residence time sufficient to complete the disinfecting stage of the treatment process.

**Discharge** - The clear disinfected waste water is then discharged overboard, or sent to a holding tank (for use in No Discharge Zones) for later discharge. When directly discharged overboard, the disinfected waste water flows from the Treatment Tank through a gravity discharge overboard connection. If THE EMI MSD is installed below the water line, the treated liquid must be plumbed to a discharge sump or pump (optional). If desired, the treated liquid can be retained in a holding tank, for later discharge, when the system is used as a Type III unit.
INSTALLATION & OPERATION

1.4 - SPECIFICATIONS

**TYPE - THE EMI MSD** is a Type II, Marine Sanitation Device, United States Coast Guard approved for use on Inspected and Uninspected Vessels under 33 CFR 159.000. **THE EMI MSD** complies with International Maritime Organization (IMO) Resolution MEPC.2(VI).

**ELECTRICAL REQUIREMENTS - THE EMI MSD** External Compressor Blower uses 110 VAC. The External Compressor Blower requires a GFI outlet. All wiring should be done in accordance with applicable Codes and Standards, such as ABYC, USCG, NEC, etc.

**MAXIMUM WORKING PRESSURE - THE EMI MSD** has a maximum working pressure of 7.0 ft (207 mbar) H2O head pressure.

**TEMPERATURES - THE EMI MSD** operating temperatures are 40F to 120F (3C to 49 C). **THE EMI MSD** must be protected from freezing, if the unit has not been winterized in accordance with the Shutdown Procedures found in this manual.

**MAXIMUM ALLOWABLE TILT ANGLE - THE EMI MSD** will maintain treatment efficiency with vessel pitch and roll angles of up to 5 degrees. Angles greater than 15 degrees can stop the unit from working until it has been serviced, to start the digestive process again. No physical damage will occur at angles less than 30 degrees.

**WATER REQUIREMENTS - THE EMI MSD** can operate using fresh, brackish, or salt water. The salinity of the water cannot exceed 4% NaCl.

**TOILET REQUIREMENTS - THE EMI MSD** recommends that either a macerating, vacuum or jet toilet be used. The digestive process is enhanced when the waste material is reduced in mass.

**TANK CAPACITY - THE EMI MSD** is designed to operate completely full. Transfer of liquid through the Treatment Plant is designed to be accomplished by displacement.

**EXPLOSIVE ENVIRONMENT – THE EMI MSD** is not designed for use in an EXPLOSIVE ENVIRONMENT. The External Compressor Blower MUST HAVE fresh air available for use.

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Flowrate (gallons per day)</th>
<th>Number of Persons per 24 hours</th>
<th>U.S.C.G. certification No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE EMI MSD 400</td>
<td>25</td>
<td>4</td>
<td>159.015/0700/0</td>
</tr>
<tr>
<td>THE EMI MSD 800</td>
<td>45</td>
<td>8</td>
<td>159.015/0701/0</td>
</tr>
<tr>
<td>THE EMI MSD 1200</td>
<td>60</td>
<td>12</td>
<td>159.015/0702/0</td>
</tr>
<tr>
<td>THE EMI MSD 1600</td>
<td>90</td>
<td>16</td>
<td>159.015/0703/0</td>
</tr>
</tbody>
</table>

Note: The treatment capacity of THE EMI MSD expressed in number of persons per 24 hours depends on the type of toilet used with the system. Environmental Marine, Inc. recommends using either a macerating, vacuum or jet toilet for optimum treatment effectiveness. The toilet used should utilize 1 gallon or less of either fresh or salt water per flush.
THE EMI MSD INSTALLATION & OPERATION

PART 2 - OPERATIONAL PROCEDURES

This section provides instructions for the Installation, Start-up, and Shut-down of The MSD

