

# Model 53 Macerator Pump Installation, Operation and Repair Manual

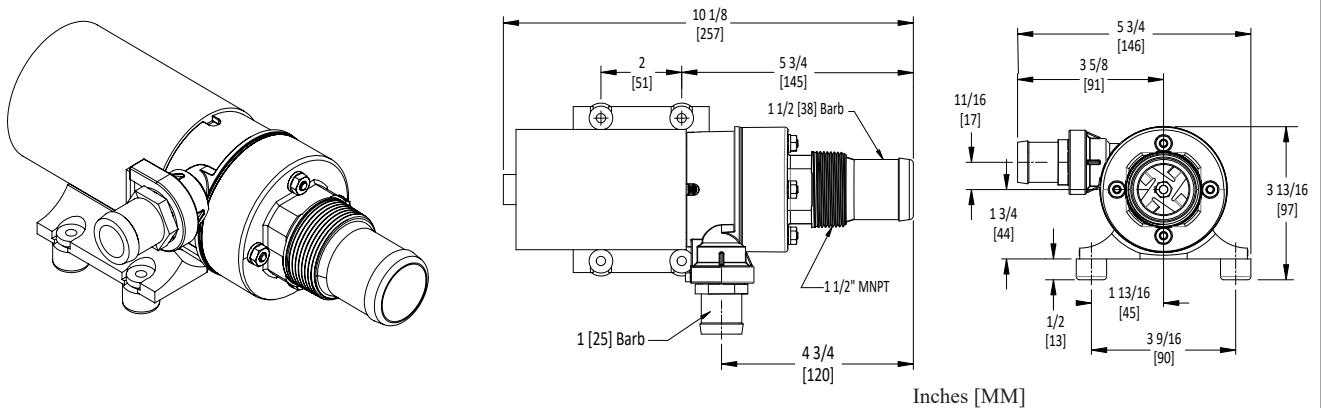
THE FOLLOWING ARE CAUTIONARY STATEMENTS THAT MUST BE READ AND FOLLOWED DURING BOTH INSTALLATION AND OPERATION

**WARNING:** *Raritan Engineering Company, Inc. Recommends that a qualified person or electrician install this product. Equipment damage, injury to personnel or death could result from improper installation. Raritan Engineering Company, Inc. accepts no responsibility or liability for damage to equipment, or injury or death to personnel, that may result from improper installation or operation of this product.*

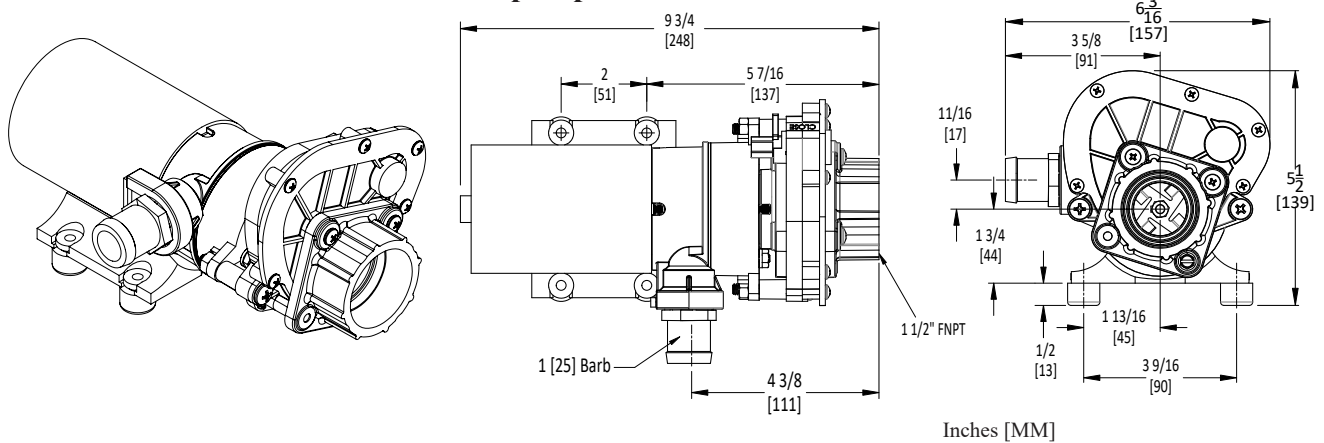
**WARNING:** ***RISK OF SHOCK OR FIRE** - If the pump is operated in an area containing flammable vapors, the wire leads must be joined by insulated mechanical locking connectors. Loose or inadequate wire connections can spark, resulting in an explosion resulting in property damage, injury, or death. Always use recommended fuse/circuit breaker and wire size.*

**WARNING:** ***Hazard of Flooding** - Any installation made below the waterline must have vented loops positioned properly and all hose connections should be double-clamped. Both intake and discharge seacocks should always be in the closed position when the toilet is not in use. Failure to do so may result in flooding, property damage and loss of life.*

**Macerator Pump 53100\*\***



**Macerator pump with Waste Valve 53101\*\***



\*\* Specify Voltage 12 (12 VDC) or 24 (24 VDC)



1-856-825-4900  
www.raritaneng.com

# OPERATION

Designed to empty marine and RV holding tanks of normal waste and fish boxes of scales and residual waste. The unique dual-cut blade design ensures waste is ground up thoroughly. Marine pump out must be in proper discharge zones only. This macerator will not handle hard objects, rags, or feminine napkins.

The optional Smart Macerator Control (SMC) monitors pump motor and prevents pump damage due to priming failure or dry running. It also protects motor against overload. If power to control is not turned off, smart control will prevent impeller sticking by jogging impeller once every seven days of non-use.

## PUMP IS INTERMITTENT DUTY ONLY!

- Make sure Waste valve to pump and discharge valve [if equipped] are both open. Turn on momentary switch and pump out tank.
- When tank is empty, pump will get louder with a high pitch sound. Immediately turn pump off, or damage to impeller and housing will occur. If pump is equipped with SMC, pump will turn off after 5 seconds of dry running
- If not equipped with SMC, do not run pump dry for more than 15 – 20 seconds. Flush tank and pump with water after each use. This macerator will handle normal waste, tissues, cigarettes, fish scales, etc. It is not designed to handle large hard objects such as large bones or fruit pits.

**Periodic Maintenance and Storage:** Flush with water after each use. Check wire connections occasionally. After periods of non-use, impeller can stick. To loosen, open rear shaft cover and turn motor shaft clockwise with a flat tip screwdriver. Then replace shaft cover. For extended periods of non-use, pump impeller can be lubricated by running a small amount of mineral oil through holding tank system.

**Maintenance:** Turn off all power!  
Rear end cap/ motor shaft slot access:  
Remove cap over the shaft

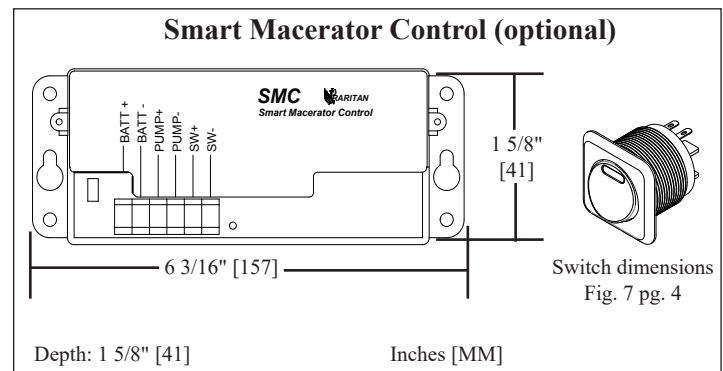
## Smart Macerator Control (SMC) (optional)

SMC monitors motor and pump to prevent dry run and overload.

Turn on switch (ESR03A) to activate Macerator Pump.

SMC control has following features:

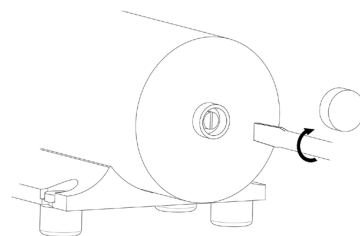
1. If pump does not prime within 7 seconds, SMC control will shut down the pump.
2. If pumps runs dry for 5 seconds, SMC control will shut down the pump.
3. If pump draws more than 20 amps, control will shut down pump.
4. LED at the switch and on the board will flash if there is shut down due to priming failure or dry run. LED will stay on if shutdown is due to overload. SMC control can be reset by turning off and on switch. Power need not be turned off.
5. If power is not turned off to the control, control will jog macerator pump for few milliseconds every seven days if non use to prevent binding of impeller.