2.1 - BILL OF MATERIALS

THE EMI MSD should have the following items:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Processing Tank, including filter media and air diffuser</td>
</tr>
<tr>
<td>I</td>
<td>Treatment Tank (chlorine contact chamber)</td>
</tr>
<tr>
<td>I</td>
<td>External Compressor Blower 110 VAC or DC (optional).</td>
</tr>
<tr>
<td>I</td>
<td>5-foot length of vinyl tubing (clear) to connect with Blower.</td>
</tr>
<tr>
<td>I</td>
<td>Half Inch (1/2) hose barb</td>
</tr>
<tr>
<td>I</td>
<td>1 1/2”X 1 1/2” rubber hose coupling</td>
</tr>
<tr>
<td>7</td>
<td>Stainless Steel Tank Hold Down Clips</td>
</tr>
<tr>
<td>I</td>
<td>Packet of ACTIVATOR</td>
</tr>
<tr>
<td>I</td>
<td>Bottle of ENHANCER</td>
</tr>
</tbody>
</table>

2.2 - INSTALLATION OF THE MSD

This section provides instructions for the installation of The MSD. It’s size and simplicity of operation ensures that once installed, your only requirements will be to keep the Treatment Tank chlorine cartridge full of chlorine tablets, and an occasional cleaning of the Processing Tank to remove sludge build up.

2.2.1 - LOCATION

The MSD should be installed with the Treatment Tank towards the stern of the vessel, in a location that will be adequately ventilated and has space around and above the unit to allow maintenance and inspection. For installation on an Inspected Vessel, The MSD MUST HAVE ROOM for inspectors to check the unit label and operation. The unit must be securely anchored to the vessel. Make Sure The Screws Used To Attach The Hold Down Clips To The Vessel Are Fastened Into Solid Material. Installation anchor clips are provided, and fit into the specially designed reliefs found on the Processing Tank and Treatment Tank The MSD can be skid mounted, if desired. If The MSD will be located where there is a possibility of freezing, it should be equipped with and approved heater. The MSD should not be located where the internal temperature will remain above 120F for prolonged periods. At 90F, the microbe metabolism is about maximum. Between 60F and 105F, their activity is still very high.

2.2.2 - PLUMBING

The following external piping connections must be made during Installation of THE MSD:

- Sewage Inlet connection on to the Processing Tank
- The Transfer Connection from the Processing tank to The Treatment Tank.
- The Overboard Discharge from the Treatment Tank
- The Pump-Out connections on the Processing and Treatment Tank. (Optional)
- The Vent Lines on top of the Processing and Treatment Tank
2.2.3 - ELECTRICAL WIRING
The electrical installation should be made in accordance with recognized maritime standards, e.g. American Boat and Yacht Council (ABYC), The American Bureau of Shipping (ABS), or Lloyd's Register. Only one electrical connection is required:

**External Compressor Blower** - 110 VAC The Blower has a regular household appliance connector at the end of the power cord. The electrical connector needs to be plugged into a GFI outlet that is on a 5 amp circuit breaker. If the **External Blower** is to be attached to an electrical branch by hard wiring it to an electrical box, electrical connections should be made using marine terminals (e.g. ring or captive spades) or butt connectors. Soldered connections or screw-type wire nuts should not be used.

2.2.4 - VENT LINES
The Vent Lines are an extremely important part of the installation. The MSD must be properly vented to ensure efficient operation. Vent Line connections are provided on top of the **Processing Tank and Treatment Tank**. Keep the following points in mind during installation:

- The **Processing Tank and Treatment Tank** can be optionally vented (to both port and starboard) to allow air to vent to either side of the vessel.
- **Vent Lines Should Maintain a Minimum of a 1 1/2 inch Diameter.**
- **Vent Lines** should exit on the system **vertically** if possible. This configuration will eliminate the possibility of water or liquid getting trapped in a horizontal vent during vessel roll or pitch.
- Vent through-hulls should be located no more than five feet above the treatment system.
- Vent Lines may not have sags or loops where water can accumulate and clog the vent.
- Position your vent through-hulls with care. Although a properly-operating, well maintained **MSD will NOT Smell Bad**, it would be wise to locate your through-hulls below and aft of sleeping areas, kitchen areas and high use areas.
- **Vent Lines MUST** remain free and clear for their entire length. Check valves or “filters” **Must Not be Used**. Condensation will accumulate in vent line filters, causing blockage, and possible malfunction of The MSD.