**NOTE:** This jog feature will function when switch is in the OFF position.

## A Maintenance Tip!

Loosen stuck impeller by turning motor shaft clockwise from rear with a flat-tipped screwdriver.



## PLUMBING

### Plumbing Connections

Pump should be mounted as near as possible to tank to minimize dry run. Pump is self-priming to a five-foot lift when impeller is wet, four foot lift when impeller is dry. Pump is more efficient if mounted near the holding tank.

**INLET:** For model 53100: Always install pump with a shut-off valve between pump and holding tank. Model 53101 includes an integral wastewater valve.

**HOSE:** Use 1-1/2" ID [non-collapsible vacuum rated] hose on inlet [suction] side. Use stainless steel hose clamps on all sanitation connections.

**1 1/2" MPT:** For model 53100: The 1 1/2" MPT can be used for connecting directly to 1 1/2" FPT tank flange or 1 1/2" FPT fittings. The inlet barb must be cut off just before the threads (see FIG 1). Seal threads and hand tighten.

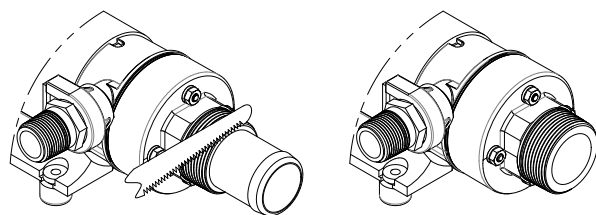
For model 53101: Use 1 1/2" threaded nipple between FPT flange and waste valve. Use thread sealant to tighten joints.

**WARNING:** Any air leak on inlet side can cause pump to run dry and can damage impeller and impeller housing. Check all inlet side connections, even those on deck plates. All runs should be smooth with no kinks or sharp angles.

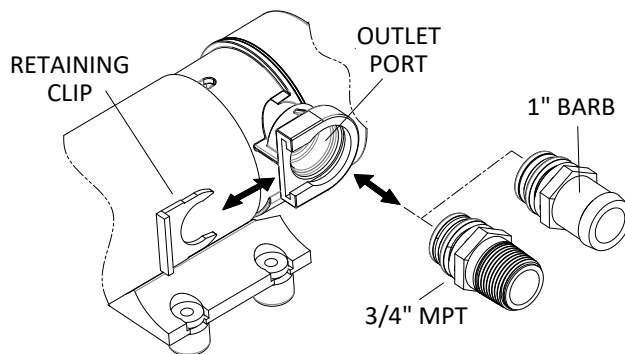
**OUTLET:** Two outlet fittings are included, 1" barb (for 1" ID hose) and 3/4" MPT. Insert the fitting into outlet port and insert retaining clip. Install a 1" shut-off valve between pump quick disconnect and hose. Connect to thru-hull fitting above highest heeled point above waterline. Vented loop installations must vent above highest heeled point above waterline (see WARNING).

Use stainless steel hose clamps on all sanitation connections.

**FIG 1** Installing 1 1/2" MPT



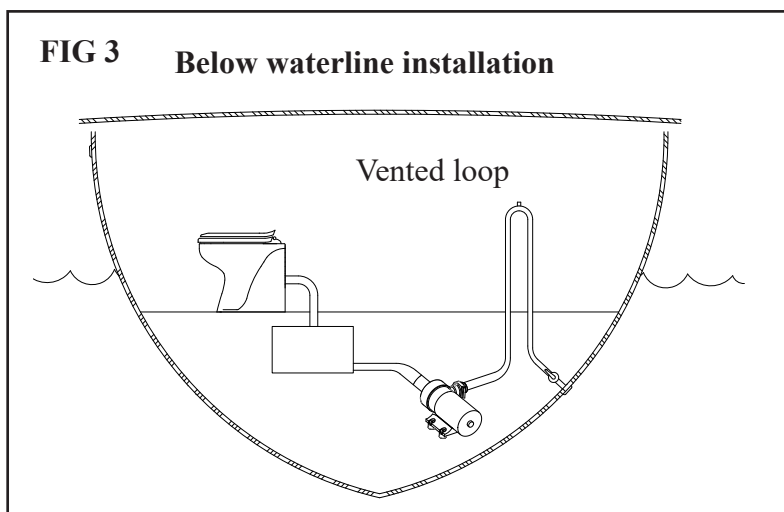
**FIG 2** Quick Disconnect



### WARNING: HAZARD OF FLOODING

- Installations at or below waterline, at greatest angle of heel, **MUST** have a **VENTED LOOP** installed between the Pump's Discharge and Seacock/Thru Hull Fitting. Install vented loop per manufacturer's instructions.
- **Double clamp** all below waterline hose connections.

**FIG 3** Below waterline installation



## WIRING

### WARNING: Hazard of Shock and Fire

- Always use proper wire, wire connectors and fuse/circuit breaker. See Specification Chart.
  - Secure wire properly.
  - Do not connect other equipment to macerator circuit.
  - Make sure power is off before proceeding.
  - Use proper wire terminals if needed for all wire connections.
1. Determine proper wire size by measuring distance from:
    - Power Source to switch to pump motor and back to power source.
    - For models with Smart Macerator Control, include distance from power source to controller to pump and back.
  2. Select proper wire and fuse/circuit breaker size from Specifications on Installation page.
  3. Install fuse/circuit breaker in positive line at source.

### Wiring with ON\_OFF switch (FIG 5):

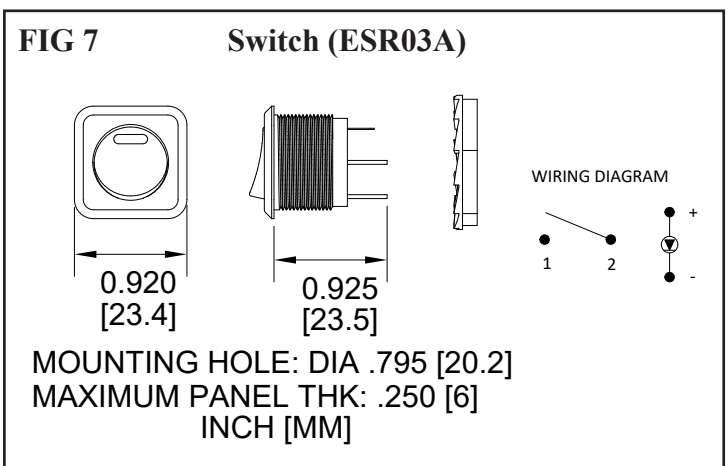
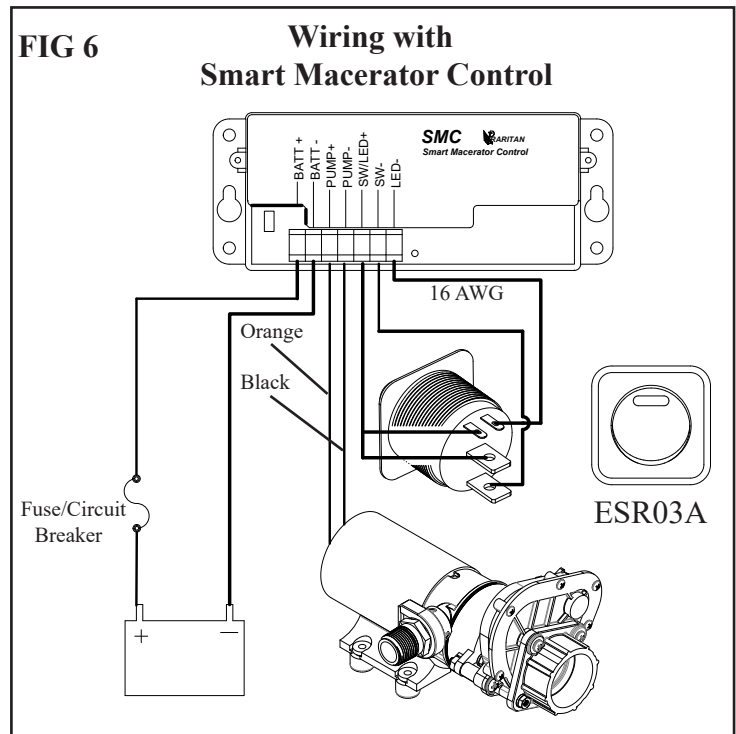
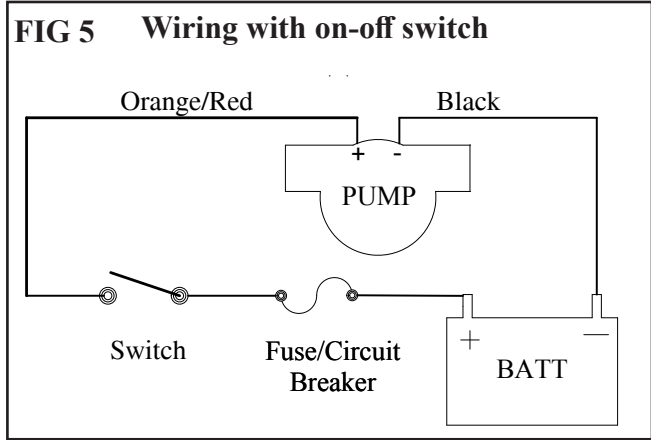
- NOTE:** Switch is not included. Mount switch near macerator pump so that operator can hear change in pump sound when tank is empty. If mounting in area where ignition protection is required use only ignition protected switch.
4. Wire as per Fig 5.