2.2.5 - AIR SUPPLY
The Most Important Item of Your System Is the Air Supply. The MSD sewage treatment unit must have a continuous air supply to operate effectively. Connect the vinyl hose from the **External Blower to the Processing Tank** at the air intake fitting located at the side of the unit **The External Blower Must Be Free Of Obstructions And Have An Ample Supply Of Free Air**. Make sure to use the supplied **External Compressor Blower** with The MSD.

**THE PROCESSING TANK MUST HAVE SUPPLY WHEN OPERATING.**
2.3 - STARTUP PROCEDURES FOR THE MSD

- Remove 3” clear Chlorine Cartridge cap on top of Treatment Tank.
- Attach filler hose to the water inlet on the Processing Tank and fill with clean water.
- Continue filling the Processing Tank until the water starts transferring to the Treatment Tank.
- Switch on the External Compressor Blower.

PROCESSING TANK MUST BE COMPLETELY FULL PRIOR TO INTRODUCING SEWAGE.

- Place enough chlorine tablets in the Treatment Tank chlorine contact cartridge to fill the cartridge.
- Replace the 3” cap on the Treatment Tank.
- Wear rubber gloves when handling the chlorine tablets.
- Follow the chlorine tablet handling guide lines and read the MSD’S sheet provided in Appendix 1.

THE MSD IS NOW READY TO PROCESS SEWAGE.

To speed up the digestion process, you can flush a packet of The MSD Activator into your toilet. This bacteria and nutrient rich mixture begins the biological process quicker than allowing the waste to begin naturally.

2.4 - SHUT DOWN PROCEDURES

When leaving the vessel unattended for more than three (3) months, the sewage treatment unit should be shut down. Ideally, the sewage treatment unit Processing Tank and biological filter should be pumped out and flushed with clean ‘water. However, the unit may be secured and left full of clean water if desired, by following the procedures given below.

- Close any valves going from the toilet/s.
- Connect water hose to the 1/2 inch water inlet on side of Processing Tank.
- Leave External Blower running.
- Open water hose valve about half way so clean water will flow continuously through the unit.
- Continue the clean water purging and aeration of the unit for at least 4 to 8 hours. This procedure will oxidize, dissolve, and flush the biological sludge so that the system will not become septic.

OR

- Remove all sludge from the Processing Tank and Treatment Tank, by pumping the sludge into an authorized waste disposal tank located at the marina.
- Continue flushing the system by filling the processing tank two to three times while pumping the tank out.
- Shut off power to External Blower.
- Close valve on pumpout (if equipped).

DO NOT USE ANY CHEMICALS TO CLEAN THE TANKS, CHEMICAL RESIDUE WILL KILL ANY BACTERIA INTRODUCED WHEN THE MSD IS RESTARTED. THE MSD IS READY FOR STORAGE.
THE EMI MSD INSTALLATION & OPERATION

PART 3- MAINTENANCE PROCEDURES

The MSD has been designed for minimal maintenance, and trouble-free operation. However, some simple maintenance should be performed to ensure that The MSD is operating at optimum conditions.

3.1 - DAILY, WEEKLY, MONTHLY INSPECTIONS

**Daily Checks:**
- External Compressor Blower is operational.

**Weekly Checks:**
- **Treatment Tank** chlorine cartridge full of chlorine tablets
- If installed, optional Discharge pumps functioning as required.

**Monthly Checks:**
- Inlet Filter on External Compressor Blower is clean and not clogged.
- Ensure all fittings are tight and not leaking.

3.2 - UNIT PUMPOUT AND FILTER FLUSHING

Occasionally the Processing Tank’s biological filter must be flushed out whenever a discharge sample no longer looks clean or has an unpleasant odor. The frequency of filter flushing will depend on the size of the unit and the properties of the sewage being treated. It is recommended that the unit be pumped out and flushed annually. Either the user, or a qualified service technician can perform this procedure. Be sure to wear protective clothing, including rubber gloves and splash-proof goggles, to minimize any exposure to wastes.