### Wiring with Optional Smart Macerator Control (FIG 6):

- NOTE:** Switch (ESR03A) included with SMC, should only be installed in area **not** requiring ignition protection. Wires needed between switch and control are not included (FIG 7)

5. Wire as per FIG 6.

- NOTE:** Reverse polarity will run pump as soon as power is turned on even if switch is not on. Power must be turned off immediately (within 2 minutes) and polarity should be corrected to avoid permanent damage to the control.



## Product Specifications

# SPECIFICATIONS

|                    |   |
|--------------------|---|
| <b>PUMP:</b>       | Self priming Flexible rubber impeller with Stainless steel wear plate   |
| <b>Impeller:</b>   | Raritan Nitrile compound with wax   |
| <b>Blade:</b>      | Stainless steel double cut  |
| <b>Seal:</b>       | Viton Lip with 316 SS spring and case   |
| <b>Motor:</b>      | Permanent magnet type, fully enclosed, stainless steel shaft, thermal protection for overload, Powder coated housing with sealed ball bearing   |
| <b>Ports:</b>      | <p><b>Model 53100**:</b><br/>Inlet: 1-1/2" hose barb &amp; 1-1/2" MNPT Male</p> <p><b>Model 53101**:</b><br/>Inlet: 1-1/2" FNPT</p> <p><b>Both Models:</b><br/>Outlet: 3/4" MNPT and 1" hose barb</p> |
| <b>Lead wires:</b> | 14 GA, Red and black  |
| <b>Fuse:</b>       | See wire size chart   |
| <b>Duty Cycle:</b> | Intermittent duty only  |
| <b>Dimensions:</b> | See page 1  |
| <b>Weight:</b>     | 5 lbs.  |
| <b>Approvals:</b>  | Ignition protected, ISO 8846, CE compliant available  |

| HEAD VS FLOW RATES |                  |             |     |  |
|--------------------|------------------|-------------|-----|--|
| Head<br>Ft [m]     | Flow<br>gpm[lpm] | Max DC Amps |     |  |
|                    |                  | 12V         | 24V |  |
| 0 [0]              | 11[42]           | 10.9        | 5,4 |  |
| 5 [1.5]            | 10.1[38]         | 11.1        | 5.6 |  |
| 10 [3]             | 9[34]            | 11.4        | 5.8 |  |
| 15 [4.6]           | 7.7[29]          | 11.8        | 5.9 |  |
| 20 [6.1]           | 6.4 [24]         | 12.3        | 6.2 |  |

Maximum Operating Head = 30 feet  
Lift: 4 ft [1.2 m] Dry  
5 ft [1.5 M] Wet

| CONVERSIONS                   |     |     |     |     |      |      |      |      |
|-------------------------------|-----|-----|-----|-----|------|------|------|------|
| Wire - AWG to mm <sup>2</sup> |     |     |     |     |      |      |      |      |
| AWG                           | 16  | 14  | 12  | 10  | 8    | 6    | 4    | 2    |
| mm <sup>2</sup>               | 1.5 | 2.5 | 4.0 | 6.0 | 10.0 | 16.0 | 25.0 | 35.0 |

| Feet to Meters |     |     |     |     |     |      |      |
|----------------|-----|-----|-----|-----|-----|------|------|
| Ft             | 10  | 15  | 20  | 25  | 30  | 40   | 50   |
| M              | 3.1 | 4.6 | 6.1 | 7.6 | 9.2 | 12.2 | 15.2 |