- After the tanks have been pumped out, remove the access hatches from the **Processing Tank**.
- Use a hose to flush clean water over the top of the biological filter media. Agitate the media so that as much loose sludge as possible can be washed off.
- Continue pumping and flushing out tank with clean water.
- It is not necessary to wash all the slime or sludge off the surface of the filter media.
- Repeat the flushing as often as necessary to clean out the biological filter.
- Fill the **Processing Tank** with fresh clean water until water begins transferring to the **Treatment Tank**.
- Shut off water supply.
- Close valves on pump out if (equipped).
- Reinstall access hatches.

The MSD in now ready to be put back into service.
3.3 GENERAL PREVENTIVE MAINTENANCE

- NEVER OPERATE THE MSD WITHOUT A CONTINUOUS AIR SUPPLY.
- Do not use toxic cleaning products that will poison the bacteria in the sewage treatment unit (Pine-Oil, Draino, Bleach, Disinfectants) etc... Ordinary soap, detergents, and shampoo will not poison the bacteria in the sewage treatment unit.

3.4 - Treatment System Do’s And Don’ts

For successful operation of The MSD, follow these guidelines:

**Do** - Read the Operating and Maintenance Manual.

**Do** - Operate according to the Manual.

**Don’t** - Flush Acidic or Caustic Materials down toilets, lavatories or basins.

**Don’t** - Flush unauthorized toilet bowl and Urinal Cleaners into the unit.

**Don’t** - Flush “Saruflush”, “Draino”, “Pineoil’, Chlorine Bleach or other similar products into the unit.

**Don’t** - Flush large amounts of Oils or Greases into the unit.

**Don’t** - Flush heavy Paper Towels, Sanitary Napkins, Cigarette Butts, Candy Wrappers or any other Extraneous Matter into the unit.

3.5 - APPROVED CLEANING PRODUCTS

To ensure optimal performance of The MSD, it is vitally important that only biodegradable cleaners be used for routine and general maintenance of the facilities using The MSD. Failure to follow these precautions will require immediate corrective action to return the system back to full services. The following cleaners are recommended for use with The MSD:

<table>
<thead>
<tr>
<th>USE</th>
<th>PRODUCT</th>
<th>MANUFACTURER</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Purpose</td>
<td>Mr. Clean</td>
<td>Proctor &amp; Gamble</td>
</tr>
<tr>
<td>Cleaning</td>
<td>Grease Relief</td>
<td>Texile</td>
</tr>
<tr>
<td></td>
<td>409</td>
<td>Clorox</td>
</tr>
<tr>
<td>Bathroom, Showers</td>
<td>Aerosol Bathroom Cleaner</td>
<td>DOW</td>
</tr>
<tr>
<td>Toilet Bowls</td>
<td>Bon Ami</td>
<td>Bon Ami</td>
</tr>
<tr>
<td></td>
<td>Enz1 7</td>
<td>Walton-March</td>
</tr>
<tr>
<td>Dishwashing Detergents</td>
<td>L.O.C. High Suds (6.50 pH)</td>
<td>Amway</td>
</tr>
<tr>
<td></td>
<td>Palmolive</td>
<td>Palmolive-PEAT</td>
</tr>
<tr>
<td></td>
<td>Dawn</td>
<td>Proctor &amp; Gamble</td>
</tr>
<tr>
<td></td>
<td>Cascade</td>
<td>Proctor &amp; Gamble</td>
</tr>
</tbody>
</table>

**CAUTION**

*ALL OF THESE CLEANSERS CAUSE SUDSING WHICH CAN CLOG VENT LINES USE MINIMAL AMOUNTS*  
**RECOMMEND CLEANING WITH CLEAN WATER ONLY**
DIGESTION ADDITIVES
Environmental Marine Inc. recommended digestion additives help in the Start Up and Operation of The MSD.

ENVIRONMENTAL MARINE ACTIVATOR - A nutrient rich mixture of Aerobic bacteria, enzymes, nitrogen and other ingredients in a powder form. This cocktail of ingredients are genetically engineered to multiply rapidly, making this product ideal for “kick-starting”

This product is a specially blended formula with added defoaming agent that is designed to Improve and maintain aerobic system performance. One 2 oz. Packet of Environmental Marine’s microbial formula contains approximately 300 billion bacterial organisms.

The recommended usage is 1 to 2 times a month depending on size and use of system.

Always follow the procedures when handling any chemical. Refer to the information sheets.

3.7 - TROUBLE SHOOTING

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause/Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad Odor, Black Water in Processing Tank</td>
<td>Not enough air/ CHECK External Compressor Blower</td>
</tr>
<tr>
<td></td>
<td>Toxic cleaning products killed bacteria/</td>
</tr>
<tr>
<td></td>
<td>DISCONTINUE USE</td>
</tr>
<tr>
<td>Discharge from Treatment Tank Not Chlorinated</td>
<td>Biological Filter clogged/Flush out Filter.</td>
</tr>
<tr>
<td></td>
<td>TOO MUCH sewage being put into the MSD/</td>
</tr>
<tr>
<td></td>
<td>Make sure the capacity of the MSD is not</td>
</tr>
<tr>
<td></td>
<td>Exceeded.</td>
</tr>
<tr>
<td></td>
<td>Not enough air/Check External Compressor Blower</td>
</tr>
<tr>
<td>External Compressor Blower Not Working</td>
<td>Circuit Breaker tripped/Reset Circuit Breaker</td>
</tr>
<tr>
<td></td>
<td>Check external Compressor Blower Plug</td>
</tr>
</tbody>
</table>
4.1 - SUMMARY OF REGULATORY REQUIREMENTS

United States Environmental Protection Agency (USEPA) -- The USEPA standards 40 CFR 140.3 states that in freshwater lakes, freshwater reservoirs or other freshwater impoundment’s whose inlets or outlets are such as to prevent the ingress or egress by vessel traffic subject to this regulation, or in rivers not capable of navigation by interstate vessel traffic subject to this regulation, Marine Sanitation Devices certified by the U.S. Coast Guard installed on all vessels shall be designed and operated to prevent the overboard discharge of sewage treated or untreated, or of any waste derived from sewage. The USEPA standards further state that this shall not be construed to prohibit the carriage of Coast Guard-certified flow-through treatment devices which have been secured so as to prevent such discharges. They also state that waters where a Coast Guard Certified Marine Sanitation Device permitting discharge is allowed including coastal waters and estuaries, the Great Lakes and interconnected waterways, freshwater lakes and impoundment’s accessible through locks, and other flowing waters that are navigable interstate by vessels subject to this regulation.

DISCHARGE REGULATIONS

United States

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>&lt;150 mg/L</td>
</tr>
<tr>
<td>Fecal Coliform Count</td>
<td>&lt;200 per 100 ml</td>
</tr>
<tr>
<td>5 Day BOD</td>
<td>&lt;50 mg/L</td>
</tr>
</tbody>
</table>

International Maritime Organization

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Suspended Solids</td>
<td>&lt;100 mg/L</td>
</tr>
<tr>
<td>Fecal Coliform Count</td>
<td>&lt;250 per 100 ml</td>
</tr>
<tr>
<td>5 Day BOD</td>
<td>&lt;50 mg/L</td>
</tr>
</tbody>
</table>

Some States and Regulatory Bodies may have even Stricter Requirements.

4.2 - USE OF CHLORINATED TABLETS

The only chemical needed for use in the MSD is chlorine tablets. The tablets are for use in the MSD and provide the right amount of chlorine to the Treatment Tank to disinfect the discharge. Make sure to follow the MSD’S sheet for use and handling of the tablets. Chlorine can be Caustic so Handle It With Care. Use the procedures below for filling the Treatment Tank chlorine tablet cartridge.

- Always use rubber gloves and splash-proof goggles when handling tablets
- Remove 3” clear chlorine tablet cartridge cap on top of Treatment Tank.
- Fill the Treatment Tank chlorine tablet cartridge with enough tablets to fill the cartridge.
- Replace 3” clear chlorine tablet cartridge cap on top of Treatment Tank.
BILL OF MATERIALS

A. 1 1/2” SEWAGE INLET
B. 3” SEWAGE INLET
C. 1 1/2” VENT
D. 1 1/2” PUMPOUT
E. 1/2” WATER OUTLET
F. 1/2” WATER INLET

G. 1 1/2” OUTLET
H. 1 1/2” INLET
I. 1 1/2” DISCHARGE
J. 3” CHLORINE CAPT
K. MOUNTING HOOKS

NOTE
ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WILL MOLDED POLYETHYLENE IMPERVIOUS TO ROT FROM WASTE
BILL OF MATERIALS