**Notes:**

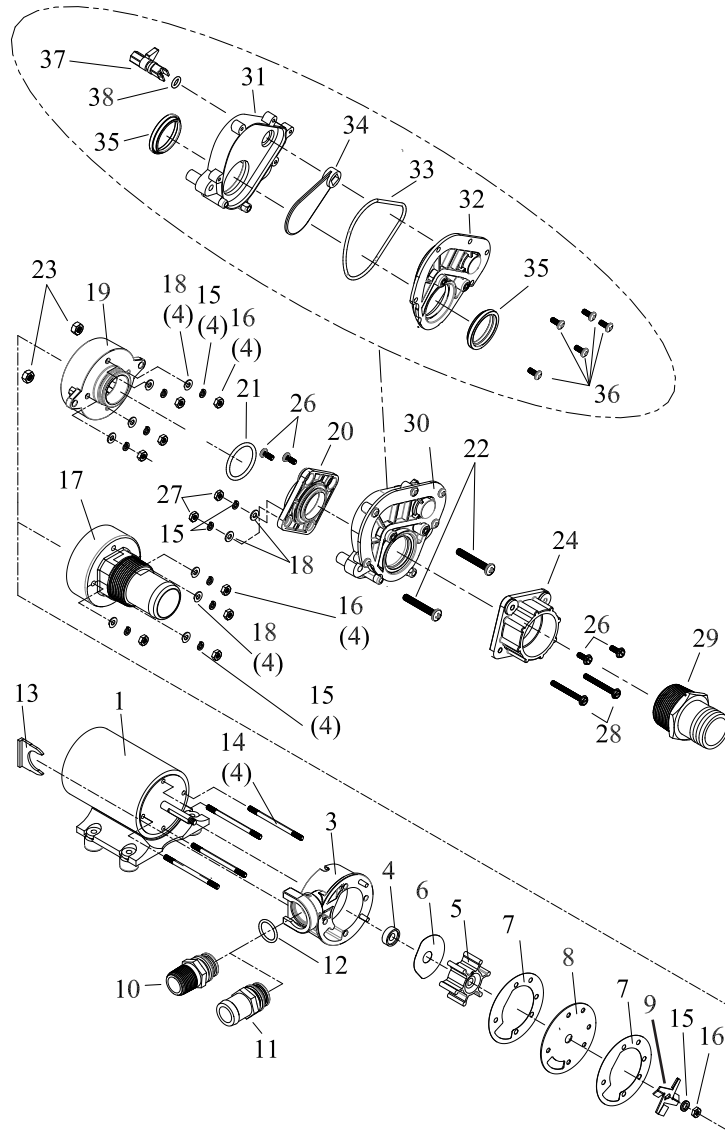
1. Distances are from source to the unit and back to source.
2. Recommended conductor wire minimum AWG for 3% voltage drop.
3. Recommended conductor sizes are based on 105°C rated insulation. Refer to ABYC standards for other insulation ratings.

### Recommended Wire and Breaker size for Macerator pump

| Units Voltage | Circuit Breaker/<br>Fuse sizes(AMPS) | Macerator amps @<br>nominal voltage | 10<br>Feet | 20<br>Feet | 30<br>Feet | 40<br>Feet | 50<br>Feet |
|---------------|--------------------------------------|-------------------------------------|------------|------------|------------|------------|------------|
| 12V           | 25                                   | 16                                  | 12AWG      | 10AWG      | 8AWG       | 6AWG       | 6AWG       |
| 24V           | 15                                   | 8                                   | 14AWG      | 10AWG      | 10AWG      | 8AWG       | 6AWG       |

\*\* Specify Voltage 12 (12 VDC) or 24 (24 VDC)

# EXPLODED PARTS VIEW



## Repair Kits:

53100RK: Includes 4,5,7,12

53101RK: Includes 4,5,7,12,21,33,35,38

## Part List

No. Part# Description

|    |         |                                  |
|----|---------|----------------------------------|
| 1  | 53105** | Motor                            |
| 3  | 53110W  | Pump Housing (includes 4,12)     |
| 4  | 31-102  | Shaft Seal                       |
| 5  | 53120W  | Impeller (includes 2 of #7)      |
| 6  | 53130   | Wear Plate, SS                   |
| 7  | 53135   | Gasket                           |
| 8  | 53140   | Pump Cover, SS                   |
| 9  | 53145   | Macerator Blade, SS              |
| 10 | 53166   | Discharge Adapter 3/4 - 14 MNPT  |
| 11 | 53168   | Discharge Adapter 1" Insert      |
| 12 | 53169   | O-ring, Discharge Adapter Nipple |
| 13 | 53167   | Discharge Adapter Retaining Clip |
| 14 | 53160   | 10-32 x 3" Stud                  |
| 15 | M23A    | #10 Lock Washer, SS              |
| 16 | 1108A   | 10-32 Nut SS                     |
| 17 | 53156   | Teeth Housing                    |
| 18 | F144    | #10 18-8 SS Flat Washer          |