A. 1 1/2” SEWAGE INLET
B. 3” SEWAGE INLET
C. 1 1/2” VENT
D. 1 1/2” PUMPOUT
E. 1/2” WATER OUTLET
F. 1/2” WATER INLET
G. 1 1/2” OUTLET
H. 1 1/2” INLET
I. 1 1/2” DISCHARGE
J. 3” CHLORINE CAPT
K. MOUNTING HOOKS

NOTE
ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WILL MOLDED POLYETHYLENE IMPERVIOUS TO ROT FROM WASTE
BILL OF MATERIALS

A. 1 1/2” SEWAGE OUTLET
B. 3” SEWAGE INLET
C. 1 1/2” VENT (*)
D. 1 1/2” PUMP-OUT (*)
E. 1/2” AIR INLET
F. 1/2” OUTLET
G. 1 1/2” OUTLET
H. 1 1/2” INLET
I. 1 1/2” DISCHARGE
J. 3” CHLORINE CAP
K. MOUNTING HOOKS

*C. CAN BE VENTED EITHER SIDE
*D. CAN BE PUMP-OUT EITHER SIDE

NOTE
ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WALL MOLDED POLYETHYLENE IMPERVIOUS TO ROT FROM WASTE.
NOTE

ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WALL MOLDED POLYETHLELE IMPERVIOUS TO ROT FROM WASTE
BILL OF MATERIALS

A. 1 1/2” SEWAGE OUTLET  
B. 3” SEWAGE INLET  
C. 1 1/2” VENT (*)  
D. 1 1/2” PUMP-OUT (*)  
E. 1/2” AIR INLET  
F. 1/2” OUTLET  
G. 1 1/2” OUTLET  
H. 1 1/2” INLET  
I. 1 1/2” DISCHARGE  
J. 3” CHLORINE CAP  
K. MOUNTING HOOKS

*C. CAN BE VENTED EITHER SIDE  
*D. CAN BE PUMP-OUT EITHER SIDE

NOTE
ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WALL MOLDED POLYETHYLENE IMFPERVIOUS TO ROT FROM WASTE.
ENVIRONMENTAL MARINE, INC
EMI MSD MODEL 1600 – 16 PERSON
INSTALLATION EXAMPLE

NOTE
ALL EMI MSD UNITS ARE CONSTRUCTED OF HEAVY WALL MOLDED POLYEHTLENE IMPERVIOUS TO ROT FROM WASTE
## DRAWING & PARTS LIST

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Part No.</th>
<th>Description</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>C50146</td>
<td>Diaphragm Assembly</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>C50145</td>
<td>Diaphragm (Only)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>C50151</td>
<td>Head &amp; Valve Assembly</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>C56300</td>
<td>Air Cleaner*</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>C50213</td>
<td>Lock Screw</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>C53006</td>
<td>Plastic Cover (Air Cleaner)</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>C50101</td>
<td>Rubber Bumper</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>C50214</td>
<td>L-Tube</td>
<td>2</td>
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<tr>
<td>9</td>
<td>C50164</td>
<td>Micro Switch</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>C56008</td>
<td>Tank Gasket</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>C55002</td>
<td>Hose Kit (Includes 2 Clamps, 1 Hose, 1 Barb fitting)</td>
<td>2</td>
</tr>
</tbody>
</table>

*Not used on Vacuum Models

Note: "Motor Only" units do not include a power cord

## REBUILD KITS

<table>
<thead>
<tr>
<th>Model</th>
<th>Part No.</th>
<th>Qty.</th>
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</thead>
<tbody>
<tr>
<td>5030 &amp; 5040</td>
<td>C50278</td>
<td>2</td>
</tr>
<tr>
<td>5060</td>
<td>C50276</td>
<td>2</td>
</tr>
<tr>
<td>5070</td>
<td>C50277</td>
<td>2</td>
</tr>
</tbody>
</table>

## Warning:

Thomas compressors are precision-made, and carefully assembled and wired. Therefore do not disassemble or attempt to repair these products. Only qualified personnel should perform repair service.

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