|                            |        |                                     |
|----------------------------|--------|-------------------------------------|
| 19                         | 53155  | Teeth Housing                       |
| 20                         | 53165  | Pump Adapter                        |
| 21                         | 25103  | Pump Adapter O Ring                 |
| 22                         | F326   | 1/4-20 x 1 3/4" Hex CAP Head Screws |
| 23                         | 1226B  | 1/4 " SS Nut                        |
| 24                         | 53180  | WVA Adapter 1 1/2" FNPT             |
| 26                         | 53181  | 10-32 x 1/2" Adapter Screws         |
| 27                         | 53183  | 10-24 Nut SS                        |
| 28                         | 53182  | 10-24 x 1 3/4" Adapter Screw        |
| 29                         | 31-121 | 1 1/2" Male Adapter                 |
| WASTE VALVE ASSEMBLY (WVA) |        |                                     |
| 30                         | 53170  | 1 1/2" WVA Assy.                    |
| 31                         | 53171  | WVA Housing                         |
| 32                         | 53174  | WVA Cover                           |
| 33                         | 53176  | WVA Housing O-ring                  |
| 34                         | 53172  | WVA Valve Gate                      |
| 35                         | 53179  | WVA Adapter Seals                   |
| 36                         | F403   | 8-16 x 1/2" Screw                   |
| 37                         | 53175  | WVA Shaft                           |
| 38                         | 53173  | WVA Shaft O-ring                    |

\*\*Specify Voltage 12 or 24

**Maintenance:** If pump is not used for long period, impeller may bind to the pump housing causing overload. Impeller can be freed by turning the motor shaft (FIG 8)

**CAUTION:** Turn off all power prior to removing the plastic cap and rotating shaft with a screw driver.

**Note:** *Smart macerator control will jog the shaft every 7 days of non-use automatically preventing binding.*

**Pump disassembly:**

Model 53101\*\*:

Using a 7/16" wrench, close the inlet waste valve by turning the shutoff nut clockwise to the closed position (FIG 9). Remove two screws (FIG 10). Slowly, pull waste water valve away from the pump.

Model 53100\*\*:

Disconnect inlet hose.

All models:

Shutoff discharge valve if installed.

Remove clip (13) and remove fitting (10/11) .

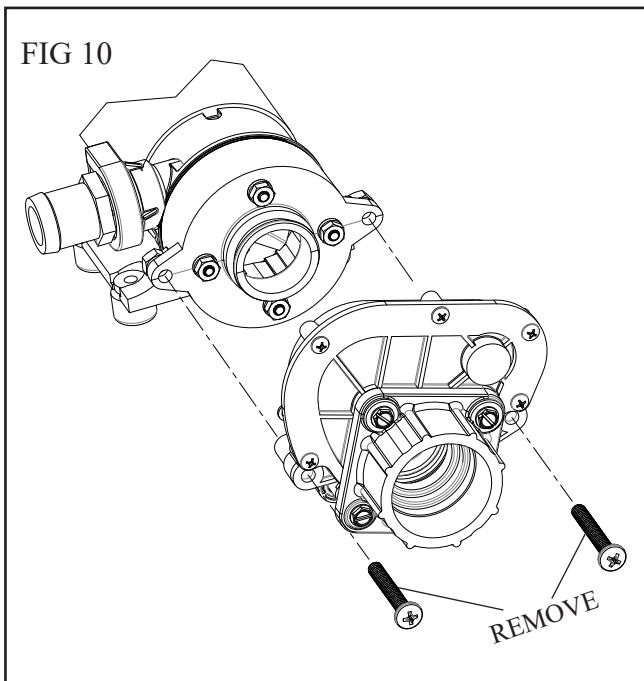
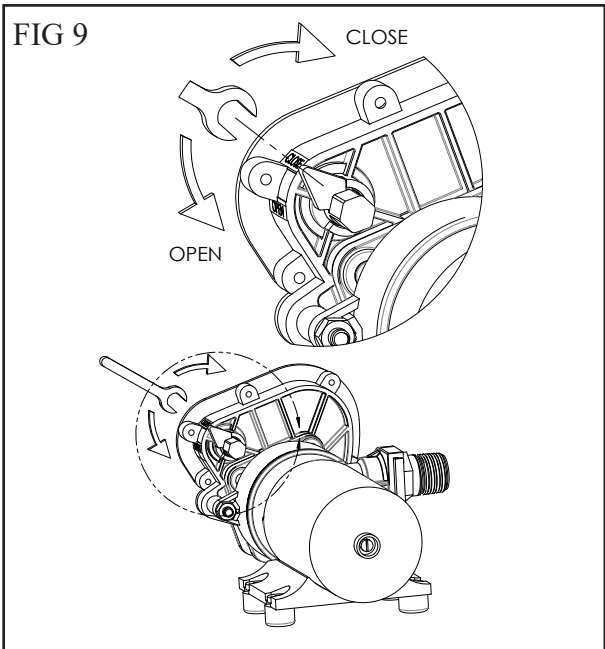
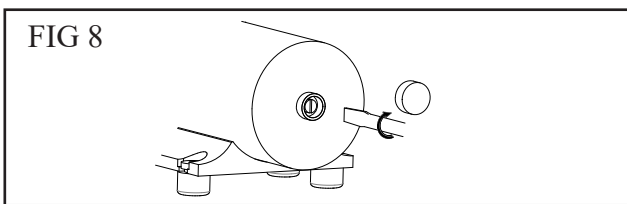
Pump can be unbolted and removed for disassembly to a convenient location.

Remove 4 cover screws (14). Remove housing (19 or 17)) and O-ring (3). Remove hex nut (16) and cutter blades (9). It may be necessary to hold the motor shaft steady. Insert a screwdriver into slot on motor shaft (see slot access above), or slip a thin wrench (9/32" [7mm]) behind blades onto flat of motor shaft. Remove top wear plate (8), gasket (7), impeller (5) and bottom wear plate (6). Remove impeller housing (3) and shaft seal (4).

**Pump reassembly:**

Follow disassembly in reverse order.

Tip: Turn rubber impeller counter clockwise to install in the housing.



\*\* Specify Voltage 12 (12 VDC) or 24 (24 VDC)

## TROUBLESHOOTING

### 1. Pump makes loud noise:

Make sure pump is not running dry.

### 2. Pumps runs but does not empty tank:

Impeller may be worn or broken, replace impeller.

### Smart control: (FIG 11)

#### 1. Pump shuts down after 7 seconds and LED is blinking:

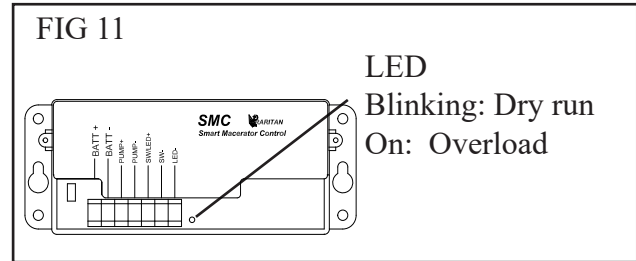
Pump ran dry.

Check for water level and check for any leaks in the input plumbing.

#### 2. Pump shuts down and LED is ON:

Motor is overloaded.

Pump may have some foreign object lodged in the macerator, or broken impeller.



## LIMITED WARRANTY

Raritan Engineering Company warrants to the original purchaser that this product is free of defects in materials or workmanship for a period of one year from the product's date of purchase. Should this product prove defective by reason of improper workmanship and/or materials within the warranty period, Raritan shall, at its sole option, repair or replace the product.

1. TO OBTAIN WARRANTY SERVICE, Consumer must deliver the product prepaid, together with a detailed description of the problem, to Raritan at 530 Orange St., Millville, N.J. 08332. When requesting warranty service, purchaser must present a sales slip or other document which establishes proof of purchase. THE RETURN OF THE OWNER REGISTRATION CARD IS NOT A CONDITION PRECEDENT OF WARRANTY COVERAGE. However, please complete and return the owner Registration Card so that Raritan can contact you should a question of safety arise which could affect you.
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530 Orange Street, Millville, NJ 08332 USA  
Telephone: 856-825-4900 FAX: 856-825-4409  
www.raritaneng.com